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A MODEL OF ENVIRONMENTAL EDUCATION RESEARCH PROMOTION

JINTANAPA SOBHON

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of
บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล

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Thesis
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Jintanapa Sobhon
.....
Mrs. Jintanapa Sobhon
Candidate

Sirichai Chinatangkul
.....
Assoc. Prof. Sirichai Chinatangkul, Ph.D.
Major-Advisor

.....
Assoc. Prof. Vinai Veeravatnanond, Ph.D.
Co-Advisor

Warapan Noisuwan
.....
Mrs. Warapan Noisuwan, Ph. D.
Co-Advisor

Rassmidara Hoonsawat
.....
Assoc.Prof.Rassmidara Hoonsawat, Ph.D.
Dean
Faculty of Graduate Studies

C. Manee
.....
Assoc. Prof. Manee Chaiteeranuwatsiri, Ph.D.
Chair
Doctor of Education Programme
in Environmental Education
Faculty of Social Sciences and Humanities

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A MODEL OF ENVIRONMENTAL EDUCATION RESEARCH PROMOTION

was submitted to the Faculty of Graduate Studies, Mahidol University for the Degree of Doctor of Education (Environmental Education)

on

September 30, 2002

Jintanapa Sobhon
.....
Mrs. Jintanapa Sobhon
Candidate

Sirichai Chinadangkul
.....
Assoc. Prof. Sirichai Chinatangkul, Ph.D.
Chair

.....
Prof. Choompol Swasdiyakorn, Ph.D.
Member

.....
Assoc. Prof. Vinai Veeravatnanond, Ph.D.
Member

.....
Assoc. Prof. Manee
Chaiteeranuwatsiri, Ph.D.
Member

Warapan Noisuwan
.....
Mrs. Warapan Noisuwan, Ph. D.
Member

.....
Assoc. Prof. Rassmidara Hoonsawat,Ph.D
Dean
Faculty of Graduate Studies
Mahidol University

Suree Kanjanawong
.....
Assoc.Prof.Suree Kanjanawong, Ph.D.
Dean
Faculty of Social Sciences and Humanities
Mahidol University

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The research objective was to construct a model of environmental education research promotion.

The research was considered to be policy research so its methodology was firstly by construction a model proposal through documentary and in-depth interviews which was then evaluated by 14 experts with IOC analysis. The model proposal was tested before the second evaluation by 452 tri-research members in the field of environmental education research comprising 114 research supporters, 160 researchers and 178 research output applicators. Then, the complete model was constructed through data analysis, selection and articulation based on the tri-research member congruence and arithmetic mean ($\bar{x}$). Finally, the model efficiency evaluation was performed by 23 experts in environmental education research. The research analysis was done through SPSS PC program with research statistics of IOC, percentage, arithmetic mean ($\bar{x}$) and standard deviation (S.D.).

The research findings revealed that most experts and tri-research members obtained congruence in components and contents of the environmental education research promotion model. There were ten model components as follow: (1) research polity, united and clarified direction; (2) researcher, high quality and adequate motivation; (3) research budget, adequate and fluent; (4) research organization, specialized unit; (5) research information, material and equipment, modern forms and efficient network; (6) research performance, supportive condition for research; (7) research output, quality and highly concentrate application; (8) research output distribution, various and effective approaches based target group; (9) research output application, various forms; (10) research evaluation, continued and effective action at all levels. Each part of the promotion model covered five aspects: principle/concept, purpose, measure/ guideline, strategy/means and indicator. The target groups of the research promotion model had to cover all three groups related to environmental education research - research supporters, researchers and research output applicators. This is the reason why the research promotion model has been called the 10:5:3 model of environmental education research promotion. Furthermore, the model should be implemented firstly at the national policy through Ministry of Education as a core leader to all performance levels in society.

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จินตนาภา โสภณ : รูปแบบการส่งเสริมการวิจัยทางสิ่งแวดล้อมศึกษา (A MODEL OF ENVIRONMENTAL EDUCATION RESEARCH PROMOTION) คณะกรรมการควบคุมวิทยานิพนธ์ : ศิริชัย ชินะ-ตังกูร, Ph.D., วินัย วีระวัฒนานนท์, Ph.D., วราพรรณ น้อยสุวรรณ, Ph.D., 268 หน้า ISBN 974-04-2661-1

การวิจัยครั้งนี้เป็นการวิจัยเชิงนโยบายโดยมีวัตถุประสงค์เพื่อสร้างรูปแบบการส่งเสริมการวิจัยทางสิ่งแวดล้อมศึกษา โดยมีขั้นตอนและวิธีการวิจัย ดังนี้ การยกร่างรูปแบบใช้วิธีการศึกษาเอกสารร่วมกับการสัมภาษณ์เจาะลึกและพิจารณาประเมินรูปแบบฯ ฉบับร่าง โดยผู้เชี่ยวชาญที่เกี่ยวข้อง จำนวน 14 ราย ใช้ค่า IOC ในการวิเคราะห์แล้วนำรูปแบบฯ ที่ได้ในขั้นนี้ในรูปของแบบสอบถามไปทดลองให้ผู้เกี่ยวข้องที่ไม่ใช่กลุ่มตัวอย่าง เพื่อหาค่าความเชื่อมั่นของแบบสอบถามก่อนนำไปให้กลุ่มตัวอย่างผู้เกี่ยวข้องกับการวิจัยทางสิ่งแวดล้อมศึกษาทั่วประเทศหรือไตรภาคีการวิจัยโดยสุ่มตัวอย่างแบบเจาะจง จำนวน 550 ราย และได้รับความร่วมมือจากกลุ่มผู้สนับสนุนการวิจัย จำนวน 114 ราย กลุ่มผู้ทำวิจัย จำนวน 160 ราย และกลุ่มผู้ใช้ผลงานวิจัย จำนวน 178 ราย รวมทั้งสิ้น 452 ราย ทำการประเมินรูปแบบฯ แล้วนำผลการประเมินมาวิเคราะห์ สังเคราะห์ คัดเลือกและจัดเรียงลำดับตามความเห็นที่สอดคล้องกันทั้ง 3 กลุ่ม และตามค่าเฉลี่ย ได้รูปแบบที่ชัดเจน สมบูรณ์ยิ่งขึ้นแล้วนำรูปแบบการส่งเสริมการวิจัยทางสิ่งแวดล้อมศึกษาให้ผู้ทรงคุณวุฒิที่เกี่ยวข้องกับการวิจัยทางสิ่งแวดล้อมศึกษา 23 ท่าน ประเมินประสิทธิภาพของรูปแบบในขั้นสุดท้ายเพื่อความเหมาะสมและความน่าเชื่อถือ การวิจัยครั้งนี้ทำการวิเคราะห์ข้อมูลด้วยโปรแกรม SPSS PC หาค่า IOC ค่าร้อยละ ค่าเฉลี่ย และส่วนเบี่ยงเบนมาตรฐาน

ผลการวิจัยพบว่า

ผู้เชี่ยวชาญที่เกี่ยวข้อง กลุ่มไตรภาคีการวิจัยทางสิ่งแวดล้อมศึกษาและผู้ทรงคุณวุฒิที่เกี่ยวข้องส่วนใหญ่เห็นด้วยมากและมีความเห็นสอดคล้องกันทั้งในเรื่ององค์ประกอบและเนื้อหาสาระของรูปแบบการส่งเสริมการวิจัยทางสิ่งแวดล้อมศึกษา ซึ่งประกอบด้วยส่วนสำคัญ 2 ส่วน คือ ส่วนที่เป็นองค์ประกอบการส่งเสริมการวิจัย จำแนกเป็น 10 ด้าน โดยสรุปสาระสำคัญในแต่ละด้าน ได้ดังนี้ (1) ด้านนโยบายการวิจัย ให้มีเอกภาพและทิศทางชัดเจน (2) ด้านนักวิจัย ให้มีคุณภาพและสิ่งจูงใจเพียงพอ (3) ด้านงบประมาณ ให้มีเพียงพอและคล่องตัว (4) ด้านองค์กร/หน่วยงานวิจัย ให้มีหน่วยงานวิจัยเฉพาะทาง (5) ด้านข้อสนเทศ วัสดุ อุปกรณ์การวิจัย ให้มีเครือข่ายที่มีประสิทธิภาพ มีวัสดุ อุปกรณ์ที่ทันสมัย (6) ด้านการดำเนินการวิจัย ให้มีสภาพที่เอื้อต่อการทำวิจัย (7) ด้านผลงานวิจัย ให้มีคุณภาพและใช้ประโยชน์อย่างจริงจัง (8) ด้านการเผยแพร่ประชาสัมพันธ์ ให้มีความหลากหลายและมีประสิทธิภาพตามกลุ่มเป้าหมาย (9) ด้านการนำผลงานวิจัยไปใช้ประโยชน์ ให้มีการนำไปใช้อย่างหลากหลายรูปแบบ (10) ด้านการติดตามประเมินผลการวิจัย ให้มีประสิทธิภาพทุกระดับอย่างต่อเนื่อง

ส่วนที่เป็นองค์ประกอบของรูปแบบฯ 5 องค์ประกอบ คือ หลักการ/แนวคิด จุดมุ่งหมาย มาตรการ/แนวทาง กลยุทธ์/วิธีการ และดัชนี โดยที่องค์ประกอบทั้ง 5 นี้จะแทรกอยู่ในแต่ละด้านทั้ง 10 ด้าน ที่ทำการส่งเสริมการวิจัยทางสิ่งแวดล้อมศึกษา

การสร้างรูปแบบการส่งเสริมการวิจัยทางสิ่งแวดล้อมศึกษาครั้งนี้จึงเป็นรูปแบบที่เกี่ยวข้องกับผู้ส่งเสริมสนับสนุนการวิจัย และผู้รับการส่งเสริมการวิจัย ได้แก่ ผู้ทำวิจัยและผู้ใช้ประโยชน์ผลงานวิจัย จึงเรียก 3 กลุ่มนี้ว่าไตรภาคีการวิจัย ดังนั้นอาจเรียกรูปแบบที่สร้างขึ้นนี้ย่อ ๆ ว่ารูปแบบการส่งเสริมการวิจัยทางสิ่งแวดล้อมศึกษา 10 ด้าน : 5 องค์ประกอบ : 3 กลุ่ม หรือรูปแบบ10:5:3

นอกจากนี้ยังพบว่าการนำรูปแบบฯ ไปใช้ควรเริ่มต้นจากระดับนโยบายของประเทศ โดยมีกระทรวงศึกษาธิการเป็นแกนนำในการดำเนินการนำรูปแบบฯ ไปใช้ตั้งแต่ระดับนโยบายถึงระดับปฏิบัติ

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CHAPTER I
INTRODUCTION

1.1 Rational and Justification

A research is considered to be as a tool for knowledge and technology development which lead to national development as well or we can say that a research leads to the summit of knowledge. Otherwise, a research is always arranged with the great number of resources and being the most significant of state policy which has to get a special support for national progress, sustainable self-reliance and competition ability in the world.

Thailand, for many decades, tried to push the research importance in any parts of society being a tool for national development as the first 6 national constitutions facing to the research importance for national development.

In spite of research has been appointed in state policy of the national constitutions, however, it is difficult to follow because they have always been changed and the politicians were less interested in national wisdom research. Thus, guidelines of national research promotion were attempted to specify in the Fifth, the Sixth, the Seventh, the Eighth, and the Ninth National Economic and Social Development Plan as well as the National Research Policy And Guidelines have been performed by The Office of The National Research Council of Thailand since 1977, 6 editions totally. At government present, facing crisis of economic regression, economic development onlunder knowledge base is considered essential emphasizing on establishing body of knowledge from studying, searching and researching. Besides, the national constitutions 1997 are emphasized on varieties of art and science research and urgent improving science and technology for national development. As The National Education Act 1999 supported research in order to specify the policies of organization development, body of knowledge development and problem solving and protecting which will increase research training especially in classroom research. Consequently, research that is essential and mentioned for national development tool in economic and social, takes the most important role as producing output as a social investment which is sustainable self-reliance.

As having know that the major cause of natural resource and environmental deterioration is the national development in 40 years earlier, as it is said that ***"Good economic with social and environmental problems and unsustainable development"***. Every national ecosystems has been failed continuously. Even though, His Majesty the King is interested, understanding and well-informed in natural resources and environmental problems however, for over 53 years his attempt to solve these problems by inclining the government and the people to protect natural resources and environment has failed, especially, deforestation protection. (Ampol Senanarong, (1997: 2-4) However, many scholars suggested to use crucial to be national development opportunity, such as Pravet Wasri (2001: 2) gave the idea that

managing innovation is urgently required upon present crisis and globalization to give a chanee for humankind to emphasize on sustainable ability in national natural resources and environment management. Thus, in the Ninth National Economic and Social Development Plan, The Office of the National Economic and Social Development Board (2000: 41,63) specified the strategy of resources and environment administration based on "Sufficient Economical Philosophy" that depends on participants process, especially social process for making community and nation immunity. The most important process is intelligent process or educational process, which people in all levels to realize and have conscious mind on natural resources and environment preservation as well as next problem protection, that is environmental education process. The main content of this strategy making steady social base, consists of major development guideline concerning with environmental education. This guideline is to increase the efficiency of natural resources and environment administration by individual development for life quality and national environment preservation. Besides, all education systems are considered to be a dynamic of performing knowledge and improving behavior for natural resources and environment preservation sustainably, that is environmental education offering.

Since 1978, environmental education has obviously appeared in Thai education system, which is influenced on international organizations, environment problems in Thailand, and awareness of environmental private organizations and private sectors. Many environment courses were employed for primary to high school in all sections. As being the fundamental courses in higher education, moreover, they were lectured for bachelor's degree, master's degree and doctor's degree. Serious interested in environmental education, model scheme of environmental education project was formed (1991-1996) by Ministry of Education and was announced in February 1991. Besides, there were other organizations together responded in giving the environment knowledge to people, included private organizations, environment private sector, and many media. Though, people have been given the environment knowledge for 20 years now, however the problems which haven't been reduced, still critical because people don't aware of it and have no skills to prevent and solve these problems. That is because, the curriculum lacks of integration, content continuity, suitable activities, personnel, budget, as well as problems of teaching techniques and coordination. Thus, all mentioned problems should be improved immediately. (Raphiphan Suwannatthachote, 2000: 281)

Vinai Veeravatnanond. (1996: 2) addressed the difficulties of environmental education procedure as follows: carry on the Environment studied followed

(1) Lacking of environmental data-based number of data, and network of Thailand.

(2) Lacking of empirical continuity of environment education curriculum in school systems.

(3) Lacking of environment authorities:- environment researchers, environment teachers, environment planners, and person who collects local environmental information.

(4) Lacking of organization co-ordination in education administration coordination among various education institutes included as well as unclear policy and environment plan of other levels of education institutes.

(4) Lacking of organization co-ordination in education administration coordination among various education institutes included as well as unclear policy and environment plan of other levels of education institutes.

(5) Uncertain environment policy of politician in Ministry of Education and the distinguish of its administrators interesting cause uncontinue focus and policy.

Research being body of knowledge base in national development, offering environment education is the problem that causes administration strategy. Meanwhile, environmental education research is one major components which guides empirical direction for environmental education administration included forming body of knowledge. It mostly employed in policies and plans, such as: the Eighth Period of Education Religion and Culture Developing Plan (1997-2001), the Eighth National Education Developing (1997-2001), all national research policies and guidelines, and national research for national revival crisis. Moreover, the speech of government policy by H.E. the Prime Minister Pol. Lt. Col. Taksin Shinawat on February, 26 2001 stated about the importance of natural resources and environment preservation as well.

Thus, condition, which intervenes in educational research, is the major condition of environmental education research as well as natural resources and environment research, and couldn't separate individually. Because of environment current and immediate economic development specified in industry which effects to world environment balance make natural resources and environment preservation process for sustained developing. Moreover, human and environment can harmoniously live together. That causes the important role of environmental education, eg., mentioned obviously in natural resources and environment international conferences and charters. Then, environmental education is considered as a major tool for sustainable preservation in order to improve desirable behavior. It also relates to education development plan, government policy, national economic and social development plan, research policy and included other major plans and policies which focus on the development of ***"human being"*** and ***"human quality"*** in the sense of human being is the major factor and result of national development.

As environmental education is considered essential for natural resources and environment preservation, environmental education research which is one part of environmental education administration also takes a major role and couldn't be overlooked in such a knowledge based society.

Therefore, main plan and action plan of environmental education (1997-2001) were formed by Department of Environmental Quality Promotion, Ministry of Science, Technology and Environment. (n.d.:13) and were employed environmental education research policy for executives and performers' application. Its measures are the following

(1) Promoting the study of environmental education model based on ***"The person who causes damage must be responsible."***

(2) Promoting environmental education research.

(3) Promoting organizations and education institutes to form guideline project for environmental education development research.

(4) Promoting the studies of environmental education administration

(5) Promoting the collecting and distributing of environment research and environmental education research.

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In part of Ministry of Education, it has hold policy, model scheme, and environmental education curriculum on the purpose of supporting the study and searching for data system management, information, analysis and follow-up problems of personnel forming and development. In additions, related experts experiences and knowledge as well as environment policy and means of organizations are applied to develop the co-ordination between environmental education and environmental conducting within national and international work system (Thanalai Sukphatthee, 1991: 22-27) Moreover, environmental research and study is in top ten ordering by Ministry of Education based on the importance of title.

Consequently, it is said that research is a principal factor of environmental education, especially research for searching administration model, which is major factor for achievement of all aspects of environmental education research system. Because of a content of natural resources and environment research concerns and intervenes in all factors of national development research, it is necessary to integrate this content with others. Thus, environment education research, which is part of education research as well as natural resources and environment research, lacks of unity and empirical direction for performance. However, environmental education research moves to the best role because of environmental current in a present time and future. Thus, such role should be more considered.

To do this, firstly, research model should be formed or developed to be main model or guideline of the promotion of national environmental education research related to strategy mentioned above. Promoting the study of environmental education administration model together with modern concept in national development based on the Eighth and the Ninth National Economic and Social Development Plan aimed that human is the central of development and everyone should be completely developed in physical, mind, intelligence, and ability in order to be person with good health, quality, happiness, morality and adaptation for well living in society throughout life. Environmental study is an important factor to create one's awareness of preserving environment that will bring good quality of life. Creating or developing a model of environmental education research, which lacks of unity and empirical direction is considered useful to identifying guidelines of environment quality development of the country. On the aspect of identifying the strategy of the environmental development plan on research, this model will be the fundamental research model of national development in the future. It causes the policy reaction of sustainable development as well as sustainable environment development.

Therefore, creating or developing a model of environmental education research promotion in Thailand is necessary for environmental education development. This can be done systematically and will be beneficial for the responsible and relevant persons to make a decision since the policy level down to performance level.

1.2 Objectives of the Research

The research objectives were to construct and propose a promotion of environmental education research model with some specified objectives as following;

1.2.1 To draft a model of environmental education research promotion based on documentary study and related experts' in-depth interviewing.

1.2.2 To evaluate the draft of model of environmental education research promotion by related experts.

1.2.3 To evaluate the model of environmental education research promotion constructed by tri-research member of environmental education over the country

1.2.4 To evaluate the model of environmental education research promotion, improved by tri-research member, by related connoisseurs, propose the model and model application.

1.3 Limitation of the Study

The construction of model of environmental education research promotion are as follows:

1.3.1 Construct suitable model for Thailand in order to be a tool for developing body of knowledge on environmental education and for decision-making related to policy part, academic part, and performance part.

1.3.2 The research model was drafted from:

1) Documentary study makes the understanding of national research problems, problems of environment and environmental education, necessity and important of environmental education, environment research problems which require development, together with concepts and theories. The major concepts and theories which can be applied as frameworks of model construction are: concept of model construction, systematic concept and theory, concept of research administration and education administration, guidelines of national and international research promotion, and guidelines of evaluation: connoisseurship model.

2) In-depth interviews of related experts who are tri-research number of environmental education.

1.3.3 The model of environmental education research promotion drafted from 1.3.2 consists of two major parts as follows:

1) The highlighted issues of research promotion model were classified into ten parts as follows:

(1) Research policy
(2) Researcher
(3) Research budget
(4) Research organizations
(5) Research information, material and equipment
(6) Research performance
(7) Research output
(8) Research output distribution
(9) Research output application
(10) Research evaluation

2) Five model aspects, which are principle/concept, purpose, guideline/measure, strategy/ means, and indicator.

These five model aspects include in ten parts above.

Furthermore, the interview was also available for research promotion model application.

1.3.4 The model proposal evaluation by relevant experts.

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1.3.5 The evaluation of improved model from 1.3.4 was done by persons related to research who were tri-research member all over country: research supporters, researchers and research output applicators

1.3.6 The evaluation of improved model in 1.3.5 by connoisseurship model. The relevant experts and connoisseurs were categorized into three groups based on tri-research member in order to cover all relate groups.

1.4 Operational Definition of Terms

1.4.1 A model was defined as structure/pattern/guideline presenting all relation of principle/concept, purpose, guideline/measure, strategy/means, and indicator in the system of environmental education research.

1.4.2 Environmental education was defined as all system of educational process developing people understanding the relation of man and environment with awareness, consciousness, values and desirable and constructive responsibility which lead to be skill and participation on environmental problem prevention and solution in present and future as well.

1.4.3 Research was defined as searching for believe able truth which leads to regulation or theory construction for reference, phenomena explanation, prediction and control; thus, it major qualifications were searching for fact through systemic process with a certain goal.

1.4.4 Promotion of environmental education research was defined as the activities designing and developing environmental education researches for sustainably environmental problem prevention and solution.

1.4.5 A model of environmental education research promotion covered 10 parts of research promotion as the following:

1) Research policy was the direction of research related environmental education in any levels; national, ministry, department and organization.

2) Researcher personnel was the researchers or officers related environmental education in Thailand.

3) Research budget was the expense from all sources for environmental education research.

4) Research organization was defined as the organizations which their activities related environmental education research among its policy/plan, promotion and performance.

5) Research information, material and equipment were defined as some forms of information, material and equipment related to environmental education research.

6) Research performance was defined as the activity and process related to environmental education research.

7) Research output was defined as the final product of environmental education research.

8) Research output distribution was defined as the forms of environmental education research distribution as conference/seminar, television or radio broadcasting, documentary, printing, and internet etc.

9) Research output application was defined as the benefit of environmental education research output in any forms as academic, preferment, policy, plan determination etc.

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10) Research evaluation was defined as the evaluation of environmental education research: pre-audit, on going, post-audit and overall evaluation of environmental education research system.

1.4.6 Aspect of environmental education research promotion model was composed of principal/concept, purpose, guideline/measure, strategy/means and indicator as following:

1) Principel/concept was defined as the major concept of environmental education research promotion.

2) Purpose was defined as the final products of environmental education research promotion.

3) Guideline/measure was defined as the regulation for environmental education research promotion.

4) Strategy/means was defined as the performance for environmental education research promotion.

5) Indicator was defined as the factors indicating the success of environmental education research promotion.

These 5 aspects of model include in 10 parts of model above.

1.4.7 Tri-research member of environmental education was defined as research supporters, researchers and research output applicators as following;

1) Research supporters were defined as the administrators/ committee/subcommittee of the research/education/environment/environmental education organizations, which were responsible to specify the policy/research plan, research subsidy or other forms of research supports etc.

2) Researchers were the persons who conduct environmental education research.

3) Research output applicators were defined as the administrators/ committee/subcommittee /practitioner who take the research output in any forms of benefit.

1.5. Expected Results

The research results were expected to get the political, performance and academic parts as the following;

1.5.1 Political Part

1) Being a guideline for all levels of administrators and organizations related to promote and solve some problems of environmental education research.

2) Being a guideline for all levels of administrators and organizations related to environmental education research plan and policy.

3) Stimulating all levels of administrators related to environmental education research, to aware of its significance and empirical direction of unity extension for actual performance.

4) Being information for the government making rational decision to promote the environmental education research leading to human resource development with environmental sustainability.

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1.5.2 Performance Part

1) Being a guideline for the administrators of research organization and researchers of environmental education to manage and do the desirable researches of research output applicators.

2) Empowering the organization administrators and researcher related to environmental education to develop more effective researches in this field.

3) Being a guideline for other field research extension.

4) Connecting and operating to environmental education research network.

1.5.3 Academic Parts

1) Getting some innovative knowledge for environmental education research system management in Thailand.

2) Presenting some guideline and information to further study among academic technicians, students, mass media and general publics etc.

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CHAPTER II
LITERATURE REVIEW

The research on model of environmental education research promotion was consists of conceptual framework, theories and literature review as following:

2.1 Country development based national economic and social development plans.
2.2 Trend and framework of futurer development
2.3 Dimension of sustainable development
2.4 Policy guideline of environment and natural resources
2.5 Policy guideline of environment and natural resource research
2.6 Trend of environment and natural resource research
2.7 Policy guideline and research of national education plan
2.8 Environmental education
2.9 Environmental education research
2.10 Environmental education activities in Asia-Indochina country group
2.11 Research related to environmental education in oversea
2.12 Related research
2.13 Research conceptual framework

2.1 Country Development Based the National Economic and Social Development Plans

Since Thailand has launched the First National Economic and Social Development Plan (1961-1966) until the Seventh National Economic and Social Development Plan (1992-1996). It has been resulted that we gained tremendous successful on economic expansion while social problems are worsen, more diversify and complicated. And the most critical problem is the excessive exploitation of natural resources and environment, which causes imbalance ecosystem.

It is concluded that the greater the social development, the higher the social problems are. And we have to rely on external factors despite of being self-sufficient society. So it would be useful to review the policies and tackle development strategies and come up with an integrated programme. It would have balance between economics, society, politics, resources and environment and being able to have ***"well-being of our people "***.

The national development results for over 30 years are consisted of various views (The Office of the National Research Council 1996: 320-322) (The period of the First through the Seventh National Economic and Social Development Plan) as the following:

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2.1.1. **The Period of the First and Second National Economic and Social Development Plan** (1961-1966, 1967-1971)

The plans aimed at growth and expansion of economics, encouraging economic re-structure by promoting production of industrial sector and the result has been very successful as there was the 8% increased on annually mass production. Nonetheless, there was an increasing of invasion into forestlands. The Second National Economic and Social Development Plan aimed at promoting social development programmes. However, the benefit was limited to personnel of industrial and commercial sectors. There was larger income gap between urban richness and rural poverty.

2.1. 2. **The Period of The Third and The Fourth National Economic and Social Development Plan** (1973-1976, 1977-1981)

It has been affected from the past stage, inequality of income generation and gap between urban and rural people is escalated. Oil prices gradually increased due to fluctuation of the world economics. It was resulted in tight money and recession on investment.

2.1.3. **The Period of The Fifth and The Sixth National Economic and Social Development Plan** (1982-1986, 1987-1991)

There was slightly improvement on development programmes. It aimed at production re-engineering instead of escalating land to crop and land became basis that was taken into consideration for planning and asking for cooperation from private sector in answer to poverty in deprived rural, trade imbalance and increasing of an international debt obligations. In the period of the Sixth National Economic and Social Development Plan, our economics regularly recovered and gained stability expansion rate whereas it has an imbalance of important developments which were income gap and adaptation of our society to cope with economic change. These two problems getting worsen. Besides, there were the deterioration of natural resources and environment.

2.1.4. **The Period of The Seventh National Economic and Social Development Plan** (1992-1996)

Framework of the Seventh National Economic and Social Development Plan focused on course of development both in quality and quantity, and equality in society in order to adapt sustainable form of development. In tackling the critical social problems, the main concern is delegation of income, needs to develop the pool of human resources and natural resources.

It has been resulted that the course of development under the National Economic and Social Development Plans throughout 30 years yielded high expansion rate of economics as well as serious concerns over our society, culture and ecosystem.

2.2 Trend and Framework of Future Development

2.2.1. **Philosophy and Theory**

The problems that are affected from the former development and there is poverty and low quality of living among the majority group of people in our

country, degradation of natural resources and polluted environment. These factors came from the development causes, which focused on extension of economics and application of industrialism-oriented approach. A further stage of development should adapt strategy and approach according to the following philosophies and theories:

1) Green philosophy and eco-development
2) Sustainable development
3) Another development
4) Buddhism adopted approach and humanism approach

2.2.2. **Framework of Future Development**

These philosophies have to be provided as conceptual framework for setting up policies and development guideline to prevent facing such problems in the past. The measures and development guideline of future are as follows:

1) To improve, encourage and support education and learning process in order to have holistic personnel development for well being, balance and continuity on development of families, groups, organizations, people and community institutions both in society and economic. So our country is being able to come up with efficiency and self-reliance in every level.

2) To promote the five dimensions of development to be balanced and sustainable development that is a suitable, various, and well integration between human socio-culture system, natural resources, technology and economics.

3) Considering and promoting small-scale production; farmers, household industries, small-sized servicing agencies and organizations which are the majority group in our country through group process, cooperation programme with circular funds for being able to live their lives and fulfill their basic needs through production process and management.

4) Improve, support and uplift morality, ethics and public awareness in development, adapting an approach of religious beliefs in order to strengthen implementing organizations. Promote practicing training and learning processes, thus create intelligence and spirit among people for their capable of being lived in simply manner, having self-sufficient attitude, dignity and disciplinary.

5) Improve and develop social mechanism, administration and management systems both in government and private sectors for more efficiency and being as an elementary in answer to delegation of power, development programmes and economics growth to our people in all levels.

6) Focus on reviving and conserving natural resources especially soil, water and forest and setting up preservation measures and come up with natural resource utilization for our generation as well as having eco-development concerns for the world. We aim at sustainable development for the next generation.

2.3 Dimensions of Sustainable Development

The basic concept of sustainable development is to utilize natural resources in appropriate way both in time and budget factors, yet recover and preserve the resources for current utilization and have continuance basis for the next generation without degradation, deterioration and depletion of natural resources.

Sustainable development concept is to preserve and utilize natural resources in long term and gain comprehensively development in economics, society and ecosystem.

2.3.1. The Dimensions of Sustainable Development

Philosophy:

A relationship between environment and economic development are divided into two groups:

1) Trade-off Concept:

This concept believes that economic growth derives from destruction quality of environment. And sustainable development is high expansion rate of economics in long-run basis.

2) Complementary Concept:

This concept believes that economic development and environmental preservation are capable of being maintained at a steady level. Economic system depends on ecosystem and natural world, which are boundary growth to support economic extension continuously.

Objective:

To bring about the basic needs in equality manner and has more product and services.

Guideline for Economic Sustainable Development

Economic Development should concern on environmental conservation. A new system of economics should focus on ecosystem, earth and nature with boundary growth. The development guidelines are as follows:

1) Fulfill the people basic needs in equal depending on self-sufficient economic approach.

2) Launch land and rural area reformation for economic stability and prevent them from deprivation of life equality.

3) Apply technology which is appropriates and related to environmental and natural resource preservation.

4) No profit on the management of rural resources.

5) Reduce consumption of wealthy people and tranfer more resources to the poor.

2.3.2. Social Sustainable Development

Philosophy:

There are 3 beliefs concerning social dimensions:

1) Human is the nature threatening as well as being the create for the natures.

2) Sustainable development is to protect, preserve nature and concern on using up of natural resources. The development of human quality of life and environment should be simultaneously developed.

3) Sustainable development concern is not only on economic improvement enlarge but also changes in an economic and social system.

It is concluded that the dimension of social development fulfill both on the basic and self-actualization needs for all mankind, and provided well-being in long term for the majority group of people.

Objective:

To bring about diversification on culture, long-term institutions, equality in society and capable of having participants from many parts of society.

Guideline for Social Sustainable Development

The sustainable development on social dimension should consider to human role and social structure at the local, country, regional and global basis emphasized on the relationship between knowledge and power of people on the principle basic as the following:

1) Cultural diversification: the development should rely on the basis of local culture and knowledge.

2) Sustainability of institutions: decisions making in community and setting up social welfare organization are directed in the same way as local ecosystem management.

3) Participation: the development should come from lower class of society and the local community should be given rights to manage their own resources.

4) Equality in the society: stability in way of life should cover the poor and the next generations.

2.3.3. Ecological Sustainable Development

Philosophy:

Human's way of life should be changed from destruction of nature to living with nature and adapting an ecological criterion for natural resources and ecosystem management, aiming at all living things could earn their lives happily on the basis of sustainable economics and society.

Objective:

To brings about diversification in genetic, return-to-balance capability and ability for yielding biological production.

Guideline of Ecological Sustainable Development

The ecological sustainable development should concern on criterion and characteristic of ecosystem which are the holistic of living things. These development guidelines are as follows:

1) Reduce production system, which releases sewerage and toxic.

2) Focus self-sufficient approach by economic decentralization.

3) Use renewable resources in appropriate way and focus on conservation of non-renewable natural resources.

4) Promote the switching of incomes, resources, and production input from the rich to the poor.

5) Form of creative work system and workers' satisfaction.

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6) Manage economic system based on a basic of co-operative organization creation and modern technology application related to natural resource and environmental preservation.

Sustainable development is the development under environmental limitation, thus it is necessary to apply the development strategies that focus on optimization, wealthy, well-being and human welfare in continuance and sustenance of economics, society and ecosystem basis by having an integration between nature, human, capital and physical environment. The main overview of sustenance are as follows:

1) The continuity of mankind in giving births, being survived, and producing of spring in safety environment.

2) The scope of limitation in economic growth.

3) To keep on quantity of biological resources, and efficiently offer products regularly.

4) The population growth is constant.

5) Emphasizing the development of self-sufficient system and small-scale business.

6) The continuousness of being able to conserve ecosystem and environmental quality.

To achieve balance in development; human necessitates to sustain and stimulate diversification means of sustenance. Also, they should form an integration between environment and trend towards the future in consideration followed human's agreement on the basis of the difference between environment, ecosystem, society and moral.

2.4 Policy Guideline of Environment and Natural Resources

2.4.1. The Fifth Ministerial Regulation of Ministry of Science, Technology and Environment (1993)

The fifth ministerial regulation in relevant to the Act of National Environmental Quality Promotion and Conservation 1992, legislated by article 7 and 11, paragraph 2 under the Act of National Environmental Quality Promotion and Conservation 1992.

To be proclaimed on the Royal Gazette No. 110, section 66 dated 20th May 1993, it concludes that a private organization which, has the rights to regist on environmental prevention and natural resources conservation, has to be a juristic person in accordance with Thai and foreign law, and neither focus on political nor profit from business concerned with preservation. The registration is presented to Director General of Department of Environmental Quality Promotion al least once a year.

2.4.2. Constitution of Thailand 1997 with Environment

Article 45: people in local community must have an entitlement on conserve or rehabilitate their traditional culture, local knowledge or local heritage and

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participate on management, nurturing and utilizing of natureal resources and environment in parity and sustainable basis, according to the law.

Article 57: the individual right to live in the context which is harmless to health, welfare, and life quality, normally, regularly and safely.

The changes of water, climate, sunshine or other natural living factors which impact to health, welfare, and life quality mustn't be performed generally unless state offices depending on the specific authority on particular law for the public benefit.

Article 58: the individual right to gain public information of public agencies, state work units, state enterprises, and local officials except the informing is risk for people's save, state stability, or individual advantage and disadvantage, according to the law.

Article 59: people shall have an entitlement on being informed any notice, information and explanation from public agencies, state enterprise before approving or launching any projects or actions which could affect environmental quality, health, and any profit for themselves, or their local community, and shall have rights to give comment on that issue, according to consideration process imposed by law

Article 60: the individual right to participate in official consideration of local administration which would impact to individual right and liberty according to the law.

Article 61 people shall have rights to address a petition and receive the notification concerning the issue within a reasonable period, as imposed by law.

2.4.3. Policy and Plan on National Environmental Quality Promotion and Conservation in 1997-2016

Policy and plan on national environmental quality promotion and conservation in 1997-2016 is imposed by article 13(1) under the Act of National Environmental Quality Promotion and Conservation in 1992, as a framework on environmental prevention and remedy for the next twenty years. The policy focuses on natural resource management and environmental quality promotion and conservation in line with economic development and sustainable society. By this approach, people shall have an awareness and participate in environmental quality remedy and rehabilitation for good standard of living. This policy was approved by the national environment commission and received a favorable resolution by the ministerial on 26th November 1996, aiming to be adopted by government agencies and relevant organizations as framework for action plan.

Policy and plan on national environmental quality promotion and conservation in 1997-2016, is comprised with the followings:

1) Natural resource policy
2) Pollution preventing and treatment policy
3) Natural environment and artistic work environment policy
4) Local community environment policy
5) Environmental education and publication policy
6) Technology concerning environment policy

Moreover, there are specific policy and appropriate guidance to turn policy into a concrete plan as the 5-year environmental quality management plan, in

accordance with article 35 and 36, and action plan concerning environmental quality management, in accordance with article 37-41. It seems that Thailand will have a complete environmental management system both in setting up a policy and turn it into an action plan.

2.4.4. Guideline of Natural Resources and Environmental Development in The Eighth National Economic and Social Development Plan (1997-2001)

1) Viewpoint of natural resource development in the Eighth National Economic and Social Development Plan (1997-2001)

(1) Natural resources shall not be used as a factor of production.

(2) Natural resources are thoroughly adopted an effective administration on their management.

(3) Local community and organization are supported in continuity development.

2) Strategy of natural resource development in the Eighth National Economic and Social Development Plan (1997-2001)

(1) To conserve and rehabilitate natural resources in appropriate approaches.

(2) To reduce some conflicts on natural resource utilization.

(3) To set an administration and management system on natural resources in the most efficient approach.

3) Viewpoint of natural resources development in the Eighth National Economic and Social Development Plan (1997-2001)

In the period of the Eighth National Economic and Social Development plan (1997-2001) focused on economic expansion and social development in line with an effective way of administration on environmental management, aiming at people, as the most important thing of development process, receive higher income and better standard of living. The plan focuses applying an international standard on environmental quality and urging operation, according to pollution control measurement which directed to development framework such as; water, air, noise, waste and hazardous waste.

4) Strategy of environmental development in the Eighth National Economic and Social Development Plan (1997-2017)

(1) Responsibilities of government on environmental quality development should be increased.

(2) Supporting and encouraging competency of people and private agency.

(3) Formulating mechanism and performance for different organizations.

(4) Encouraging and increasing administration performance on environmental management.

Conclusion

In the period of the former national economic and social development plan, the issues concerning environment and natural resources is getting serious along

the development level, particularly on industrial aspect which continuously affects living conditions of people.

2.4.5. Strategy of Natural Resources and Environmental Administration in the Ninth National Economic and Social Development Plan (2002-2006)

1) Viewpoint

Lacking of effective measurement on administration of environmental management comes up with deterioration and depletion of natural resources and environment as well as lacking of people's preservation awareness, thus the Ninth national Economic and Social Development Plan considers inefficiency in line of natural resources and environmental administration ***"the philosophy of sufficient economy"*** depending on the participation all walks. Moreover, the plan directs to form balance between economic development and rehabilitation, reasonable for sustainable development and self-reliance, and manage natural resources and environment by social process to be the basis of national development.

2) Objectives

The objectives are to form natural resources and environmental administration in order to respond the reconstruction of national development into the balance of quality development. The balance is to converse the development in producing extension to product extension by using natural resources economically and harmlessly to environment. The management should consider the equality in society,environmental awareness , culture and increasing community ability of gaining benefit and participation in sustainable development. Thus, the objectives are dictated as follows:

(1) To have natural resources utilization in line with conservation and rehabilitation in order to have proper control over utilization process and prevent environmental quality in order to encourage balance on economic development and good standard of people living.

(2) To arrange natural resources and environmental management which encourage the development and no effect on environment and ecosystem. People, local community and local administration agency shall have an entitlement on participation and responsibility on natural resources and environmental management practically and continuously.

3) Goal

To conserve and rehabilitate forest and reduce soil erosion and regain soil quality, prevent and protect biological diversification, eliminate wastes, preserve water quality in the main river, eliminate and reduce hazardous waste and control air quality.

4) Guideline of Development

(1) Conservation and rehabilitation of natural resources and environment.

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1. To administer natural resources systematically and apply on participation process.

2. To administer pollution and prevent environmental quality for well-being of people.

3. To conserve and rehabilitate local environment and local heritage and historical areas in order to support sustainable development.

(2) Utilization of natural resources in sustainable manner in relevant to possibility and bring about equality which have no effect towards environment.

(3) Enhance administration performance on natural resources and environmental management, focuses on development mechanism on administration conservation, rehabilitation and utilization in sustainable manner and derive more effective, and be able to solute environmental problems systematically and continuously:

1. Development focuses on people and their standard of living and retain the national environment by:

1.1. Adapting the national education both informal and non-formal system and long lift education as a mechanism for formulating knowledge and adapt consumer behavior which brings about good health and harmless for environment throughout understand the rights of people to participate in administration of sustainable environmental management.

1.2. Developing personnel to have administration ability in technique adequately both in quality and quantity. Leadership in participation among community and society should be formed in the term of working and environment managing in various levels: country, religion and local.

2. Create mechanism in order to maintain balance between natural resources and environmental development and conservation.

3. Revise law in order to support natural resources and local environmental administration and people.

4. Develop mechanism and process for all parts getting opportunity to participate in administration of natural resources and environment regarding to environmental education issues:

4.1.Provide environmental knowledge, strength and competency development to local community, and people by using all systems and levels of education process to crate discipline and attitude in natural resources and environmental conservation on the right way, at the right time.

4.2. Provide local community platform, meeting, seminar, a platform for people sharing their comments and disseminating information regularly in order to cooperate learning process forming by carrying on pilot project, publication, disseminating information, project initiated by government and let the people display their comments for the reason of making acceptance. (Office of the National Economic and Social Development Board, 2000: 41-50)

More emphasizing in the ninth development plan, the formers as we have seen, natural resources and environment are defined as one of the seven strategies as well as the emphasizing on environmental education process for empirically administrating in this article.

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2.4.6. Guideline of Action Plan on Provincial Environmental Quality Management

Province takes a major role on environmental quality management according to the Act of National Environmental Promotion and Conservation in 1992. Province is responsible on providing an action plan for provincial environmental quality management and carry out a project in accordance with the action plan which are divided into four groups:

1) Create awareness and consciousness
2) Be careful and preventive
3) Remedy and restoration
4) Performance study

Regarding to these four groups (action plans), projects could be coordinated and related among them that cause the systematic and efficient solution of provincial environment problems. Besides, it is the assistant of work-planer to consider which project is essential for the solution and should be conducted with the cooperation of authorizing work-unit.

This guideline employs 2 projects concerning with environmental education research, that are: (1) Conciousness and awareness creating group, (2) Performance study group.

2.5 Policy Guideline of Environment and Natural Resource Research

Research policy concerning natural resources and environment for the last ten years are as follows:

2.5.1. Research of Natural Resources and Environment in accordance with The Fourt National Research Policy and Guidelines (1992-1996) Office of National Research Council (n.d.: 49-50)

1) Research for Environmental Development

(1) Research Policy

1. Support research for solution of air pollution, sewage, toxic and deterioration of natural resources.

2.Support research and development of environmental administration in alignment with the country development.

(2) Research Guideline

1. Carry out research and develop appropriate technology for sewage management in system, such as: garbage and waste recycle.

2. Carry out research for technology development of decreasing coal pollution .

3. Carry out research for appropriate model development which empower people's awareness on environmental conservation and participate in services, restoration, administration and conservation of natural environment and man-made environment.

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4. Carry out research for organization development in order to encourage effective administration of natural resources and environment managemental.

2) Research for Natural Resource Development

The objective is to improve the administration of natural resource utilization and restoration emphasizing on environmental solution related to national economic and social development. Research policy and guideline is specified as follows:

(1) Research Policy

Support and encourage research for natural resources conservation: forest, mineral, soil and source of water.

(2) Research Guideline

1. Carry out research and conserve all sorts of natural resources on effective and efficient basis.

2. Carry out research and develop for searching technology of increasing mineral value.

3. Carry out research and development on law improvement in order to reduce conflict and eliminate obstacles of mineral development.

4. Carry out research and development on structure modification of agricultural production in order to be concurrent with land affordability and possibility of water source development.

5. Carry out research and development on prevention of soil erosion and transfer such technology to agriculturist.

6. Carry out research and development on organization improvement in accordance with policy of conservation and development of water source.

7. Carry out research and development on forest and ecosystem conservation.

2.5.2.Research Policy for Natural Resources and Environmental Development according to The Fifth National Research Policy and Guidelines (1997-2001) by Office of National Research Council (1997 A: 61-62)

Policy:

1) Support research on policy part aimed to concerning on natural resources and environmental development.

2) Support research and develop technology and apply technology of natural resources and environmental conservation and administration both in preventive, solution and re-use waste from any activities.

Guideline

1) Constructing policy research covering political economy, law, and administration to form natural resources guideline systematically and effectively as well as environmental prevention and solution especially in urban area and industry.

2) Constructing policy research in order to search measure and stimulus to empower private sector's role in solution of natural resources and environmental problems in country.

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3) Researching and developing on technology of prevention and solution of any pollution caused by inhibitane area, transportation, and industry, eg., technology for garbage elimination, technology for constructing water treatment system, technology for fuel product improvement throughout using information technology for natural resources and environmental administration

4) Constructing research for guideline of local organization development and process of concoiusness creating to preserve environment and prevent pollution.

5) Researching and developing on recycle of useless articles from areas of agriculture, industry, and commerce depended on economic and social possibility.

2.5.3. The Sixht National Research Policy and Guidelines (2002-2006) by Office of the National Research Council (2001 A: 88-91)

Research policy and guideline in aspects of social and culture consist of national programmatic research about national resource management. The objectives are to develop technology, which promotes natural resource utilization and conserve environment sustainable. This technology should be relevant to the constitution of Thailand 1997 and global trends about major natural resources including land, forest, water and environment factors such as the compellation of ecosystem. Moreover, the ability of natural resource base should be considered in order to support and respond human. Because of limitation of ability, preserving and compensing are required for well-being of world population

A number of problems are presented in table which concludes confliction in form of mass mob as follow:

Table 1 Summary of Confliction in Form of Mass Mob and Group

Problem / Year	Agricultu-ral Problems	Estate and Protesting State Compens ation	Laborer Conflict	Environ-mental problems	Disagree-ment between Public and Official	Problems of the Beneficial Group	Others	Total
1993	108	173	65	37	121	133	140	777
1994	21	222	109	67	199	203	421	1,242
1995	77	236	109	117	164	119	378	1,200
1996	78	187	143	71	211	84	272	1,046
1997	125	217	152	95	212	104	380	1,285
1998	131	252	147	131	207	108	453	1,429
1999	215	262	157	136	229	138	565	1,702
2000 (Particular in the first 6 months)	139	106	82	99	65	55	384	930

Source: Office of Prime Minister

2.5.4 Research Policy within National Policy and Plan of Environmental Quality Promotion and Preservation in 1997-2016

Research is considered to be essential to solve problems and develop environmental and natural resource technology. Although the policy is dictated for a

study and public relationship for environment, however, it emphasizes only on a study and application on information technology.

2.6 Trend of Environment and Natural Resource Research

2.6.1 National Research Period in National Revival Crisis

National resources and environment research has been stated as follows:(Office of National Research Council, 1999 : 35-37)

Research Framework

It emphasized not only research and development for natural resources and environmental management in order to sustainably join the application together, but also sharing with local wisdom. Research framework can be concluded as follows:

1) Promotion of technology development in order to enlarge the efficiency of natural resource application in production process without destroying environment. Moreover, agricultural and industrial energy is saved for export promotion.

2) It promotes technology research, development and appropriate evaluation in order to manage environment by eliminating water pollution, air pollution, rubbish and waste. By contrast, recycle is used appropriately and relevant to local wisdom as well as international agreement.

3) It was made to promote technological engineering research and development for developing, such as: plant species of plants, species of animals, and biological sources using in both fertilizing and insecticide for agricultural sustainable development without destroying natural resources: forest, soil, water, and beach.

4) It promotes the research and development for pure technology for industry to support the export quality through ISO (International Standard Organization).

2.6.2 Problems of Natural Resources and Environmental Research

Mostly, research circuit is not complete that it makes the application incomplete. Also, research direction doesn't maintain in unity, thus, research performance concerning with major crisis of natural resources and development hasn't had yet. Besides, workplan for research guideline isn't formed. Other problem is natural resource data-based is too less to apply or make a reference. That means the lower number of related research and even one aspect of application couldn't fulfil. (Chatchai Rojanawithit, 1998: 54-55)

2.6.3 Guideline of Natural Resources and Environmental Research

Natural resources in the future should be as the following. (Chatchai Rojanawithit, 1998: 54-55).

1) Research for ordering the major problems of natural resources and environment should be rapidly conducted to save present resources from useless application.

2) The first major problem should be rapidly researched followed by the others and relevance to national environment quality plan.

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3) Research for improving organization concerning with natural resource management and structure should be done. Moreover, there should be the co-operation related organization in order to enlarge efficiency and unity status.

4) It should be a research for improving both laws and regulations, which are out of date and trouble as well as law of basic organization administration and management.

5) Urgently, it should be a research to improve people's attitude and values of preservation.

6) Research and improvement of technological science curriculum should be urgently conducted for environment quality preservation in national education system.

7) Research for establishing natural resources and environment information center and network should be conducted to link the data since central part till region.

2.7 Policy Guideline and Research of National Education Plan

2.7.1 Guidelines of Education, Religion and Culture Improvement Plan Period 8 (1997-2001) by Ministry of Education

1) **Education**

(1) Policy 1, measure of fundamental education is to evaluate and construct education management research in every section seriously.

(2) Policy 2, its goal is to conduct research and apply research output to develop manpower. Its measure is to support research fund and fund for research training and application. Besides, research translation and distribution of academic output by academic technician are also supported .

(3) Policy 3, the objectives of curriculum development and learning process reformation are to research for developing efficiency learning process. Supporting local tradition research widely, and apply research output for learning process development are being the measure.

(4) Policy 4, measure of selection system, production, and personnel development reformation are academic personnel supported to expand the knowledge, skills, and ethics in many forms, such as:

- Conducting quality research by taking leave permission
- Improving payment regulations of research conducting
- Fund supporting for translation and distribution of academic output

(5) Policy 5, learning throughout life, the objective is to:

- Study and apply local wisdom to public
- Support education fund, training, and research fund for personnel and organization in order to develop body of knowledge

(6) Policy 6, reformation of education administration and management, the measure is to support research and apply for widely developing of education administration and management.

2) **Religion**

(1) Policy 1: The development of religious study and personnel

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Its measure is to support research and developing model of religious personnel development. In addition, it supports high education level to in-depth study in religious instruction in order to develop human's mind and society.

(2) Policy 4: Religion administration and management

Its measure is to support research conducting for developing religion administration and management .

3) Culture

(1) Policy 1: Preservation of art and culture inheritance

Its measure is to support studying, researching and collecting local knowledge, such as: art and culture, history, basic culture, local wisdom, local technology, tribal culture and every branch of national culture.

2.7.2 Guidelines of Research and Development in The Eighth period of The National Education Development Plan (1997-2001) by Office of National Education Commission

The Eighth Period of The National Education Development Plan is specified research and development as the 5th major plan of totally nine in spite of research is included in every major plan. It indicates that education research is mostly significant both present and future.

Objectives

1) To make learner more interested in knowledge,self-searching of knowledge, critical thinking ability, and ability in technology application for Thai-society.

2) To increase ability level in research and development extension of related work unit to produce quality and quantity researcher rapidly.

3) To support high education level to be as a knowledge source as well as base of wisdom development according to Thai being.

Goals

1) To increase investment rate of national research and development both in official and private sector at least 1 per cent of total national product in 2001. Then, government should invest around 0.50-0.75 per cent of total national product.

2) To expand science and technology research and development in order to increase efficiency of capital reduction and also develop economic which balances and relates to the development of society, natural source and environment.

3) To develop and increase social-science research and development in Thai social context. That is for progressiveness of Thai social dimensions as well as expanding relationship between neighborhood and world population.

4) Research and development in academic institute is considered to be major activity for instruction supporting.

Guideline/Measure

1) Education institutes are awared of the important of research and development for supporting instructions. Learner should be formed to be skillful and spiritual researcher. Moreover, they should have abilities in thinking, analyzing, and synthesizing and can do intensive report since graduate.

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2) High education institute, both government and private sector, should be best in wisdom and develop body of knowledge to international standard. According to this, they should do the following :

- Expand the output of Master's and doctor's in branches of research and development.
- Produce quality research by research fund distribution.
- Reinforce and give academic suggestion for lecturer and accompany the one who graduate to be a lecturer.
- Allocate fund adequately.
- Support research conducting next to doctor's degree.

3) Cooperation of research conducting and development between domestic institutes and overseas should be supported as well as exchanging science and technology experts from abroad.

4) Education institutes should be coordinated with private sector, especially in industrial and services, to conduct research and form industrial garden together.

5) Work system throughout atmosphere and environment of educational institute and society should be made by state in order to support research action and application for more national development, such as :

5.1) Abolish customs duty of every kinds of materials and tools for research.

5.2) Support research budget in form of supporting fund for all levels of academic institute and related work unit included specific intelligence center in high education.

5.3) Co-operate in research plan and form information system to network in order to exchange data as well as experience and reduce repetition.

5.4) Invite thai and foreign scientists and technicians who gain more experiences to conduct research and develop country, in addition, improve surrounding to support working.

5.5) Give opportunity for official and lecturer to run quality research by taking leave permission temporarily.

5.6) Improve both payment regulation for research official and academic services for society and industry. That will be the development of body of up-date knowledge and will be another way to increase official incomes.(Office of National Education Commission, n.d.: 82-85)

2.7.3 National Education Act 1999

The learning reformation accordance with National Education Act 1999 has stated about research that it is the process which relates to learning process as well as working process of the relevance who are as follows:

Research for Learning

The learners consider that research is one aspect for learning. They could design research on their interesting topics, such as: science and technology, religion, art and culture, and career. Research is related to learning process in the sense of thinking and managing practice, seeking reason of problem solving,

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integrating body of knowledge as interdisciplinary and learning of interesting problem in actual situation.

Research for Teaching Improvement

The three main duties in class are: managing learning process, researching for improvements by integration, and lastly collecting data for systematic analysis. Besides, the finding sources can be revealed and described. The teacher who can conduct this research should be the person who can state the problem.

Administrator Researching for ISO

Concerning with organization/ school, research findings always apply for making decision, planing, for organization objectives. Thus, research is one of administration process. Moreover, administrator is the one who takes important role of being research supervisor of teachers and other personnel as well as making information technology system and essential materials as well.

Office of National Education Commission, which aware of those mentioned importance, aims to support research application for learning and performances of teachers and administrators. Moreover, it forms group-work for religion and culture supporting which authorizes in those of following:

a. Develop body of knowledge and science of research action and development related to the National Education Act.

b. Support research of education, religion and culture conducting by staffs, official and private institute and association.

c. Develop public research which consisted of staff, institute, and association conducting research all over the country form and develop data-based of education research, religion and culture through electronic media (Office of National Education Commission, 2001: 1)

2.8 Environmental Education

Environmental Education has been evolving for many years. It got a big stimulus in 1972, when representatives at the United Nation Conference on the Human Environment in Stockholm, Sweden recommended that the UN establish an international environmental education program. The United Nation Educational Scientific, and Cultural Organization (UNESCO) followed up on the recommendation by sponsoring a series of environmental education workshops and conferences around the world. In 1975, representatives from member nations met in Belgrade, in the former Yugoslavia, to outline the basic definition and goals of environmental education. Then in 1977, representatives from more than 60 nations gathered in Tbilisi in the former Soviet Republic of Georgia for a follow-up to Belgrade. Delegates to these two international conferences ratified the following definition of environmental education.

2.8.1 Definition of Environmental Education

From the National Resource Commission of Education International Meeting on Environmental Education in the School Curriculum (IUCN) in Paris,

France 1970 (UNESCO, 1977: 75), the environmental education is defined as a process that accepts values and improves concept and attitude, environment and related culture, all of which are combined to make decisions and determine behavior towards the environment. Meanwhile, the Environmental Education Act or the Public Law of the U.S.A., maintains that the main point of the environmental education is the model in providing education concerning the relationship between human and environment as a whole, the relationship between the population and pollution, natural resources, conservation, transportation, technology and between the city planning with human environment (Walter E. Steidlr, 1977 as cited by Vinai Veeravatnanond, 1996: 13)

An American expert in environment, Bernard J. Lucko, (1982 as cited by Vinai Veeravatananond, 1996: 14), defines the environmental education as the studying process with the aim to promote knowledge of the population in the relationship between life and physical and social environment. Environmental education also aims to create awareness of the environmental problem and to persuade to yielding responsible behavior, which leads finally to problem solutions. Also, Stapp (1981: 1) gives similar definition; that is, a process with the objective of developing the world population to be aware of all environmentally related problems. Schmieder (1977: 27) sees that the environmental education can be a new way to instill responsibility for the general people in acquiring knowledge and developing the basic needs of human being.

Many Thai environmental scholars have various definitions of the environmental education, each focusing on a certain point. Kasem Chunkaew (1993: 15), for example, summarized the concept of environmental education that it is a well-systematic process of knowledge provision, emphasizing the use of technology. Vinai Veeravatananond (1996: 15) stated that environmental education is a studying process emphasis on physical environment; concrete factors that change environment, and the impact on human beings.

In summary, environmental education is the purposeful process of education that makes people aware of environment importance. The people can be taught in skill, knowledge, values, emotions and responsibility to be well prepared in order to take right action for the current environment issues and for prevention of the future problem.

2.8.2 Philosophy, Principle, Goal and Objective of Environmental Education

1) Philosophy of Environmental Education

To provide knowledge about the environment, scholars must creats a clear cut philosophical framework. Tanner, who wrote the article ***"Singnificant Life Experience"*** (1980: 20), explained the idea about the spaceship earth, revealing the related system of environment and the environmental education program. Learners should be encouraged to understand the basic philosophical idea of the spaceship earth. This frame of thought can be an overview of the environmental education program.

Temduang Ratanasanee (1986: 12-13) referred to the Environmental Education Act in the U.S.A., indicating the basic concept of environmental education

that those who have undergone through environmental education must possess all basic knowledge on global environment, nature law delineating the ecological system, including the relationship between man and ecological, system. Besides, learners have to know about the impact of ecological system on human ways of living, the humans responsibility should take in all environmental changes. We as members of society should be cautious in using things in nature. From the UN. Conference on Human Environment (as quoted in Temduang Ratanatasanee, 1986: 13), education and training on environmental problems are taken as important matter, so they are included in the policy of environment as the long-term plan.

Definitions of environmental education stress the importance of the mutual relations between man and environment. Men are supposed to understand nature and any impact of the human action on environment. Also, the environmental education provides points of views on application and environmental education philosophy. Then learners must come to the whole relation of thing, which acts as the spaceship earth.

2) Principles of Environmental Education

The general consensus which has emerged on the nature of environmental education reflects the goals and principles set out at Tbilisi in 1977. The following set of statements is based upon the Tbilisi Report recommendation 2. (UNESCO, 1978: 27)

Tbilisi Recommendation

Environmental Education:

1. Is a lifelong process;
2. Is interdisciplinary and holistic in nature and application;
3. Is an approach to education as a whole, rather than a subject;
4. Concerns the interrelationship and interconnectedness between human and natural systems;
5. Views the environment in its entirety including social, political, economic, technological, moral, aesthetic and spiritual aspects;
6. Recognizes that energy and material resources both present and limit possibilities;
7. Encourages participation in the learning experience;
8. Emphasizes active responsibility;
9. Uses a broad range of teaching and learning techniques, with stress on practical activities and first hand experiences;
10. Is concerned with local to global dimensions, and past / present / future dimensions;
11. Should be enhanced and supported by the organization and structure of the learning situation and institution as a whole;
12. Encourages the development of sensitivity, awareness, understanding, critical thinking and problem – solving skill;
13. Encourages the clarification of values and the development of values sensitive to the environment;
14. Is concerned with building environmental ethics

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3) Goals of Environmental Education

Goals of environmental education have been established in the International Environmental Education Workshop in Belgrade, Yugoslavia, 1979 (UNESCO, 1980: 26)

1. To instill awareness and concern for the interdependence in economy, society, politics and ecological system in urban and rural areas.
2. To provide an opportunity for people to get knowledge, value, attitude, association, necessary skill to protect develop environment
3. To construct behavioral patterns on environment of individual group and society.

Vinai Veeravatnanond (1987: 2) summarized the environmental education goal as follows:

1. To provide knowledge and understanding on environment.
2. To bring about appropriate behavior that is determined by the sake of environment condition.

In conclusion, the goals of environmental education are to provide knowledge on environment, and to create the conscience of responsibility in protecting and improving the quality of environment.

4) Objectives of Environmental Education

Environmental education objectives have been set according to the Belgrade Charter (UNESCO-UNEP, 1976: 1-2)

Environmental Education is ***"a process aimed at developing a world population that is aware of, and concerned about, the total environment and its associated problems, and which has the knowledge, attitudes, skills, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones"***

Specially, environmental education stresses these five objectives:

1. **Awareness:** Help students acquire an awareness and sensitivity to the total environment and its problems; develop the ability to perceive and discriminate among stimuli; process, refine, and extend these perceptions; and use this new ability in a variety of contexts.
2. **Knowledge:** Help students acquire a basic understanding of how the environment function, how people interact with the environment, and how issues and problems dealing with the environment arise and how they can be resolved.
3. **Attitudes:** Help students acquire a set of values and feelings of concern for the environment and the motivation and commitment to participate in environmental maintenance and improvement.
4. **Skills:** Help students acquire the skills needed to identify and investigate environmental problems and to contribute the resolution of these problems.
5. **Participation:** Help students acquire experience in using their acquired knowledge and skill in taking thoughtful, positive actions toward the resolution of environmental issues and problems.

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2.8.3 Environmental Education in Thai Society

Deterioration and imbalance of natural resources as well as polluted environment are totally caused by human handling. Then, human become the cause, problem and sufferer. Therefore, in order to remedy and prevent the natural resource and environmental problem to be achieved, it should be aim at the source of problem – human – firstly (Department of General Education, 1992: 79). Environmental education provided in both formal and non-formal education is believed as the method to remedy the environmental problem permanently and be existed in the long run (Vinai Veeravatnanon, 1992). As environmental education will be the process which establishes appropriate knowledge, awareness, responsibility and approach in respect of environment to youth and people. (Sirirat Kasornpratum, 1991: 214). As a result, government is aware of the mission to provide the environmental education to help people establish knowledge, awareness and responsibility toward environment quality development. The Ministry of Education in charge of national Educational management is aware of the importance of the environmental problem existing at present and in the future. Then, the ministry establishes guidance to put environmental education into all levels of curricula and provide guidance to set activity regarding environment in academic institution and community. That lays down the approach to develop and carry out activities of environmental education applied by teachers in schools and chiefs of communities with efficiency (Ministry of Education, 1991: 4).

The environmental education is provided in both formal education but also provided as non-formal education by government and private agencies including private sectors that do not directly involve in publicizing environment knowledge to public. Meanwhile, medias play more important role to provide environment knowledge to communities. Anyway, it is noted that the environmental knowledge has been provided to people by putting it in curricula since the academic year 1978, environmental problem is still not alleviated (Rapeepan Suwanneetachote, 2000: 282-287).

The environmental education is the process to provide the correct knowledge and approaches regarding to environment. Such practice strengthens ethic to learners to be the ones with responsibility to environment and awareness toward the environmental problem including skills needed in making a decision to solve the environmental problem appropriately.

In late 1960, the environmental education became the subject getting influence from 3 educational approaches: nature study, conservation education and outdoor education. Later, the environmental education had more emphasis on social dimension of environmental problem with its aim to help people establish awareness, attitude, knowledge, skill and attention to solve the environmental problem (EPA, 1994). In 1970s, the environmental education became the subject being clearer and noticeable from international conferences hold at that time. The issues of environmental problems and environmental knowledge provided to establish the awareness among people were always raised the conferences. The workshops on environmental education hold at Belgrade and the conference on environmental education hold at Tbilisi become the starting point of environmental education. These

conferences laid down main approaches in establishing education, objectives of the environmental education, the teaching – learning process, addressing content, method and assessment which is acceptable by other countries and brought to develop to be the principle of curriculum development. The principle in environmental education has been followed until now.

The educational management regarding to environment in Thailand has been seriously interested since 1978. The environmental education is the basis of general knowledge put in the curricula of national education at primary and secondary levels. The environmental education has been clearly seen in National Economic and Social Development Plan stipulating policy on environmental education as follows:

1) The curriculum development of environmental education at all levels will be established.

2) Students in respect of environment at pre-graduate will be required.

3) The environmental education in form of integrated multidisciplinary will be provided.

4) Curricula and the ways of teaching will be reformed.

5) Publicizing environmental education to public will be achieved.

6) Short course trainings to personnel relevant to environmental development will be provided in both public and private sectors.

1) The Policy, Master Plan and Environmental Education Scheme for Ministry of Education, 1988.

The scheme of environment awareness and education (EAE) established by the Ministry of Education to improve curriculum of environmental teaching materials was funded by the United States. Subsequently, the Ministry of Education declared the direction and policy of environmental education that led to establish the master plan of environmental education scheme and declared to be effective in February 1989. The master plan stipulates ***"all students and 60% of people will be aware of conservation of national resources and environment including cooperation to solve the environmental problem by correct approach with pride in order to achieve sustainable development"***. To attain the aforesaid goal, the ministry lays down the following 4 strategic approaches:

1) The most critical environmental problem in the country will be chosen as the content of teaching and campaign.

2) Integrated environmental education will be put into the existing curricula of all educational levels and in both formal and non-formal education.

3) Solution process will be focused by starting from the problem happened locally and extending to the problem happened to be farther.

4) The behavior of students and people toward environment will be focused and changed.

The strategies laid down by Ministry of Education are in line with principle of the environmental education stipulated in Belgrade Treaty. It is seen that the Ministry of Education gives an importance and pays attention actively to provide environmental knowledge to students by establishing environmental subjects to be learned by all educational levels and laying down guidance and principle of the environmental activity for students.

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2) The environmental management in formal education. The environmental education provided to youth has been clearer since the Ministry of Education has introduced the curricula of primary and lower secondary at the beginning of the year 1978.

2.1) The curriculum of the environmental education at primary level. The curriculum of primary at present is the 1990 revised edition of the 1978 upper secondary school curriculum. This curriculum has been divided into 5 groups of subjects. The content of environmental education is included in the group of strengthening experience for life. Also, it is included in the group of strengthening habit.

2.2) The curriculum of the environmental education at lower secondary. Educational management at lower secondary with its aim related to environment emphasizes on establishing awareness and taking part in environment quality conservation and development. The content related to environment is included in the subject groups of science-mathematics and social science. It is also put into personality development comprising the subjects of health and physical education and art education.

2.3) The curriculum of the environmental education at upper secondary. The curriculum of upper secondary at present is the 1990 revised edition of the 1981 upper secondary school curriculum.

The upper secondary school curriculum underlies the objective relevant to environment as follows:

To understand conditions and changes in one's society, nation and the world as a whole; determine to take part in national development according to one's roles and responsibilities including conservation and promotion of national resources, national religion, arts and culture.

Therefore, subjects related to environment are listed in both subject groups of sciences and social science which include both compulsory and free elective courses. Furthermore, environment related subjects are listed as free elective courses in the subject group of language, health and physical education and art education. Activities to complement curricula are also held in schools and communities at any occasions other than teaching in class.

Furthermore, the subjects related to environment with different elective and compulsory courses were introduced at vocational and university education. Each curriculum and some universities also provide environmental education at bachelor, master and doctoral degree.

3) Management on environmental education in non-formal education. The environmental education has been provided in formal education. Also, other agencies that are from both public and private sectors and not directly related to providing teaching and learning in formal education have been jointly responsible in educating public as mentioned earlier. The government agencies playing important roles are as follows: the Environmental Quality Promotion Department, the Pollution Control Department, the Office of Environmental Policy and Planning. These agencies with their policies to encourage, publicize any environmental tasks, collect and organize environmental data, provide environmental technology information by

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utilizing technologies and provide training and seminar. Such practices are aim at establishing knowledge, awareness to people and environmental quality promotion. Particularly, the Environmental Quality Promotion Department assigned Mahidol university to make up the master plan and action plan of environmental education in the end of the year 1994. These plans were to be proposed as national plans and guidance to undertake functions of environmental education by relevant agencies and to develop teaching material, techniques and teaching patterns of national environmental education. Also, the collaboration between the Environmental Quality Promotion Department and the Ministry of Education to select the qualified schools to be set up as provincial center of environmental education has been implemented in 1997. So far the total 19 centers with their aims to support and develop task forces of the environmental education at provincial level have been set up nationwide.

Moreover, medias have been the significant role in educating people with environmental knowledge. Television, radio and newspaper become more popular medias for publicizing environmental information to people. According to the study implemented by Ubolpong Wattanaseree (1990), Jintana Jinakul (1997) and Rapeepun Suwannatachote and her team (1999), students get most environmental information from televisions, radios and newspapers. The students specify information broadcasted by television is the most reliable information because it provided illustration for the audiences. Anyway, each media offers different focuses or selling points to produce the programs.

4) The role of private agencies in protection and conservation of national resources. Public and private organization including private sector have begun to take part in and rehabilitate environment to be responsive to the changing trend. These independent organizations are range from legal identities and non-legal identities, international private organizations and local communities as well as conservation clubs in the campus of the educational institutions at any levels. These organizations are scattered all over the country. They have carried out various activities based on type of these organizations group united.

According to studies, the type of private organizations in natural resources protection and conservation are classified into the following 4 types (The Office of Environmental Policy and Planning, 1996):

1. Private organizations in environmental protection and conservation of natural resources. The number of these organizations registering with the Ministry of Science, Technology and Environment are 49 organizations.

2. Ordinary private organizations. The organizations do not register with the Ministry of Science, Technology and Environment but carry out activities related to environmental quality development.

3. Businesses and private sector. At present, the role of the businesses and private sector in conservation of natural resources and environment has been clearly seen. Activities to conserve environment are grouped into 4 types:

3.1 Investment for pollution control

3.2 Non-pollution technology development

3.3 Technology development for saving natural resources

3.4 Reduction of waste quantity and recycling

4. Organization of Local community. This kind of organization has been encouraged to engage in environmental management in conservation and

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rehabilitation of national resources and environment within the community such as ***"The Confederation of Southern Local Fishermen"***

2.9. Environmental Education Research

Before research on environmental education will be mentioned, the overview of policy guidance development and research on environment and natural resources is as follows:

1) National Economic and Social Development Plans in the past had caused deterioration of environment and natural resources and led to social problems. Therefore, the National Economic and Social Development Plan should be reviewed to develop people.

2) Educational trend and guidance in the future focuses on life quality, strengthened community and well balance of environment and natural resources by supporting to upgrade ethic through formal and non-formal education.

3) Sustainable development dimension to balance development. The development includes environment and future trend to make a decision according to mutual agreement made by human and based on environmental diversity, ecological system, society and culture.

4) Policy related to environment such as new constitution emphasizing on participation and entitlement to conserve and rehabilitate natural resources and environment. Policy and plan of national environmental quality promotion and conservation, 1997-2016 focuses on management to support and conserve quality of environment and natural resources. Approaches to make up the action plan for environmental quality management at provincial level are classified into 4 project groups. Two of these groups related to environmental education and research are group of awareness establishment and group of practical research and study.

5) Policy on research is related to environment and natural resources. Policy on research of environment and natural research made by the National Research Council of Thailand particularly focuses on development, improvement and protection. Some parts of the policy mention research to develop the suitable approach to encourage people to establish awareness and take part in protection of environment and natural resources. Although Policy and Plan of national environmental quality promotion, 1997 includes policy on education and publication for environment, it emphasizes on study, research and apply information technology only.

6) Trend on research of environment and natural resources focuses on technology development to prevent and remedy the problem.

7) The policy and scheme on the research of national education fairly emphasized on fairly educational research.

The attempt to conserve and reduce problems of environment and natural resources is always seen in overview of the development, policy, research policy, policy and scheme on research of national education including the importance and role of environmental education in Thai society. Anyway, the problem still exists and seems to be more serious in the future. As noted above, such phenomenon indicates lacking of efficiency to manage to achieve the set goal. Important management is

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personnel management that requires the person with awareness and value including desired behavior. Then, they will undertake functions with readiness and seriousness.

Human development needs to be gone through formal and non-formal education process. Environmental education is the educational process to build awareness and behavior required for conservation of environment and natural resources with balance. Moreover, present government (chaired by Taksin Shinawatra as the prime minister) makes emphasis on development based on knowledge. Some parts of the knowledge are developed by research. Anyway, when being studied in details, most of the researches for promoting environmental education research are related to research issues/subjects. Anyway, researches concerning about integrated management system to determine the appropriate approaches for management to encourage environmental education researches are never conducted. It is necessary to conduct the researches to lay down policy and implement approach for executives at all levels to develop knowledge of environmental education for the country in accordance with globalization by emphasizing on environment and environmental education.

Although there aren't many policies that support environmental education research, these policies are often included in researches on environment and natural resources and education are not seen clearly. Anyway, it seems some can be seen and raised as follows:

1. The policy/master plan and curriculum of the environmental education set by the Ministry of Education as follows:

Research and study of data and information technology system will be encouraged. Analyzing and following up the problem to build and develop the personnel on environmental education is also supported. Particularly, knowledge, capability and experience of the expertise in the areas of environment including policies and approaches of the environmental organizations should be brought into developing environmental education, environmental implementation to be correlation within internal system and international collaboration. (Thanalai Sukpattee, 1991: 22-27).

Moreover, according to the action plan of the Environmental Quality Promotion Department – the Ministry of Science, Technology and Environment (n.d.: 13), it includes the important policy, the policy to research and study the environmental education, to be applied by executives and followers. The policy comprises the following measures:

1. Encouraging and supporting research on the form of environmental education in accordance with the principle said that the one who damages the environment, the one who is responsible for such damage.

2. Encouraging and supporting research on environmental education.

3. Encouraging and supporting agencies or environmental institutions to carry on pilot project to research, study and develop environmental education.

4. Encouraging and supporting research on the form of environmental education management

5. Encouraging and supporting to collect, compile and publicize the researches of environment and environmental education.

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2.10 Environmental Education Activities in Asia-Indochina Country Group

The environmental education activities in Asia-Indochaina group have been widely performed; especially, Malaysia, Indonesia, Philippine and Singapore, through government and private sectors, educational organization and mass media. Moreover, there have been a plan of environmental education development or national economic and social development plan facing some parts of environmental education. Furthermore, environmental education has been contained in both each subject and specified subject. (Vinai Veeravatnanond) et.al., 1997: 167)

2.11 Research Related to Environmental Education in Oversea

2.11.1 The World environmental conference at Tbilisi, Union of Soviet in 1977 has added and confirmed the Belgrade conference with principal concept as fundamental environmental education management on research and evaluation (Vinai Veerawattananond, 1997: 14) as the following

1) Development the policy of environmental education research

2) The research scope has been covered goals and objectives of environmental education, content structure of environment, knowledge and attitude for the effective education management, teacher's behaviors, learning process, problems and threats for conceptual thinking, values and attitude leading to environmental behaviors.

3) The appropriate situation for environmental education management as contents, instructional approaches and innovative learning in environment.

4) Development of approach and curriculum for general publics; especially, through mass media and curriculum application evaluation.

5) A subject design for regular and pre-regular teachers, research design for environmental education management.

6) Studying the contents of environmental education for interdisciplinary approach

7) Researching and teaching approach with cheap media and self-construction

8) Exchanging some research findings each other.

9) Analysing some imported equipment being adapted to be appropriate condition of each community.

2.11.2 **Australia** has specified the environmental source research to be one of environmental education objectives. (Vinai Veerawattananond, 1997: 31-32)

2.11.3 **Japan,** in 1996, has a project of learning management throughout the country on sustainable environment learning in the Teacher's Colleges in order to develop the functional teachers, and to train the teachers' college students and regular teacher before starting their instruction on environmental education. Besides the teachers' college, the project covers 5 universities which have ครุศาสตร์ students and

settle up the Environmental Institute in those colleges and universities called Council of Environmental Education Institutes Associations in order to co-operate each other and manage the Learning for Sustainable Environment (LSE), under the co-operation with the UNESCO-ACEI, by assessing the environmental crisis and managing the learning related to the society situation together with assessing the environmental crisis . The LSE is an experimental research for finding the future environmental education guideline.

Moreover, Japan has tried out many projects; such as, developing school for Educational research trying cut the environmental education instruction in primary level integrated in the social study and science based on the directed experience. The result is found that the new generation care and reserve the environment more than before. More than this, the government and other organizations have other projects and continually conduction in all level. (Vinai Veeravatnanond and others, 1997: 56, 58)

2.11.4 **Indonesia** has a policy to develop the environment by the government declares the breeding and planting regulation and educate the people to realize the responsibility to the environment.

Moreover, Indonesia has Environmental Study Centres (ESCs) which was built for suggesting some technique for research, training, and other international, and regional service.

Each ESC is an independent section of the university and responsible to the tridharma or 3 functions of the university which are researching, educating and training, and publics service. The centres will conduct basic job and improve the researching and conduct the EIA process (Environmental Impact Analysis) on the special project. (Vinai Veeravatnanond and others, 1997: 115)

2.12 Related Research

2.12.1 Research Related Environment

Juraiwan Kaewkamnert (1994: abstract) analized the environmental problems in Thailand. It was found that the rapid economic growth, change of economic structure and urbanization effected to more environmental pollution. This was the reason why the Seventh National Economic and Social Development Plan made a priority of environmental problems as water pollution, air and noise pollution, toxic pollution, problem of world weather changing, The purpose of this study is to collect the study report concerning with the pollution in Thailand. Then, the research attempt to categorize and analyze them in order to be a guideline and a supporting for planning the further study.

Based on the resescarch findinds in 1987-1992, researcher found that the quantity of the pollution study and research are less. The government should support and encourage researchers to do research much more than this especially in the topic of pollution solving. Also, the problems of pollution from industries and inhabitants are essential. The main cause is the lack of responsibility of owners. The government , therefore, pay more attention to these problems. Strict law is essential things for controlling and eliminating them.

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In additions, data of pollution isn't enough for researcher. So, vision as well as up-to-date academic knowledge is required.

Siriporn Tanbut (1995: abstract) studied effect of environmental pollution to hygenic 1987-1993, she found that its effect is one of the most important problems for medical science and public health at present. Her study aimed to collect and analyze related findings. The scope of her study, located in physical and chemical factors to hygene cited from Thai officials, proposed morms and trends, which are available for the further research.

Distributed by its content emphasizing on the hygene problems that caused by environment factors, the researcher has collected 99 studies and analyzed contents in all. The researcher found that all topics studied in step and informed hazard identification as well as exposure assessment of risk. Moreover, most studied used Cross-sectional Approach and scoped in Bangkok and circumference, except the study of arsenic in Nakornsrithammarat. Emphasized on all risk assessment, all environment factors are required for the next step research.

Chatchai Rojchanawithit (1998:A2), ***"The status of resource and research 1992-1996"*** aimed to its utilization, stated that :

Not only an average of the study in this field is decreased each year but also its objective is opposite to those of National Research Institute and environmental administration. During 1992-1996, we have had 949 research that is a few amount comparing with the intense problems we've faced. That is, firstly, the duties of research institute are depended on its head office. Secondly, in order to respond their own needs, those researchers have been presented only the things they interested in. That is to say, the studies seemed to be new private resources including individual wisdom but application.

2.12.2 Review of Related Research and Literature

Having few studies, however, there have some which are useful for researcher to specify the problems. Also, some can support data and sources.

Piya Wongsukrom (1996: A-B) studied on the synthesis of environmental education research with content analysis technique and Metta Technique scoped in Mahidol University 1990-1994, his samples were 149 Master's degree research, data was the summary of research details, and finally treatment by percentage, means and standardize score. The conclusion is as follows:

1) The descriptive results for content analysis technique about knowledge, skill, attitude, values and environmental behavior were dictated that samples' knowledge and idea are in middle level. However, from the result of environmental evaluation, we found that the students achievement is high.

2) The synthesis results of quantity research with Metta Technique are :

2.1) According to experimental research about sound slide making in Environmental and Natural Resources Preservation, we assumed that the achievement of experiment is higher than control.

2.2) From the multipled regression analysis of achievement, we generalized that teacher using materials, education level of teacher, students'

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environmental knowledge from mass media, and teacher's experience make gains which are significant at the level 0.05.

As a result of this, the researcher found that the development of curriculum and materials should be more study, for instance, Computer Aid Instruction (CAI). Moreover, there should be a study of environmental education both in and out of school. The topic of a study should be response to National Policy and Plan of Environmental Development, for example, natural environment, things human made, ecology, etc.

Suwimon Wongwanich and staff (1996: abstract) synthesized environmental education research in Thailand, they stated that its purpose is to examine and synthesize the environment education research in Thailand from earlier since 1996. This research is descriptive research and its tools are recording form and data coding form surveying and collecting data from abstracts, and describing by frequency, percentage, and analyzing its content.

The results found that 370 surveying research mostly belonging to Master's degree and can categorized as follows:

1. The studies directed to develop curriculum and problems of usage.
2. Officers from related organizations lack of encouragement and interesting.
3. Development of instruction's materials are efficient.
4. New teaching method using in related subjects is more efficient than discussion.
5. Samples' attitude and behavior in medium level are quite good but poor in knowledge.
6. Most of projects are successful and attitude's response is good.
7. Only indoor activities are taken place.
8. Noise pollution and others were conducted also.

2.12.3 Related Research and Status of National Research

According to relevant studies, factors of research system and statement of problem will be clearly. In a study of status of national research status, The National Research Council of Thailand (1996: abstract), aimed to study status of research and develop in any fields in 1993 and study trend of national research and development. Conceptual system is obtained to be the basic of specifying factors of research project education, personnel, budget, funder, tool, application and trend of further research. The study is categorized into two as follows:

1. Documentary Research
2. Survey Research

The data was collected from questionnaire and interviewing, and was calculated by the researchers to obtain the percentage. The results then were numerically presented in tables, lastly, interpreting and discussing (The target population of this study is the head of research office, included one from State Enterprises and private sector.)

The conclusion can be shown in the following:

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1) **Research Unit:** The study stated that the total of research office in Thailand is 396, highest number is in Bangkok (200) and the following is in northern (64), respectively

According to this, 90 offices are official and 250 offices belongs to Universities and colleges. It also indicates that great number of office(280) belongs to the office of life quality development (L.Q.D). Popular research topics are education, religion and culture(134) , economic development (156).

2) **Research Project:** There were 5377 projects in1993. The maximum is social science and humanities(628). Categorizing in field, a study of economic development is the greatest number, 4340 projects. Moreover, the studies had been taken mostly in Bangkok, 50.7 %.

3) **Budgets:** In 1993, the total is 4,473,411,892 baht allocating from government.

4) **Researcher:** It is found that there has been 17,126 researchers in both government and state enterprises. Most of them are officials and doing research as their full-time job.

5) **Funder:** Surveyed in 1993, there were 80 funders in Thailand. The budget is formed in employment, loaning, and sometimes free; mostly in economic development.

6) **Tools:** Research tools aren't significance trouble for researchers. They are only substituted for the old one as well as the damaged one, sometimes for lacking.

7) **Application:** Responding to requirement of some offices, research will be applied

Thus, the things we keep in mind for the study should emphasize on (1) all problem factors; (2) the important of application.

2.12.4 Research Relevant to Connoisseurship Evaluation

In Academic Excellence Index Development Faculty of Nursing in Private High Education , Uraiphan Janewanichayanon (1994: abstract) found that there are 23 criteria of excellence conceptual framework and 121 indicators. After evaluation, possibility indicator is suitable and useful.

In the study of the Development of Administration through Total Quality Management (TQM): Independent study of Chulalongkorn University, Phansak Phonsaram (1997: abstract) arranged the seminar of the experts and the result is to offer the administration process leading to total quality in organization (TQM) which is suitable for Chulalongkorn University The process has 8 steps, according to the evaluation, each step is suitable and possible in high level.

In Connoisseurship and Creativity: Monitoring Creative Thinking Abilities in Primary School Children in England, Jou A.Palmer(1992: 17-27) observed creative thinking abilities of students in six classroom divided into treatment group and control group. Both are different in teaching method, class management, and curriculum, and similar in taking pretest – posttest. The result are: (1)At the time of the pretest there appears to be no difference between the groups. (2) At the time of the posttest (after the treatment), there appears to be a difference between the groups. (3)The difference is significant. The researcher evaluated them by Connoisseurship Model of Evaluation adapted from Elliot Eisner's (1979), Stanford University. The finding supported that Eisner's concept of Connoisseurship

model is the best one and it can be used with Quantity Research in order to enrich the reliable and correctness

Wanchai Sirichana (1994: abstract) studied on the Development of Education Quality Insurance Model in High Education, University Affairs, also stated that his study directed to develop model, procedure which are suitable for education quality insurance in high education. He collected the findings of ISO model of many countries by using connoisseurship evaluation and improve particular in high education in Thailand.

2.12.5 Research Output in Overseas

In Environmental Knowledge of Elementary School Students in Greece, Paraskevopoulos, S. Padeliadu, and K. Zafiropoulos (1998), mentioned the major objective that is to adapt data-base for increasing the efficiency of environmental studies, according to the lack of environmental studies in elementary and primary school. Many teachers try to manage the environmental studies' curriculum but sources are inadequate.

The finding, population are 686 students. in grade 5 and 6 in Greek, states that students have learnt environment science with text and their real experiences. Moreover, the recommendation pointed out that using systematic approach should be better. By concept of viewing the environment in unity, it would make the learner understand and improve environmental preservation's attitudes.

2.13 Research Conceptual Framework

Research conceptual framework is based on theory as follows:

2.13.1 Concepts and System Theory

Based on the Structural-Functionalism Theory which is the master of the Mainstream Theory, Bronislow Malinowski, a Polish humanist proposed that every section of the system in a society and culture is important under its function, and support each other, then, the society and culture still remain and well-going on Similarly a house consisted of the stake, roof, gable, wall, floor etc. will collapse if any part is lost, or irregular.

A.R. Radclitffe-Brown studied the relationship of the Structure-Function using Holistic Study Method. Radclitffe-Brown suggested the Harmoneous Society focused on each Structure-Function of the structure, then consider the supporting among the Structure-Function. If they are harmoneous, the society will be happy, on the contrary, with conflict, the society will be paralyzed, There should be a remedy or cut off and replace with a new structure accordance well with the others.

The term ***"system"*** means the factors which co-operate each other in order for a result. Or, ***"system"*** means an interaction of the factors in activity, function, and some conducting. Herbert G. Hicks said that ***"system"*** means to combine many related things in order for unity under the major purpose of the stability or growth and interaction of the whole system. (Booncherd Sobhon: 1993: 1)

The system could be classified into 2 types as follows:

1) **Closed System** is a self-contain system, which does not bind with others and self-separate from social.

2) Open System is a system which communicates with the person,

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organization or bureau in order to exchange balanced benefit, however, the condition changes could effect the system.

One system is consisted of 3 factors: the first is input, the second is process or Conversion Process or Decision Process and the third is product. The 3 related factors will function together in cycle. When any factor has a problem, it can effect the others. Moreover, system is related to both internal and external environment, that can effect as the influence or interfere to each structure or factor in the system, and then, the feedback sent back to the process again. The system related to the input, process and output is called Input-Output Model. The relationship among the factors of this model is as follows:

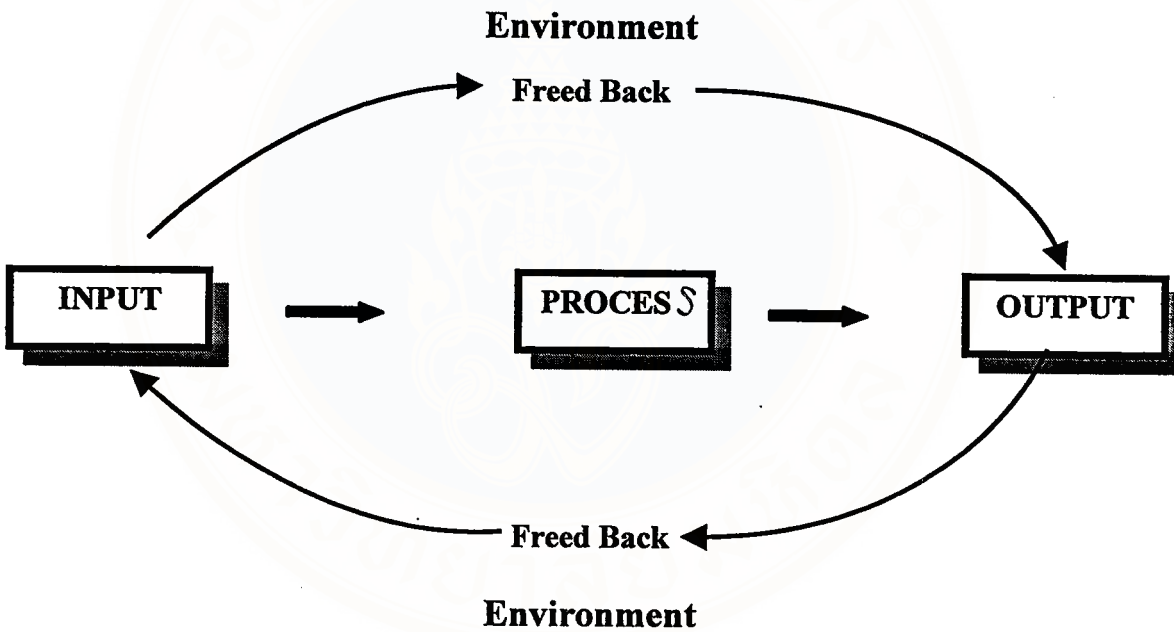

Figure 1. Environmental System and Relationship

2.13.2 Systematic Approach

Based on system approach, the organization is directed to its goal and can be examined for the adaptation as well.

Kast and Rosenzweig (1985 cited in Unnop Jeenawat, 1996: 68) noted the meaning of system that it is composite and relevant to each other.

Also noted by U-thai Boonprasert (1983), he concluded that the meaning of system has two characteristics:

1) System is entity, which has a particular character. The composition is independent in duty, however, it is similar to its objective.

2) System is a methodology to runs a particular duty specified by the process..

Academically, system still has two characters.

1) **System as Work Unit:** it includes body system of living things; system of inanimation, for example, car, engine, camera, electric fan, projector;

invisible system is just like economical system, social system, national defense system, and educational system.

2) **System as Process:** That is the work step, which sometimes named system based procedure, work system, or work procedure. Anyway, this system supports to those mentioned in the first.

System as work unit consists of basic element working together in any activities in order to achieve the purpose. This system is composed of:

1) **Goal** is the highest achievement of system.

2) **Element and Function** are major sub-systems that differ in duties but the same in its goal.

3) **Co-ordination** means consistent co-operation within system.

4) **Activity** is a factor to complete goal. To do activity, input, product, process and impact are mainly concerned.

Comparing system mentioned above with school, the systematic analysis of it is:

(1) School has its goal. The goal is to form desirable student characters. Moreover, students are expected to succeed in their life and to assist the society.

(2) Similarly, school has basic elements, that is, visible things: administrator, teacher, janitor, students, building; invisible things: curriculum, discipline, rules, and courses. In all, school can complete with all above.

(3) School co-ordination is good. Staff has his own duty and responsibility, also, is in the same line. Instrument and material are used for the highest value.

(4) Activity means school process majority in instruction, other activities are included. The factors of these are classroom, material, lesson plan, and best teacher. Anyway, the objective of this process goes to output. The feedback of the output, both positive and negative, makes ***"impacts"***. Lastly, positive output is ***"Goal"***.

However, goal depends on external factor as well. **System as work process** means working by using suitable and efficient procedure or step. The step which is improved that can be the leader of the success, and sometimes namely work process or systematic procedure. Important character of it is completely circle. Systematic procedure has many steps depending on its utility.

1) General Systematic Procedure has 4 steps as :

(1) Identify problem: what you require, why you study, whether the study is useful.

(2) Plan to respond needs and solute the problems

(3) Action

(4) Adjustment

Step 3 is pararell to step 4 and conclusion will be made after step 3.

2) Systematic Improvement: Adapted from systematic procedure, it can be categorized into 6 steps as :

(1) Awareness creating for having development

(2) Analyze to search development point

(3) New procedure for development

(4) Performance

(5) Evaluation

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(6) Be proud in output.

This technique, however, is suitable for teamwork such as school staff because they can participate in all steps.

3) Process Skilled: Expanded from systematic procedure, this process contains more step than the others in order to practice students in working process advised by teacher and gets along with scientific approach. The 9 steps of this process are the following:

1. Awareness in problems and needs
2. Critical thinking, analyzing, criticize
3. Having many collections
4. Interpreting collections and choose
5. Ordering performance procedure
6. Doing with admiring
7. Assessment
8. Improvement periodically
9. Evaluation in all for pride.

To increase the efficient, systematic work is required. School management should be kept in line of this method, in this sense, it would be continuously improved. As mentioned ,system consists of many factors which independently works influenced of the same goal and the same condition. Anyhow, it has 4 characteristics: (1) having reaction to environment, (2) having goal, purpose, and objective, e.g., profit is business' goal, qualitative output is educational goal,(3) having discipline. It is necessary for system to have a stability, for this reason it must have a consistency in order to manage the internal reaction. For instance, our life depends on sub-system like digestive system and excretory system. That is how the internal discipline concerned. (4) having self-correction. In accordance with environment reaction, sometimes its error influence on internal system. So it has to adjust itself for facing new environment. To describe self adjusting, we need feedback concept. That is, with respect to Wilailak Rattanapianthamma (2000: 35-37), system produces output while getting feedback, then output becomes input again.

2.13.3 Guideline of Research Administration System

1) **Research administrative resources**: sub-systems are (1) research, (2) man, (3) budget, and (4) material. Without them namely research resources, research can't be designed, or it would be the useless one.

2) **Research Administration process**: The process aims to manage research resources. Booncherd Sobhon (1993: 3) discussed that this process has four methods :

(1) **Scientific Management**: This method emphasized on the profit and the efficient of output. Besides, it also based on POSCORBD or PA POSCORBD (P = policy, A = authority, P = planing, O = organizing, S = staffing, CO = coordinating, R = reporting, B = budgeting, D = directing)

(2) **Human relationship**: Human relationship is the main point of the process. Sometimes it named motivation, supervision, personnel, leadership, and incentive.

(3) **Modern Organization**: It combines scientific method and human relationship together for the highest application.

(4) **Development Administration:** It implied from the three above for achievement , considering with internal and external factors.

3) **Research output and outcome:** Research output (or research result) is research finding or namely research report as research outcome is finding application. Anyway, means wholly in basic research, applied research, and research and development. At last, all are for economical development and society.

In order to achieve the success, it is necessary for national research development to know about factors, which are basic constructions for research. As the result of knowing these factors, researcher can make a decision how he invest for his research. Moreover, constructional theory can be applied to analyze the status of research as well. To view the national research clearly, increasing important factors should be included in education conceptual framework, for example, research proposal, funder, research used, statement of problem, and trend of development.

Beside, Jintanapa Sobhon (1996: 241) has presented Research Implementation Circle in the following

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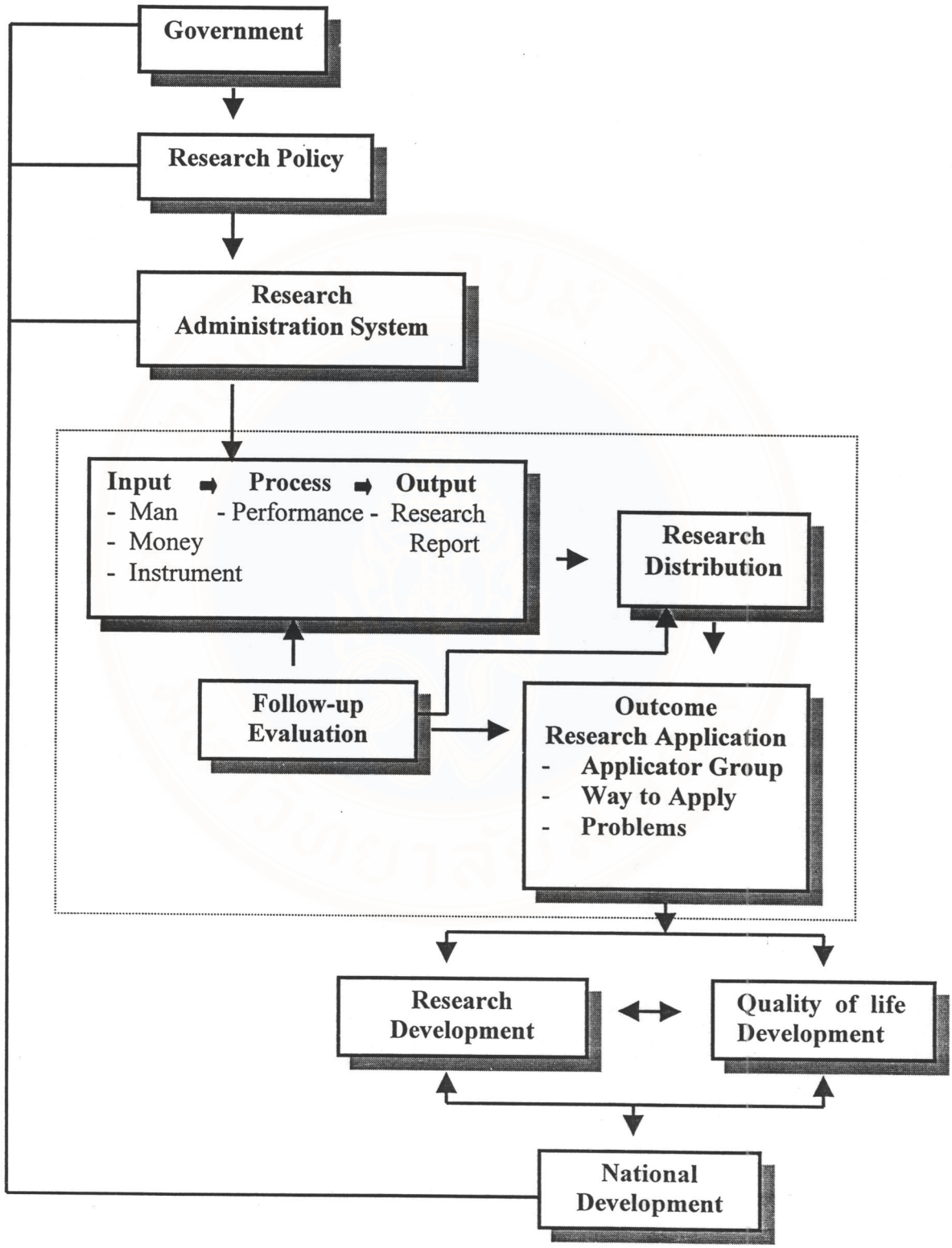

Figure 2. National Research and Development System Circuit

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Concept of research Administrative System is as follows: (Booncherd Sobhon, 1993: 2-5)

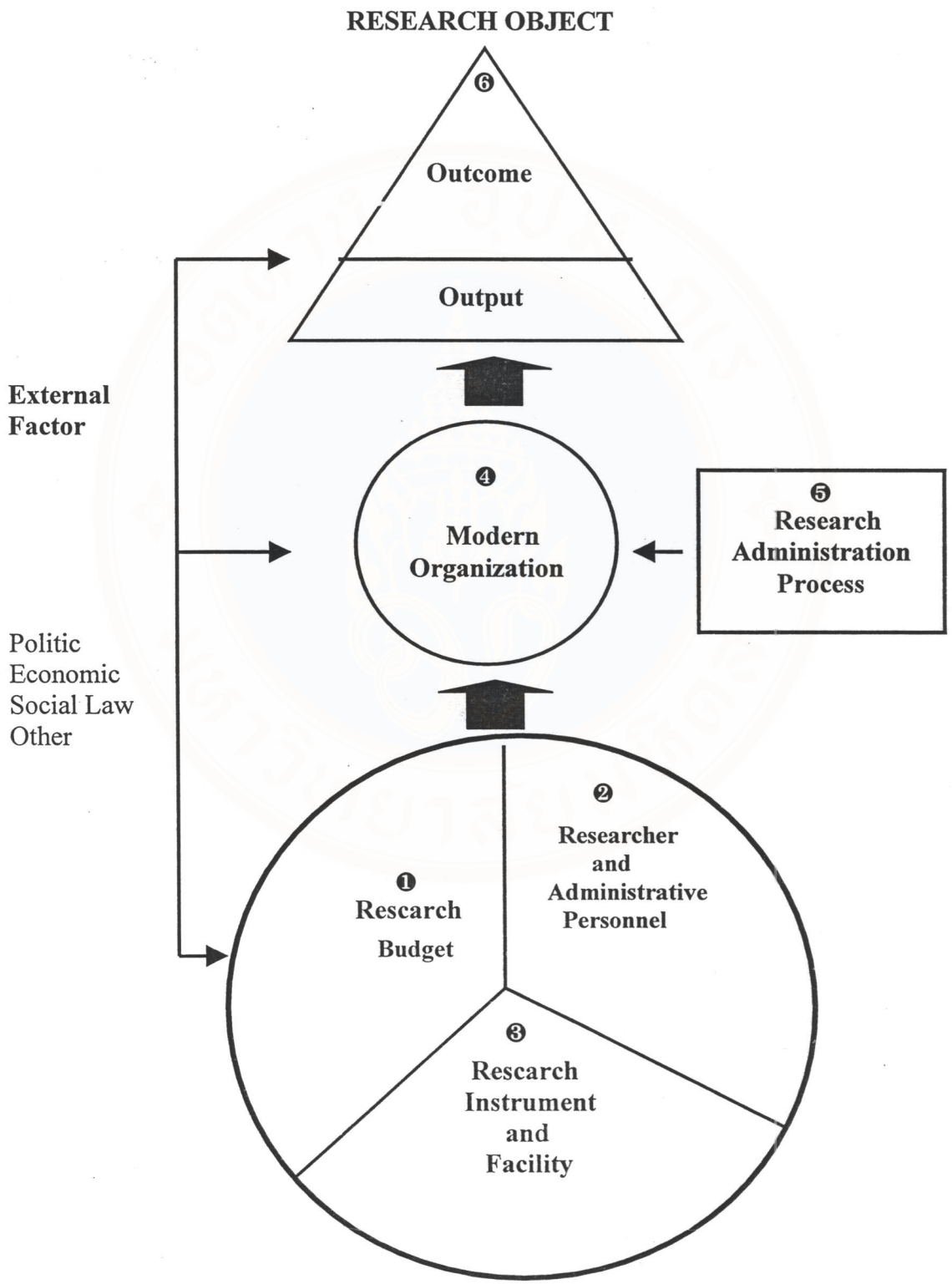

Figure 3. Research Resources, Display Research Administrative Implementation

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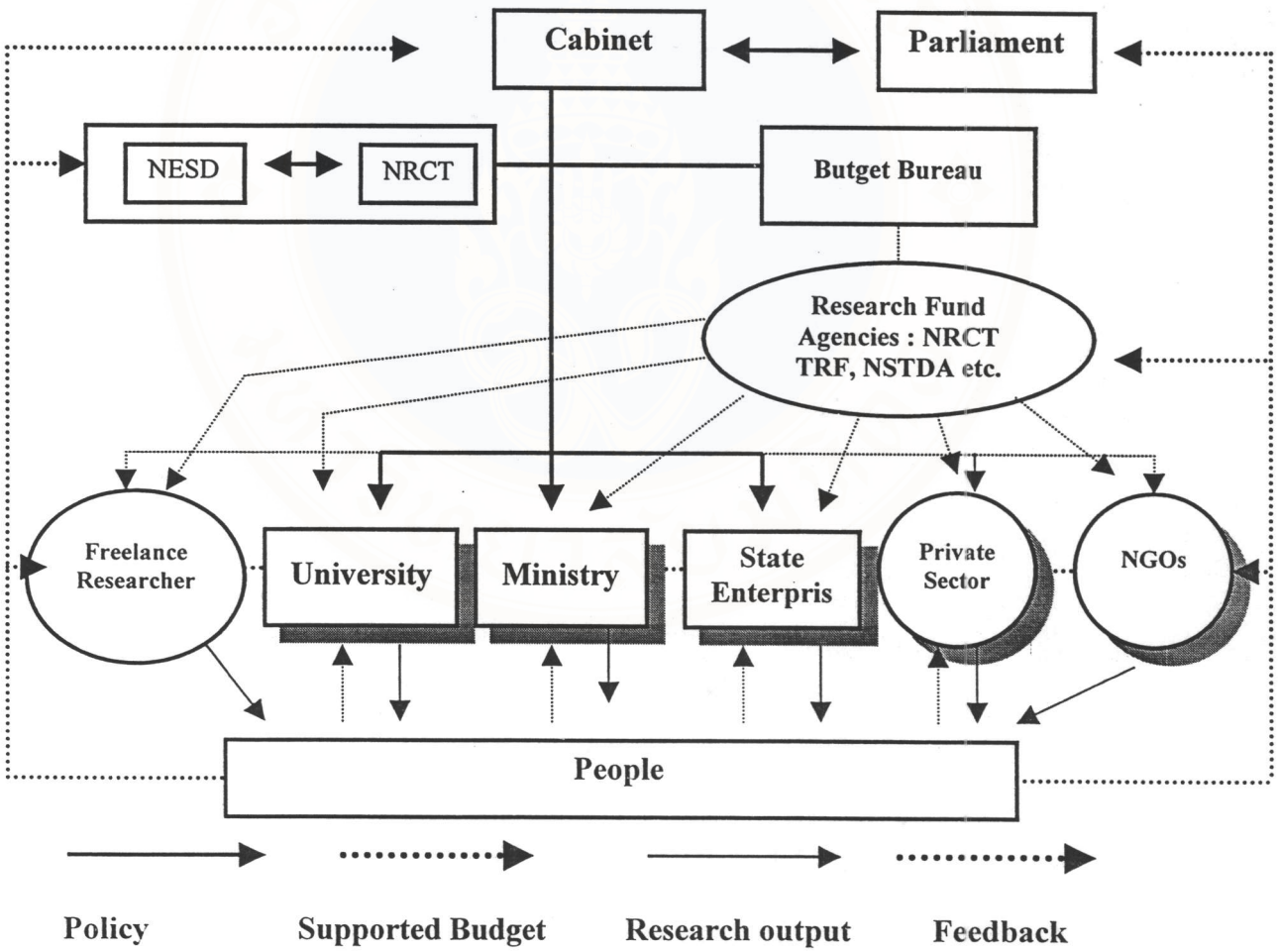
As we of research resources have seen, all types of research can be achieved with relevance conducting by research organization. The following are main factors of national research implement.

1. Budget
2. Research and development institute
3. Thai staff, personal administration and reinforcement
4. Policy and national research planning
5. Follow-up evaluation
6. Co-operation and co-ordination
7. Research application
8. Reactive effect of politic system, economic, and society



NESD: The National Economic and Social Development Board
NRCT: The National Research Council of Thailand
TRF: The Thai Research Fund
NSTDA: The National Science and Technology Development Agency
Figure 4. National Research System
Source:The Office of National Research Council, 2000: 29

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2.13.4 problems of national research and development system

The Research Policy and Planning Division, The Office of The National Research Council of Thailand (2001: 299) has arranged the significance of problems in national research and development system orderly as follows:

1. Problem of policy and plan of research and development
2. Problem of researcher/staff
3. Problem of expense and fund
4. Problem of administrator of research and development unit
5. Problem of organization
6. Problem of supporting
7. Problem of co-ordination
8. Problem of data, instrument, and facility
9. Problem of research application
10. Problem of conducting research and development
11. Problem of research and development output
12. Problem of distribution
13. Problem of evaluation

Fortunately, the related connoisseurs and units have given available suggestion for the above problems, briefly presented as follows:

1) Following Amorn's study in Research for the Development of Research Promotion Policy and Progress of Thailand (Volumn 1 Summary for asministrator), Amorn Raksasat and Staff (1990: G- H), the results of researchers' comments in all levels on general research promotion and research administration can be defined as follows:

(1) National research policy and planning should be obvious.

(2) Budget should be one percent of population incomes and be doubled each year until reaching goal.

(3) The procedure and the discipline of fund should be simple.

Moreover, fund should be paid at once and be enlarged in order to reinforce researchers.

(4) The government should support private sector to do research much more than this. The supporting may be in form of offering instrument, personnel, or the tax reduction.

(5) The government hasn't applied findings of research for planing policy and solving problems yet that make researcher lose his attention.

(6) Effective research has done in less number. Research unit should pay more responsibilities on this.

(7) Administrators of state work-units lack of attention, interesting, and promotion on research.

(8) Quality researcher is rare. Thus, the government should produce more professional since childhood till high education. Moreover, he or she should be trained to be best and the follow-up evaluation should be added all of which are in level of workunit..

(9) Research center should be set up to co-ordinate among research unit.

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(10)The achievement of the National Research Council of Thailand is poorer than Office of the National economic and Social Development Board. So. the administration improvement of the former should be done seriously.

(11) Most of researchers are officials and their incomes are so little that they move to private sector.

(12) Having only the same field meeting, researcher has narrow vision, thus research association is required to share ideas and knowledge with other fields.

(13) Research information and services center should be formed under the consideration of the National Research Council of Thailand for the reason of solving researchers' problems on fund approval and information receiving

(14) The services of the National Research Council of Thailand are inactive and inflexible.

(15) Research fund should be whole paid because the steps of withdrawal are difficulty and not appropriate.

(16) Organization implementation isn't convenient. The government should support foundation forming both official and private sector..

2) Sippanon Ketuthat (1997: 13-14) has summarized the conference of ***"Research Development in line with National Development"*** into eight main problems.

(1) Comparing researcher with manpower, the probability is 20-25 researcher : 10000 manpowers, the fact is that we have 10% of domestic researcher: 2 researchers : 10000 manpowers.

(2) The research fund of Thailand is inadequate about 5 times. At present, budget is 0.17 % of GDP, the probability is 0.75.

(3) Administrator couldn't manage the budget appropriately, in sum of 50 – 100 million baht per person, thus best administration is needed.

(4) The discipline in official research is too serious, and risk to follow.

(5) Thailand doesn't have research professional. Most of researchers has done research for 5 to 10 years. Talent renewal should be considered in this case. Also, some workunit has been improving itself in order to solve this problem.

(6) C0-ordination between the government and private sector is less.

(7) There is no switching in knowledge and technology with overseas.

(8) Research policy is incomplete such as in field of science and technology, politic and social, etc. For this reason, expanding branches of research institute is more available for connecting data.

3) Sutham Areekul and staff (2000: XIII) have suggested the way to solve problems of national research system that :

(1) Identify policy, guideline, main goal and national research plan obviously and uniquely.

(2) Support the funder to be independent unit and various in action.

(3) Form measure for making quality researcher who goes hand in hand with national research work.

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(3) Form measure for making quality researcher who goes hand in hand with national research work.

(4) Gather fund and source from both state sector and private sector. Good measure of fund allocation and sources is required for qualitative research.

2.13.5 Guideline and Suggestion to Support National Research

Many of relevant organizations and connoisseurs have given guidelines to support national research work to continue its various development. The researcher has summarized the main issues of this part as follows:

1) Guideline to Improve National Research Administration

To make efficiency of national research policy and guideline vol. 6 (2002-2006) in abstract performance in short term (5 years) requires guidelines to improve national research administration. These guideline focuses on its results and administrative process of solving main problem facing in the past. Consequently, suitable guideline are following:

(1) Guideline to improve the convergence between work-unit ***"Quad-research number"***.

(2) Guideline to improve policy focuses on social needs

(3) Guideline to create culture and application of research work to solute problem

(4) Guideline to develop research career

(5) Guideline to evaluate

(6) Guideline to co-ordinate with abroad

(7) Guideline to administrate budget

(8) Guideline to develop research of private sector in business.

(9) Guideline to lead research policy to work-plan

2) Guideline to improve the convergence of work-unit in research system *"Quad research member""*

To ensure the effect of national research administration, co-ordination of relevant work-unit is required. National research system can be divided into 4 components namely ***"quad research member"*** which are state, funder, researcher, and relevant personnel. (The National Research Council of Thailand, 2001: A 110-111)

(1) The state consists basically of the cabinet and The National Research Council of Thailand. Their authorities are:

(1.1) As the leading agency of national research work that identifies the research policy and guideline.

(1.2) Informs the research policy and guideline and also persuades the other 3 members to perform.

(1.3) Follows up the support of research work and evaluates the results which are presented for the development of research policy and guidelines periodically.

(1.4) Informs research work to public by public relations, demonstrations, and exhibition of research work and its application.

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(2) Research supporter composed of (1) The Bureau of the Budget; (2) Office of research fund (3) National Science and Technology Development Agency; (4) Office of Public Health System Research; and (5) National Energy Policy Office. Other associations and foundations authorize in three basic aspects as follows:

(2.1) Analyze, verify, and screen programmatic research, which should be supported based on national research policy and guidelines.

(2.2) Allocate budgets to support research work. In this point, The Bureau of the Budget is the one who allocates the budgets in great level/มหภาค down to research supporting unit and research work unit.

(2.3) Gather enough fund for needs, also, promote private sector in business to spend for its own research.

(2.4) Study in order to improve form and research administrative method started from setting problem till the application.

(3) Researcher is the important part for research work that consists of government research work unit, state enterprises, higher education institute, and private research center. Its three basic authorities are:

(3.1) Propose research project in accordance with the national research policy and guidelines.

(3.2) Conduct research by supported researcher and manage the administrative system and the atmosphere that facilitate to conduct research.

(3.3) Report the results and research expense to the supporter on time.

(4) The relevant is a diverse part comprising people, private sector and other government office. It requires research work and gets the reaction of research application. Its three authorities are as follows:

(4.1) Identify the research characteristics based on its application or being wisdom sources.

(4.2) Apply the research work efficiently.

(4.3) Inform the reaction of its application both positive side and negative one.

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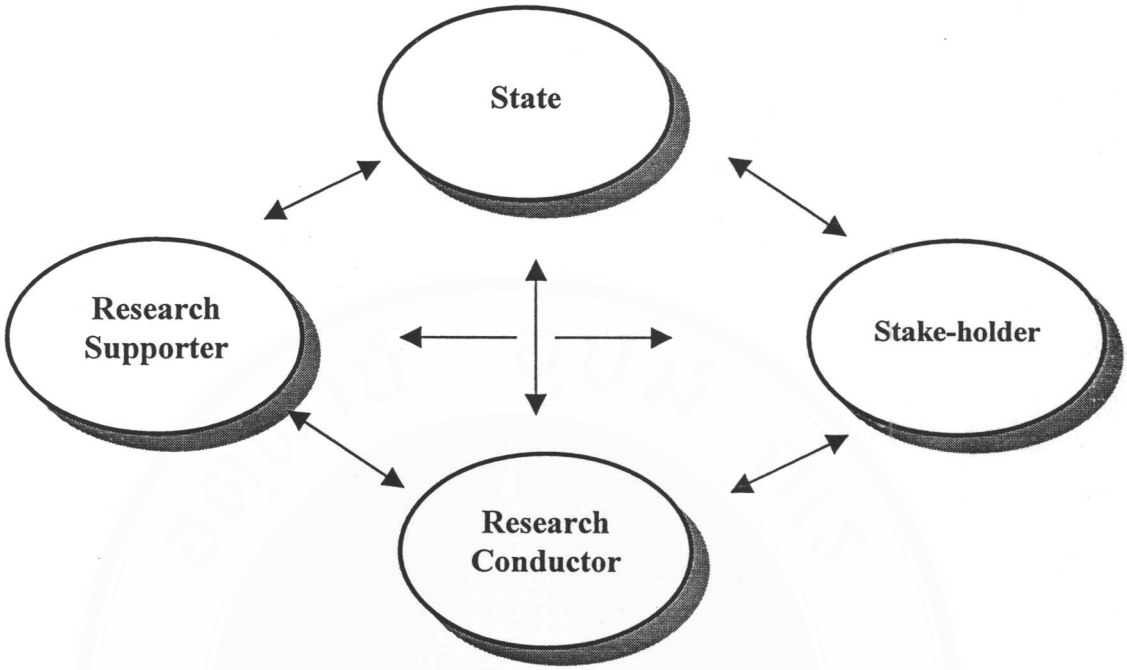

Figure 5 : Research Quartet Member

3) Guidelines to Support the National Research

In the process of the National Research Support, the main factors of research administration systems are budgets, researchers and research organizations, and other relevant factors. The government should state the guidelines as:

(1) Research expense should be spent according to the Seventh National Economics and Social Plan (1992-1996). Its goal is mentioned that the budgets should be expensed about two percents of the total at the last of the Seventh Plan (1996). In 1994, the state's expense for research is about 0.9 percents of the annual budget. Consequently, in 1995-1996 the state's expense should be increase continuously to two percents of the annual budget in 1996. The over load of research expense, that is, 0.9 percents of the budget in 1995-1996 sums to 14,679 million baht (6,124 million bath in 1995 and 8,555 million bath. in 1996) is apent to support the research administration as in the followings:

(1.1) **Setting at Funds to Support Research**. The fund may be distributed to:

- Research funds for high education sector is distributed to each institute in form of sub-fund for instance, research fund for high education 1 (Chulalongkorn University).

- Research fund for official has 2 sub-funds that are research fund for official in a field of science and technology and research fund for official in a field of social science and behavior science.

- Research fund for private sector is the fund for supporting research in business sector, the state independent research organizing and private sector, which conducts research for business application.

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(1.2) **Fund Administration:** In order to administrate the 3 funds mentioned above smoothly, they should employ in the state independent organizations, neither official nor state enterprises, that belong to National Research Council. Also, National Research Council should transfer to Office of the Prime Minister and authorizes in improvement Act of the National research Council to be more suitable for the new duties.

(1.3) **Re-improve Research Plan of Official:** The research plan of official has to be classified clearly and specifically included program and project.

(1.4) **Improve Budgets System of Official**: This improvement goes along with the first one that the budgets of office conducting research will be in 2 systems. They are 1) program budgeting depending on research conducting of its own office; 2) Lum Sum allocates in form of general budget in order to make flowing in research conducting.

(1.5) **Cooperation among the Bureau of the Budget and National Research Council in budgeting.:** The cooperation should be in form of the Commission namely The National Research Budget Commission. Its authorities are considering all research budgets including research fund, official budget, state enterprises budget, and state independent research organization budget.

(2) **Researcher:** should be increased closely to those in the countries which their government allocates budget for research expense about 2 % of annual expense, e.g; Singapore, Austria, and Denmark. In these countries, there are 27 researches per 10,000 manpower. The researchers may be increased by way of:

(2.1) **Construct the Specific Research Organization.** It is set in order to conduct research in the field that is essential for the country.

(2.2) **Expand output of Master Degree and Doctoral Degree.** The output mainly focus on the field needed and the field that has specific research institute.

(2.3) **Scholar for Master's and Doctoral**. The students in master level and doctoral level should be scholar especially in the needy field and the field that has specific research institute. The scholarship would be domestic and overseas.

(2.4) **Construct Advanced Educational Institute**. The advanced educational institute focuses on master level and doctoral level majoring in science and technology, likely to the construction of KAIST Institute in Korea.

(2.5) **Construct Research Training Institute**.

This institute may be construct in each original institutes and focuses training on the topic that each university is expert.

(2.6) **Cooperate Research Work Between Thai Researchers and International Researchers.** The cooperation may be various such as exchanging international researcher, co-conducting research, research for doctoral degree.

(2.7) **Join Hands Between Thai Professional in Aboard.** The cooperation project should be in form of, for example, Joint research and Marketing, Sabbatical Leave, Summer Visits, and Thai Trains Thai.

(2.8) **Hire the Researcher from Aboard**. Foreign researcher is hired for research work that the state requires.

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(2.9) **Built Motivation Among Work.** The motivation among working can be built by considering appropriate salary and other compensation. Moreover, making atmosphere of working, providing enough research tools, and giving up troublesome rules are needed. Lastly, making rules, which support and enthusiasm the workers.

(3) **State Research Organization** is not enough for research work and country development at present and in the future. The state should construct research organization in form of specific research institute in order to respond national needs in various aspects. According to this, there should be at least 8 expecting organization in department level. They are:

1. Research Institute of 4 Basic Needs.
2. Security Research Institute.
3. Social research Institute.
4. Industrial Research Institute.
5. Research Institute of National needs.
6. Research Institute of Searching Useful Knowledge for Human Being.
7. Specific Research Institute for solving problem crisis.
8. Specific National Natural Resources.

The Office Authorizing over the Specific Institute Those above eight institutes should belong to Office of the Prime Minister. Formerly, they are independent research organizations belonging to National Research Council. The supervision of National Research Council to the Specific Research Institute is loosing, however, rigorous in the result considering of research work based on the purposes. In long term, these specific research institutes included National Research Council, are reformed to National Research Ministry for responding to globalization era. The security of each country depends on up-to-date technology knowledge that has not been found yet and is essential for the living things on earth and on other planets in universe. World in the next step is research world for modern technology creation and peace. For this reason, national Research Ministry is required at this moment for directing Thailand to be the leader in future research of the world, not the follower as it used to be.

4) The suggestion to improve research system.

Office of the National Economic and Social Advisor House (2002: 3) has suggested the way to improve research system as follows:

(1) Policy

(1.1) Research and development policy should converge to other development policies, e.g., industrial promotion, trade promotion, economic development and finance. Technological development plan should be made to respond to the objectives of other fields which we want to develop, the plan should link weak point and strong point together as well as promotes each other in order to be a guideline and national research framework.

(1.2) The government ought to specify national project that is the long term one and is performed and restyled continuously. The objectives of the project are: make knowledge base, produce national specific excellence continuously, and be economic development base, for example.

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(1.3) Policy should include finance promotion which is in the condition of making ability in technology and its principle or procedure should flexible. Moreover, the condition must be in flowing steps and informs widely.

(2) Research and Development Structure

(2.1) The structure has to support the co-operation of research work between government office and private sector. Besides, it should support research work-plan which is from the co-operation of other bureaus and convergence mechanism can be made by integrated conducting

(2.2) The structure has to specify a development research, which relevant to the market needs and transfers body of knowledge and local wisdom that are efficient application and increase the ability level of competition.

(2.3) The structure will be a basic for research supporting and development adequately and emphasized on the former sources.

(3) Research Organization

(3.1) Research organization is obviously considered to be policy unit, fund unit, or research unit. Each role is different in order to investigate each other, however, fund unit is connection center for cooperation of research work.

(3.2) The present branch of research organization should specify its skills and its excellence (unlimited in field but shouldn't be too many) in order to reduce a repetition. It has to co-work with other organizations as cluster to create integrated output in concrete.

(4) Personnel

(4.1) Career path of researcher must lead to a professional one who is honorable as an executive and is conceded by public.

(4.2) There has been a plan to develop man source in science and technology aspect focuses on deduce experiences, creative thinking skill, technology development and forming learning by doing system.

(5) Other Factors

(5.1) There has been national structure to maximize ability level of making update tools/materials for research, development and industry

(5.2) Basic structure of information should be spread and is used as tools for co-ordination, inquiry, and result analysis, etc.

(6) Budget Allocation

(6.1) The budget allocated to research organization should be in system of increasing or decreasing based on national research framework that responds to policy. The system also has reaction to economic and social development by evaluation on earlier results.

(6.2) Capital Market System and Venture capital should be made for the purpose of being tools for gathering fund from private sector.

5) Trend and Vision in National Research Development

Booncherd Sobhon (1998: abstract, 142) studied the trend and vision in research development of Thailand in 2016, objected to study trend and vision of principal factor of Thai research development in 2016. The results of this study are the followings:

1. The trend of Thai researcher is stable, that is, two researchers per 10,000 manpower. However, vision required is 12 researchers per 10,000 manpower.

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2. The trend of research expense is stable, 0.11 percent of GDP (required 0.65 percent of GDP)

3. Research unit or research institute in the future trends to unchanged in number. The vision is indicated that specific research institute should be increased in nine characters in order to support the increasing of future researchers.

4. Published research trend is stable; about 6099 researches year. Vision is dictated that if research budget and researcher are increased, research work will enlarge to 0.5 topics per researcher per year on the average.

5. Thai patent in Thailand is less on trend increasing, 4 topics per year. Vision, which leads to Thai patent should be enlarge 45 topics annually.

6. The trend of import technology budget is always increase. Research expense rate compared with technology expenses is 1 : 38, its vision is 1 : 6.

7. The trend of research funder is also stable. For vision, there should be a lot of research funders should be formed in great number in order to support research variously and allocate budget to University and research institute in form of supporting money for general research. Besides, this sum can be formed to research fund as well.

8. Trend of man power in Master's degree increases while doctoral degree increases in a bit. Vision is that manpower in doctoral degree should expand to 2000 per year which can be educate for requirement off national research development in the next two decades.

However, there has been many problems to research before planning authentic work. Hence the study in other aspects of problems should be obvious in order to apply the information for planning correctly.

That is to say, there should be a study in depth of other factors for redevelopment of research cited in this report again. The study will be a source for applying correctly in project planning or activity.

As the preceding factors are only numbers in whole viewed, some factors lack of information and many details such as in which field the specific research institute in future would be construct; whether it is useful and reasonable for its investment; how much the investment is; which resource is used; in what ray of the administration of organization is highest efficiency; how other sectors as private sector and it self are converged; for whom research is applied, and who the funder is. Regard to the only one example mentioned above there are a lot of aspects to answer clearly in order to fulfil the future plan not to fail as the earlier.

Finally, the study should be careful in the sense for reliable information which con be applied for planning national research development correctly. Then, the expected efficient is now occurred.

2.13.6 Guideline of International Research Promotion

1) Researcher staff of science and technology development

Research Institute for National Development (1998: 42 - 61) has studied texts from international research organization and the changing of research content. They have viewed that the planning organization and the research administration are considered the principal one by other countries now, especially, the developed countries which have economic growth as U.SA, UK and Canada. So, learning texts of the countries

that advance in planning, conduction, and administration of research is guideline for other conducting included strong point and weak point. Moreover, it would be a guideline of national research promotion and guideline of environment education research promotion.

With respect to studying the role of research organizations in overseas, research staff has selected to study in eight of them as follows:

(1) National Research Council, Canada
(2) Social Sciences and Humanities Research Council, Canada
(3) Centre National de la Recherche Scitifique, France
(4) Deutsche Forschungsgemeinschaft, Germany
(5) National Academy of Sciences, U.S.A.
(6) National Science Foundation, U.S.A.
(7) Social Science Research Council, U.S.A.
(8) The Research Councils, U.K.

1.1) Important Character of Research Organization in Overseas.

The organizations of research and research support in U.S.A., Canada, France, Germany and U.K., as given for and example previously, arc quite different form many aspects such as the difference in principal duty; the structure; and source of fund. However, these organizations are similar to some aspects that influence on the efficient and achievement of conducting and can be analyzed as follows:

(1) Principal Duties

Principal duties of some organizations are research supporting as some Organization have their own research institutes. Nevertheless, the duties of these organizations obviously defined. All of them not only direct on create new knowledge output for academic intelligence but also highly emphasize on applying their research and the output which applies for national development. They also consider the important of development of research and personnel development that are mostly essential resources for extension research work and national development.

(2) Structure.

Things having seen in most of studied organizations are the conducting be board of directors who authorize over the organization administration with a view to extremely take care and direct the organization conduction. Board of directors consist of connoisseurs in any branches from the government and private sector. Doing this is advantage for connecting the two of them and assist to form flexible culture of organizations and adapt themselves along the movement of external condition.

(3) Source of Fund

Most of the studied organizations have received budget from the government and more partly receive by private sector. The budget rate of these two sources are different depend on each organization.

1.2) **Summary of Important Co-characters on Research Organization in Overseas.**

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(1) The objective of organization establishment and duties are instinct. The allocation of men resource and fund is much more down to principal duties than distributed to activities retail.

(2) The authority of administration is higher.

(3) Organizations are dynamic that they have been adapted their structures and activities in response to condition movement. In additions, there has been established specific work-unit in order to respond specific duty efficiently and its administration is flexible also.

(4) They emphasize on importance of research and support research which is update body of knowledge and make academic steadiness in long period. Meanwhile, they also emphasize on research work which responses to important problems of country and research that aims apply output on truly performance.

(5) Organization has its technique to link researcher and research applicator. It makes co-operation and co-ordination of research work between government and private sector. In this case, research applicator doesn't focus on project level only but in organization level as board of directors level, identifying principal problem of research work-plan, and institute establishment and development.

(6) Research network is formed to link research unit of states, private sector, education institute, through the network of abroad institute in some cases.

1.3) Research Property in New Content.

(1)According to technology revolution and globalization throughout the changing of development goal as mentioned above, research content and nature of research work have mostly changed. That is because important problem of national development at present is double-based problem and forming body of knowledge problem for solving these must rely on major research project and much time.

(2)Research is characterized co-academic rely on knowledge of many fields. Thus, research work is not only complex and large but also co-academic in many case. Meanwhile there has been much more convergence between knowledge of science and technology and knowledge of other science (non S&T), for example, social science, economics, and law. Also, basic knowledge or basic research converges with applied research. The changed property of research is influenced on conducting research project as much.

(3) Because of the opening of economical development, it leeds many countries to complete intensely in business in world market. In additions, crowded problems of national development in many aspects and budget tension make flow of thought that requires the application of research based on commercial or applied use for serious development. On the other hand, research has to relevant to topic of national development or solving problem or applicator requirement. So research is less characterized from supply push but much more in demand-pull.

1.4) Significance of Changing on the Administration of Research Work and Organization.

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(1) The trend of research work by individual researcher in form of sub-project is going to decreases especially in research work that aims to search narrow knowledge in order to respond his own needs. As research work by team, many be consisted of either researcher from the same field or other field, may enlarge to major project or research programs and themes. Moreover, role or research project manager is doubled in its importance to direct and administrate research project, which is major, complex and concerned with many specialization and many researchers. Accordingly, research support organization would emphasize greatly on fund for support research, which is major project or programmatic research and decreases the support of researcher in particular cases of subproject. Besides, it has been a mechanism of abilities improvement in administration of research project in itself level and organization level.

(2) As research organization and research support organization have been faced to budget limitation and tension, which want the impact of research work on country development. For this reason, organization has to emphasize not only the project relevant to problem of development, or project focused on applied use or has highly opportunity in commercial but also having abilities in ordering projects based on the importance. According to this, research investment or research support can be highly impacted.

(3) The applicator who applies major research output of national development and commercial purpose is considered mostly important for example, to join with researcher about identifying problem; to join in conducting, research directly. At the same time, dynamic of organization has been made in order to support the convergence between researcher and applicator, to support applied use, and commercial benefits. As having seen, for example, in overseas, specific institute or council are formed by research applicators within some organizations..

(4) Rate of investment or research supporting, mostly belongs to government, trends to be changed because of application needs, state budget limitation, and budget decreasing. By contrast, the rate of private sector is higher.

(5) In new condition of development and content of conduction research, the standard of former research network make it work essential both in the same organization and organization of research support in overseas. The purposes are (1)to support each other in many aspects; (2) to make relationship within the organizations in overseas; (3) to examine, follow-up, and keep the standard of research; (4) to co-ordinate the domestic local experts with those in overseas.

2) Amornwich Nakornthap, research project for development of national research system (2002:1-5) has presented concepts gathering from international experiences about research work as summarize follows;

2.1) U.S.A. has guideline to support research as the followings:

(1) Having various research system and distributing decision making in policy part to organization of research administration in many levels trend to emphasize on programmatic research which has obvious goal.

(2) Undergraduate Research Network in U.S.A.:

- Having been set over twenty years long and purposes on promotion of undergraduate research and improvement of instruction focusing on research in university.

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- Most of them are Summer Research Programs of other Universities, some are sponsored by government and private sector.
- Having national co-ordinating organization as Council for Undergraduate Research
- Having research journal to support such as Journal of Young Investigators.

(3) Application of Post-Docs in U.S.A.

- Survey manpower holding of a doctoral degree in government sector, private sector and academic bureau continuously.
- Suggest head office to make strategic plan for application of doctoral manpower especially in research work.
- Has had concrete incentives.
- Offer salary for research assistant of doctor's degree about half of one who starts in private sector in order to increase manpower in research track.

(4) Government Performance and Result Act:

- Begin to use in America since 1997
- Purpose to increase accountability in official sector including research work that worths 800,000 million baht.
- Emphasize the verification of research budget focusing on achievement that the performance office has to make strategic plan, performance plan, and performance report presenting to allocation fund office, also, objective to ***"Object, Quantifiable, Measurable"***

2.2 England's Guideline of research promotion are as follows:

(1) Since Thatcher's government, it has reformed research system to strategic investment mostly in strategic areas as well as has changed conditions of fund allocation from government to be more competitive particularly in university.

(2) The government tries to increase a variety of funder especially in private sector and forms it within Funding Council, Research Council, and each Science Committee.

(3) British Research Council

- coaches researcher to apply research work.
- Suggests various techniques such as press release method, methodology of media strategy, and co-ordinate with politics.

2.3 France, government role and administration of research policy still base on the central. It identifies priority areas of research work and promotes university role in research work.

2.4 Germany's guidelines of research promotion are:

(1) Allocation of research fund in Germany still characterizes in complex and having a variety of funder that makes most of research organization safe from political problems and external intervention.

(2) Research Consortia in Germany :

- Focuses on model of research organization that is flexible
- Defined as a particular group at appropriate time based on specific research problem.

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- Government fund is adequate and flowing.
- Researcher works under contract of borrow and back at last

2.5) Japan's guideline of research promotion are :

(1) Private sector is main part of basic research and applied for economical development by government support in some fields.

(2) It trends to co-operate between university and industry, offer the instructor to research for private sector, and stimulate foreign researcher to work in Japan.

2.6) Summary of Research Promotion of Developed Countries in all

(1) Guideline of research promotion in all

- View research as Strategic Investment and identify Strategic Areas for research investment
- Be tighten mechanism of research management and monitoring for achievement of investment.
- Support University to be Research University in order to encourage the development of production sector.
- Produce talent renewal on science from University continuously, who would have good career path, but doesn't focus on Elite Group.
- Have had strengthen science studies-based and best science teacher in school.

(2) Goal and Expectation about Research.

- Respond to real situations and economic needs emphasized on research is competitive strategy for international economic.
- Be able to guide national development emphasized on balance between science and technology research and social science and humanities research.
- Emphasized on the ability of solving and applying in high level and disciplinery research as in major programmatic research in order to study complex economical problems.

(3) Research Goal for National Security.

- To be basic research in science to form human and national science basement.
- To develop technology for industrial support
- To study on environment and health in order to increase life quality.
- To study on social sciences to solve social problems.

(4) Characters of Organization and Research Administration

- Research organization is various in many levels as policy level, support level, and performance level especially in the two latters.
- The flexible structure is easy to begin and support research, which studies on new topic fluently. Moreover, it is relevant to social dynamic and the advance of technological science.
- Variety also means having had research organization of each discipline in order to create progressiveness in particular field.

(5) Producing, Preserve and Improvement of /Researcher.

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- Structure and system of producing, preserve, and improvement of talent renewal should be continued all the time in order to adapt researcher to be a good career in society.

- It is relevant to educational system with a view to cultivate values of science and technology as well as create potential in research to adults.

(6) Application and Circulation of Data.

- Circular structure and system of data, which are well distributed, facile and save, stimulate the occurrence of acknowledgement application and improvement research in open communication.

(7) Efficient System of Research strategy.

It maintains :

- Goal in way of research strategy.
- Co-operation of multi-member and participation with all relevance as well as policy stakeholders.
- System of follow-up research work
- System of research work evaluation
- Mechanism of researcher working and learning promotion

3) In National Survey of R&D in Singapore, 1994 - 1995 and list S&T Indicator for ASEAN, National Science and Technology Board indicates the factors of promotion of research development as follows:

(1) Main indicators consist of two factors as :
  (1.1) Researcher
  (1.2) Research expense
(2) Other indicators consist of :
  (2.1) Working which conducts research
  (2.2) Printed out research work
  (2.3) Invention and patent
  (2.4) Budget of technology (selling and buying)
  (2.5) Funder
  (2.6) Manpower who holds Bachelor's /Master's/Doctor's

2.13.7 Guideline of education administration with research

Rung Kaewdang the secretary of Office of the National Education Commission (2002:15), who was chairman in opening ceremony of seminar of ***"Research and Development of Academic Institute Administration Supporting Learning Reform of Model and Network Administrator "*** stated concept that ***"Our education administration doesn't use academic science and science of administration hasn't stated much about research work. Principal duty of administrator is to administrate learning and transfer everything to network school. Anyhow, administrator can lead education to succeed by using 2 sciences that are administration science get along with research science. This project will be support continuously, both research and network extension. Thus, model institute has to improve or develop academic institute based on its duty identifying in Act of Education by using administrative science as well as research technique for getting models of promotion and expanding result, then"***

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2.13.8 Guideline about Participation

Participation divides into 4 forms (Colhen and Uphoff, 1977: 219 - 222) as ;

1) Participation in decision
2) Participation in performance
3) Participation in distribution of benefit
4) Participation in evaluation

At present, people have opportunities to participate in many social activities, for example, public healthy office has brought concept of primary public health methodology (สสม.)for assistance on its development. In this case, the public can participate in activities by being a volunteer or works for environmental side. Moreover, people have been promoted to be environmental Volunteers, for example.

2.13.9 Guideline about Creating Model

Any work, succeeding in its purpose, requires admin science to assist in conducting. Micovic (1984: 225 - 276) urged that administration in system is whole results and reaction between different parts of system. Consequently, in different conducting has to consider other factors (human, organization, material, theories) that arc relevant among themselves and influence on each other as well as behavior of factors in all. A tool for describing such factors which have reaction on relationship is called model. The advantages of model are: (Albers 1969: 74 - 75)

1) Model's meaning, ***"Model"*** is the word that indicates various things. Generally, it means original conducting on something, for example, construction model, school development model, and secondary school administration model. Educational Dictionary by V. Good (1973) concluded 4 model meanings which are : (1) as a model for something which will be a guideline of construction or repetition; (2) as an sample for copying; (3) as a diagram or dimension representative of something or principle or concept; and (4) as a related factors or variable program that combine altogether to be social components or symbols which may be in form of an mathematical formula or a description as well.

Yaowadee Rangchaiyakul (1999:27) defined a meaning of model in construction part that it is a way for persons to reveal a transferring of thinking, understanding, and imagine on phenomenon or any events. The transferring can be done in many characters such as painting, portrait diagram, or continuity diagram. For another, it can be proposed by way of 4 easy mathematical characters which are : (1) an imitative transferring or a transferring from understanding to be as a systematical construction which is easy for other persons' acquisition; (2) it isn't a long description or narration, but it indicates symbol relationship and system principle ; (3) emphasizes only on major part for the same understanding ; and (4) its characteristics aiming in brief communication that the persons can understand the whole meaning and sub – components relationship under one presentation.

With respect to Good and Yaowadee Rangchaiyakul, it can be concluded that the model has 2 major characters which are : (1) ***"Physical Model"*** or concrete model, eg., plane model, house model; and (2) ***"Qualitative Model"*** or abstract model.

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Moreover, there have been the others who have given closely meaning, such as;

Stoner and Wankel (1986: 12) described that model is a copy of reality phenomenon in order to understand a complex relationship of such phenomenon easily.

Willer (1967: 15) has given its meaning that model is conceptualization about phenomenon based on rationale of formal system and objects to clarify the definition of relationship and relevance .

Peter Abell (1971: 1) has given the meaning by way of social model that it is an attempt to describe or narrate things in form of concept. Then, taking out relationship of concept characterizes in relationship picture that can be obviously seen.

Uthai Boonprasert (1973: 31) stated that model means something showing relationship of main factors particularly in one sense.

Sawat Sukhomtharangsri (1977: 206) said that it means the reprsentative made for describing behavior of some reality characters.

Tadao Miyakawa (Translated by Kongsak Santapluksawong, 1982: 12) stated that model is display of reality studying by us and is searched out in any characters as describing, prediction, or controlling about structure. In additions, it is movement of real condition that we are studying.

Keeves (1988: 559) mentioned that model is a display of structure for studying relationship of variables.

Besides, model also means something which indicates :

1. Real model
2. Sample model
3. Relationship among data, sign and principle of system
4. Example plan of conducting which shows relationship between other parts in system (Saeree Chadcham, 1995: 3)

Conclusion, model is something showing structure of thought, factors, and relationship of different factors, which are essential for the topic we've studied is a transferring of person's thinking, understanding and imagine on any phenomenon or events revealing via various forms for easy understanding, brief and easy event presenting according to systematical principle.

2) Model Classification

Keeve (1988:561 – 565) has categorized education and social model into 4 kinds as follows:

(1) Analogue Model is defined for comparing concrete phenomenon in order to make understanding in abstract, eg., a model of number of student predicted to be in school system, assuming in watering in and out of tank. Students being in system minus by students being out are number of students to be in system.

(2) Semantic Model is a model that uses language for phenomenon describing or narrating. The phenomenon is studied by language, diagram or picture to understand its structure, components and component's relationship, such as, learning in school model.

(3) Mathematical Model is a model which uses mathematical equation to communicate variable relationship.

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(4) Casual Model is improved by Path Analysis Method and Semantic Model construction based on construction of caused and effected variable relationship.

Yaowadee Rangchaiyakul (1999:24) has categorized model based on its usage into 4 types as : (1) imitative model; (2) sample model; (3) symbol relationship model and system principle graph; and (4) continuity operation by systematical relationship diagram.

Having seen that, first model concept focuses on model characteristics, on the other hand, the second focuses on model usage.

Joice and Weil (1985) have proposed model by way of thought, teaching behavior, and individual relationship; that can be categorized in four models as

(1) Information Processing Model
(2) Personal Model
(3) Social Interaction Model
(4) Behavior Model

Tosi and Carroll (1982) has categorized model, in character of concrete and abstract, into two forms as follows :

(1) Physical Model
(2) Qualitative Model

Moreover, Steiner (cited in Saeree Chadcham, 1995: 7) has also categorized model in two forms as the followings:

(1) Physical Model is divided to :

(1.1) Model of something such as plane model, which is similar to the authentic one.

(1.2) Model for something such as the model for making aeroplane. The model is the same size as the real one.

(2) Conceptual Model separates to :

(2.1) Conceptual Model of something is a model which is copied from the present theory as model which is made from theory of the maintenance of student in school, for example.

(2.2) Conceptual Model for something is a model made for describe theory or phenomenon, eg., model made from theory of naturally selection for describing the theory mentioned above.

3) Model Components

Studying model sample from documents and researches, it found that model components have no invariable rules. Mostly they depend on a particular character of studied item.

4) Model Construction

According to documentary study, guidelines of model construction were mentioned as follows:

Keeve (1988:560) stated that model construction includes 4 methods which are:

(1) Model should consist of more variable structural relationship than normal line relationship.

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(2) Model should define as a guideline for predicting expected application result and can be evaluated and supported by empirical information.

(3) Model has to indicate or point out a caused – effected machanism of a study. Thus, model is not only a predictor but also a phenomenon describing.

(4) Model should be a tool for forming new conceptual and new variable relationship.

Peter Abell (1971: 5 – 7) mentioned about model improvement steps according to hierachy of scientific sophistication that : (1) identifying unit of analysis to make sure in which topic should be constructed, and making concept about unit of analysis; (2) transferring concept to variable and determine variable value indicator and variable relationship indicator; (3) relationship model; (4) proposing a relationship model to general; and (5) model identifying.

In regard to Keeve's principles, Peter Abell's steps, and documentary study, theyt found that model should be constructed by many different steps. Generally, however, they were divided into 2 new steps that are model construction and model validity. The details of each step depend on basic conceptual framework of such model construction.

5) Qualification of Good Model

Albers (1969: 74 - 75) described about the advantages of model that :

(1) Use for viewing clearly in present system

(2) Use for prediction if such model can describe nature

(3) Use to be representative for more than one system

Good model is like thing that makes one who wants to study in any topics understand in primary stage before going to in-depth stage. Thus, good model should be as the follows:

(1) Consist of structional relationship between each variable which is more emphasized than relationship among variable in whole

(2) Lead to a prediction of the following results that can be investigated with empirical information. Then, the model will be cancelled if it isn't relevant that model will be cancelled.

(3) Clearly describe structure of cause effect - based relationship of the topic studied

(4) Lead to create modern concept or new relationship of the topic studied

(5) Whatever model will be depended on its theory framework, Kongsak Santipluksawong (translated) 1986: 5

Having seen that there are a lot of models. They could be differed in its area and context of work depended on situation they are applied and internal factors. So, there is no maintainous principle which dictated that model must be consisted of which factors, how the structure is, and how the relationship is. Mostly, it depends on specific characteristics of situation, conceptual, theories, and basic principle to form a topic of study, for example, model of organization management. Management composes of environmental factors, structure, technology, process, and decision. These factors are from the synthesis of systematic thinking and situational administration. From the study of project and research, the researcher found that in

social sciences mostly create qualification and gesture model and presented factors of model differently based on the situation studied as for example follows:

Tawatchai Ponperm (1980) proposal a model of Provincial Educational Museum in form of qualification and gesture which composes of principle, reason, objective, procedure, goal, resource, budget, and expected benefit.

Anake Dulbut (1983) also proposed a model of education project for slum children in primary school to Bureau of Bangkok Education. The presented model is qualification as well as gesture including limitation, objective, form of educational management and procedure, role qualified and co-ordination of personnel, related bureau, and suggestion.

Nirart Chantharaprachit (2000) has studied a model of instruction evaluation which in part of diagraph, qualification, and gesture. Its factors consist of planing project that indicates (1) systematic process of activity; (2) evaluation of concept and evaluation data; (3) personnel preparation; (4) process of using evaluation tools; (5) summarized analysis; (6) output report; and (7) using results to improve instruction

In Development of Education Quality Insurance Model in high education of Ministry of University Affairs, Wanchai Sirichana (1993) has developed qualification and gesture model that composes of principle, guideline, conducting and administration construction, methodology, criteria specification and other administration aspects.

From above examples, qualification and gesture model is considered a representative of real model as well as main plan using for describing and presentation of conditions, policy plan, and systematic thinking. Having seen that s study of social sciences mostly stated about qualification and gesture model including digraphs. Such digraph characterizes in diagram, graph, picture that describes or display relationship of factors or variable in system, or the topic studied such as diagram of administration organization, work-plan of computer program, graph showing relationship between income, capital, and interest, and diagram of computer network, for example.

2.13.10 Evaluation: Connoisseurship Model

The evaluation for appropriateness and reliability by connoisseurship is another better method to propose education process concept if such new concept or new process couldn't be tested in real situation.

This model is considered to be educational evaluation which is called educational criticism and is famous used because of its reliability. It is said that the decision or criticism by connoisseurs who expert in their own branches can be accepted (Conrad and Wilson, 1985).

Advance organizers of this method is criticism points that are values, traditional conceptual, or working habits. Based on direct theories and indirect theories on nature and standard of evaluation, criticism points are employed in connoisseurs included their educational base and practicing.

That is to say, the connoisseurs are "tools" for model research. Thus, in education research at present, connoisseurship and criticism are defined as a tool for process describing and class interaction which developed by Eisner's concept

and researcher of Stanford (Palmer, 1992: 18). The purpose is to make research output more correct and reliable.

Connoisseurship evaluation based on Eisner's concept is one of research forms which has different basic character. Eisner (1976: 192 – 193), who improved this concept, pointed out that educational research is too much dominated by scientific – based process or quantitative method in spite of many studies are complicated. Furthermore, Eisner believes that being update in awareness is a basic qualitative of connoisseurship. For this reason, guideline of education evaluation based on Eisner's concept is different from others and can be concluded as follows :

1) As a model that doesn't focus on objective achievement according to either goal – based model, responsive model or decision – making model. Connoisseurship model emphasizes on deep analysis in particular aspect which is considered but hasn't to relate objective or related persons or decision – making process. However, it might combine factors of consideration together based on connoisseurs' judgement in order to get conclusion on quality, efficiency, or suitability of evaluated article.

2) As an evaluation model which focuses on specialization of evaluated article. It's not only improved by art criticism model that is fine and profound but also depended on higher expert judgement because value can't be evaluated by any tools except connoisseurs' judgement only. Later, it is applied for higher education particular in branches that require such evaluators. So, this evaluation model is famous used in higher education that requires highly special experts.

3) As an evaluation model which persons-connoisseurs are defined as a tool. With acceptance that connoisseurs are fair and having good senses. In this respect, standard and criteria are formed by connoisseurs' experiences and skillfulness.

4) As a model which accepts flexibility of connoisseur working process which accords to each personality and skillfulness firstly from identifying issue till indicating data required for collecting, codifying, and judging throughout presenting method.

This by this, connoisseur selecting considers in profession status, experiences, and high credibility in his profession.

This research is a social research that purposes in constructing a model of environmental education research promotion and can't be evaluated suitably by other methods as well as can't be tested in real situation. Thus, connoisseurship model is considered to evaluate the research for having their criticism and useful suggestion on the model proposing.

2.13.11 Summary of Sources of Research Conceptual Framework

According to the earlier national development data, sustainable development environmental and resource policy, national education research plan and policy, importance of educational research in Act of National Education 1999, importance of environmental studies, environmental research, activity relevant to environmental studies in ASEAN, activity relevant to environmental studies in overseas, related research, and research conceptual framework altogether are:

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1. Systematic guideline and systematic theory
2. Guideline about research administration system
3. Problem of national research and development system
4. Guideline and suggestion to support national research
5. Guideline to support overseas research
6. Guideline of educational administration and research
7. Guideline about conceptual in model
8. Evaluation

Connoisseurship investigation is data-based to guide this research conceptual framework, as diagram follows:

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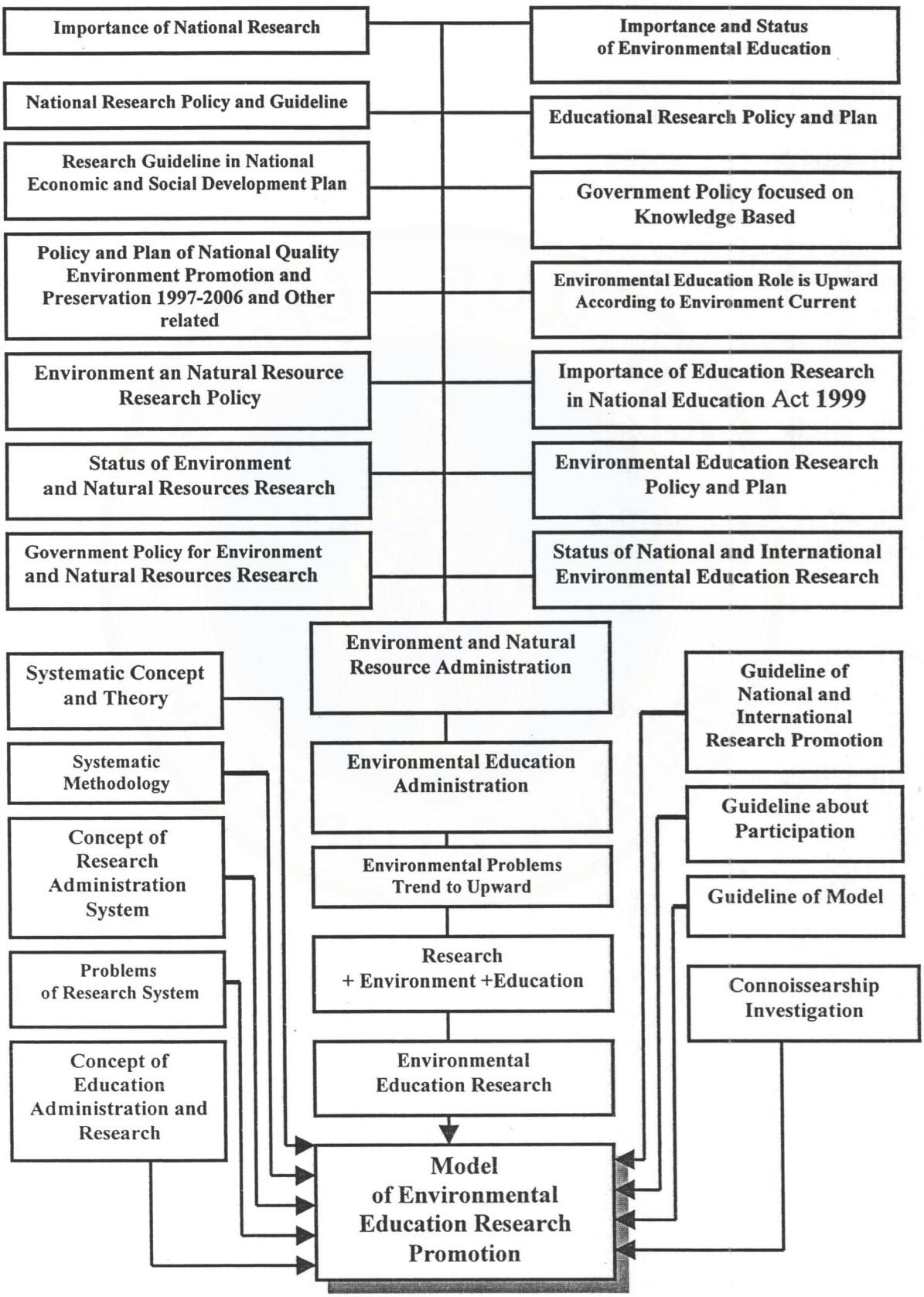

Figure 6. Sources of Research Conceptual Framework

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The national research and the educational research that go hand in hand with the educational administration, the state policy is focusing on knowledge-based development and the severe situation of environmental crises require the creation of environmental education to develop sustainable environment. This study is an important tool to develop an environmental education. However, the policy of environmental education lacks unity and clarity because it is related to various branches of sciences, e.g., science of educational research, environment and environmental education. The researcher acquires the idea of development research on this issue by creating the model to promote the research on environmental education in order to increase its important role with in the realm of the environmental education. Besides, the study can be used as a tool to develop a national environmental education that is efficient and sustainable.

Creating a model to promote the research on environmental education requires several concepts: concept of system, concept of research administration system, guidelines to support domestic and overseas research, concept of environmental education, etc. Concept of system and research administration system can present the elaborate research system, which consist of several sub-systems that are well-integrate and at the same time function together with the general research system. In the research system is composed of sub-system which are factors that lead to the research process and to produce the research work. The result will be used benefically. The researcher has crystallized 10 components or the factors in the research system in domestic and overseas:

1. Research policy
2. Researcher
3. Research budget
4. Research organization/work-unit
5. Material used for conducting research
6. Research performance
7. Research output
8. Publication of research work
9. application of research work
10. Evaluation of the research

These 10 components will be applied by the researcher as the guideline that should be promoted on research on 10 aspects of the environmental education. The content of promoting research on each aspect will be modified by using the content of promoting domestic research from the review of literature and all above mentioned concepts.

Structure or the components of model in promoting research on environmental education will be based on 2 parts: creating and evaluating the model while keeping the structure and components of the model flexible. Most of them are depended on unique characteristics of the topic to education as the details mentioned above. Therefore, the researcher strives to look at the guidelines of the policy making, strategy making, arranging model of environmental education suitable for the school and others form given as samples in the topics about concepts of making model. The main issues of the conference on global environmental education and other guidelines related to environmental education are abstract and need to be mentioned in the policy level, principle and concept down to the practical level. They are as follows:

1. Principle, Concept, Policy, and Vision

2. Objective, Goal, Target and Responsibilities
3. Guideline, Criteria, Plans
4. Strategy, Approach, Means Performances, Implementation, Project Workplan
5. Evaluation and Indicator of achievement

The researcher utilizes these information as guidelines to identify components or the model structure. It should start from principle/, concept, guideline/, measure, strategy/ , means and the indicators of achievement.

The relevant sector will use the concept of ***"Quartet-member of the national research"*** which consists of:

1. The state as the leading agency of national research work that identifies the research policy, evaluate the research work and assures that it is responsive to the research policy;
2. Research supporter is the the person or agency that supports the research in form of budget allocation for research and research development;
3. Researcher or Research Conductor is the person who gets the support from the former 2 group directly in order to conduct the research in response to the policy and guideline of research supporter;
4. Research application the person who gets the benefits of research work and uses it in the academic, policy, and performance levels or business purposes.

Tri-member in environmental education research was formed by quartet-member modification that were gathering of group 1 and group 2 because they were in qualification on the aspect of research promotion. Tri-member consisted of research supporters, researchers, and research output applicators.

However, guideline of making model as previously mentioned has to conduct together with expert in-depth interview in order to get the proposal which formed by documentary concepts as well as the agreement of related. All above could make suitable proposal before model evaluation in the next stage.

Research conceptual framework is as the following.

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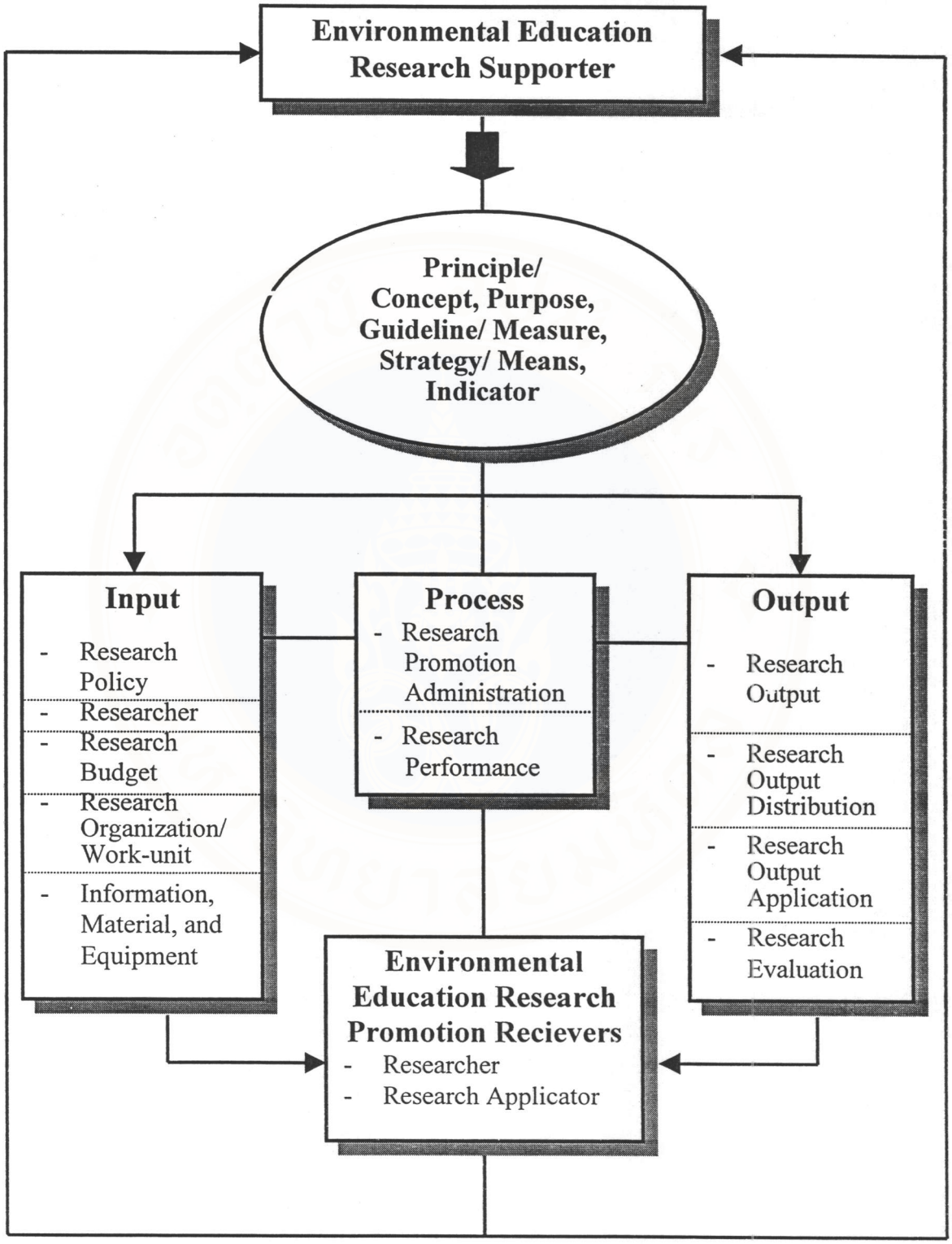

Figure 7. Research Conceptual Framework

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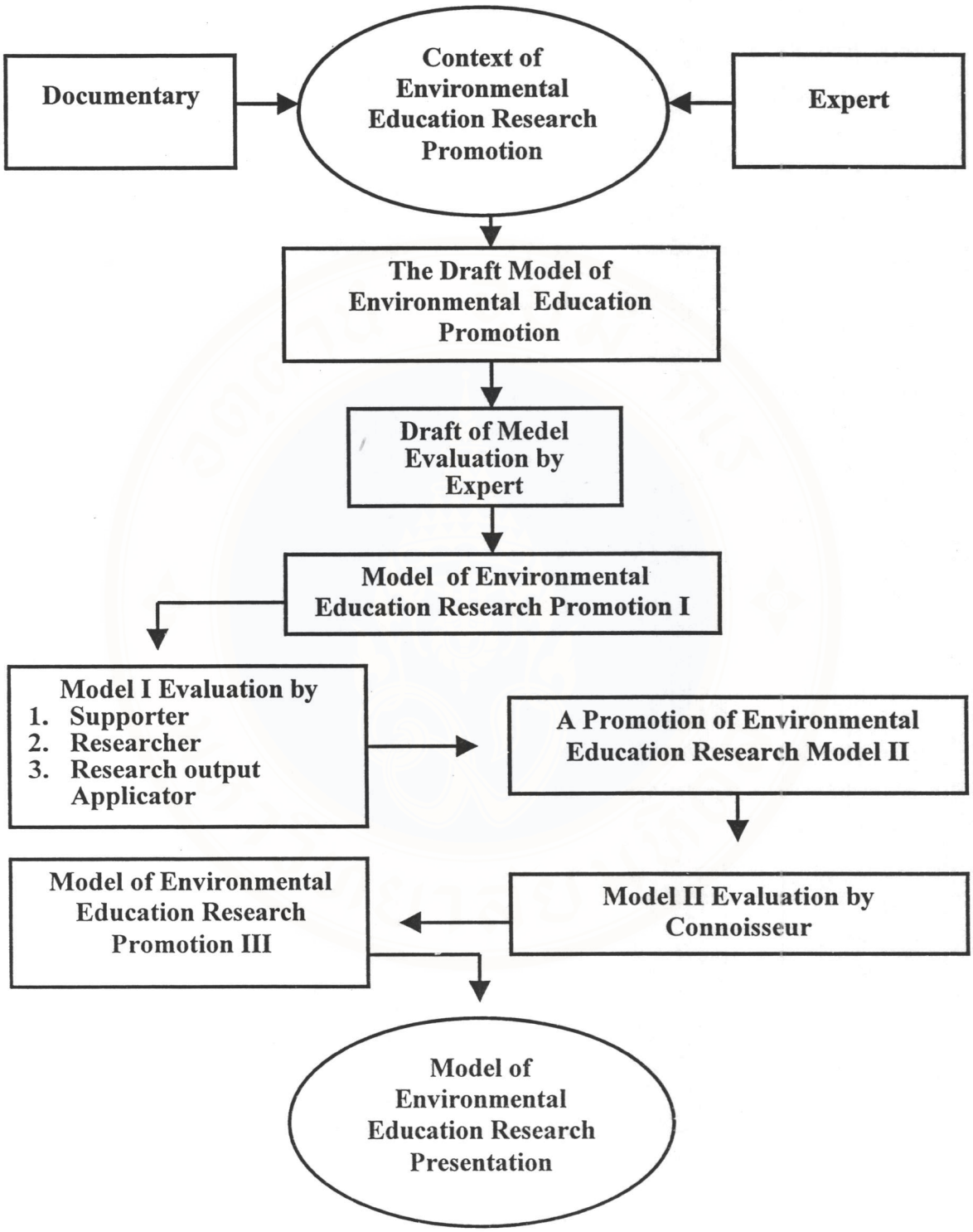

Figure 8. Research Procedure

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CHAPTER III
METHODOLOGY

The research objective was to construct a model of environmental education research promotion, because the importance of environmental education research and being one part of environmental education administration. Thus, the research methodology was made as the following.

3.1 Research Design
3.2 Research Process
3.3 Research Methodology

3.1 Research Design

The research was considered to be a development and policy research leading to construct a model of environmental education promotion with evaluation of experts tri-research member of environmental education and connoisseurship model.

3.2 Research Process

There were 8 steps of research process as following:

Step 1. Research preparation; this was a step of documentary related to national development, sustainable development, present and trend of environmental nature resource policy, present and trend of environmental and nature resource research policy, policy and plan of environmental education research in Thailand, environmental education, environmental education research and research related. However, the research conceptual framework was based on systematic theory, concept of research management system, research promotion guideline and concept of model construction and evaluation: connoisseurship model.

Step 2 In-dept interview; this made to collect all related information to draft a model of environmental education research promotion through tri-research member experts as research supporters, researchers and research output applicator. Thus, these experts have got much experience in research or environmental education or education or environment.

Step 3 Drafting a model; this was made to draft a model of environmental education research promotion through integration of documentary information and in-depth interview information; then, evaluated by the tri-research member experts

Step 4 Model Evaluation by the experts; draft of model in step 3 was evaluated by the experts in step 2 . The step 2, step 3 and step 4 are important for drafting model because it will lead to suitable and reliable guideline of primary model.

Step 5 Questionnaire try-out; questionnaire was made after model evaluation by tri - research member experts. The evaluation was in form of questionnair and improved before using.

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Step 6 Model Evaluation by tri - research member of environmental education; after the questionnair try-out the model was improved and sent to tri - research member of environmental education for some opinions to evaluate as follows:

1. Research supporters were: administrator/committee/sub - committee in research/ education/environmental education/environment organization, which authorize in specify research policy/plan or support fund or support in other forms. Particularly, the research supporters could be from those of Ministry of Education and workunit in Ministry of University Affairs which related directly to the promotion of environmental education research.

2. Researchers who were conduct environmental education research all over the country.

3. Research output applicators were: administrator/committee/sub - committee/officer in related workunit especially in group of school which is the provincial environmental center, the best school of environment in province, region, and country. Moreover, it included higher education institutes which instruct about environmental education or environmental science or have environmental education center and included non-government organizations (NGOs).

Step 7 Evaluation by Connoisseurs; analyzed and improved in step 6, the researcher investigated the model by connoisseurship evaluation to complete it and was possible to apply in real situation. The model evaluation was agreement from considering in congruence, clarity, completeness, appropriateness, and possibility of application.

Step 8 Presentation and distribution; improving based on connoisseurs' suggestion, the researcher made it in form of research report and printed in journal. Then, it was made in complete form presented to faculty of graduate.

The results of procedure could be concluded in Figure9 as follows:

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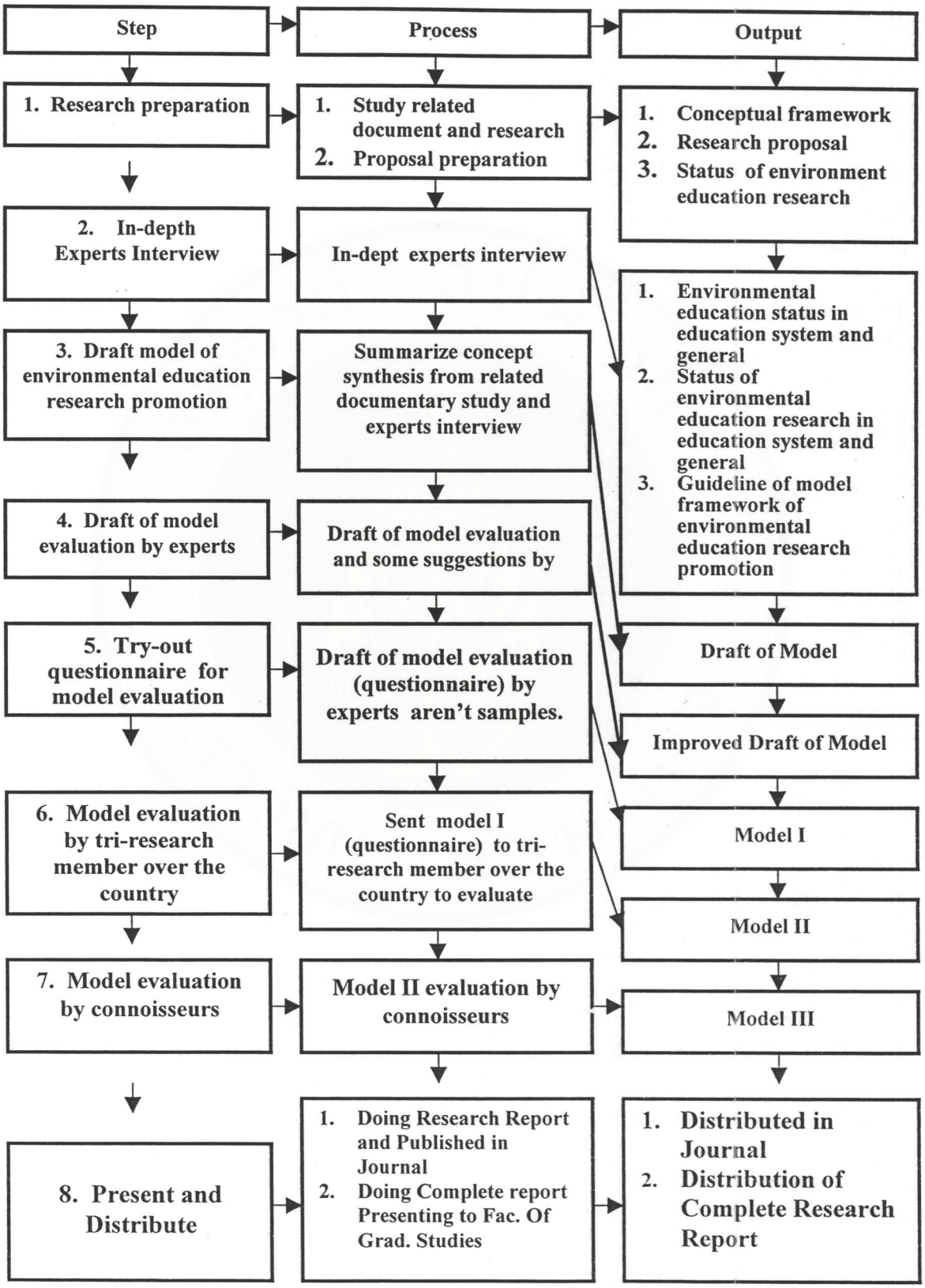

Figure 9 The Step, Process and Output of Model Construction of Environmental Education Research Promotion.

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3.3 Research Methodology

3.3.1 Documentary searching for research conceptual framework

3.3.2 In-depth interview of tri-research member experts of environmental education

3.3.1.1 Qualifications of tri-research member experts

1) Research supporting group

1.1) Holding not lower bachelor degree (and).

1.2) Having the experiences of research, education, environment and environmental education (and).

1.3) Being or used to be administrator in national research supporting organizations (or).

1.4) Being or used to be an administrator in educational organization related environment, environmental education or education.

2) Researcher group

2.1) Holding not lower bachelor degree (and).

2.2) Having the experience on research, education, environment or environmental education (and)

2.3) Having got some academic works or researches on environment, environmental education or education research with general publishment in some journals related.

3) Research output applicater group

3.1) Holding not lower bachelor degree (and).

3.2) Having the experiences on research, education, environment and environmental education (and).

3.3) Being one using the environmental education research output to determine policies and plans, teaching, researching, training, meeting or seminar, academic work and any other responsibilities.

3.3.2.2. Collecting the tri- research member experts list.

3.3.2.3. Structured interview schedule was available to collect some data related environmental education status, environmental education research and guideline for designing of environmental education research promotion model.

3.3.2.4. Data collection was made by formal interview and phoning for further information with 14 experts.

3.3.2.5. Data analysis and synthesis was made through the integration approach of content analysis experts in-depth interview and documentary, then constructing a model of environmental education research promotion. The model was composed of 10 parts and 4 aspects. Thus, the major parts of research promotion were research policy, researcher, research budget, research organization, research information, material and equipment, research performance, research output, research output distribution, research output application, and research evaluation. However, each part contained 4 aspects as principle/concept, guideline/measure, strategy/means and indicator.

3.3.3 Evaluation draft of model of environmental education research promotion by experts

3.3.3.1 There were 14 experts evaluating the draft of model. These experts are the same experts groups in 3.3.2

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3.3.3.2 The instrument for the draft of model evaluation was a questionnaire asking for their opinions with 3 score levels for each question

- Agree 1 score
- Not sure 0 Score
- Disagree - 1 Score

3.3.3.3 Data collection was made by taking the questionnaire and getting more interview to the experts for model improvement.

3.3.3.4 Data analysis was made by evaluating the IOC (Index of Item-Objective Congruence) each question and draft of model structure or contents based on the standard criteria (Office of Ratchabaht Institute Council and Office of Higher Education Standard, 2002 : 108-109) as the following;

1 score for the question according to the model structure or contents

0 score for the question that the exerts were not sure to its accordance with the model structure or contents.

-1 score for the question not according to the model structure or contents.

The IOC formula was as; $IOC = \frac{\sum x}{N}$

IOC = Index of item objective congruence each question the model structure or contents.

$\sum x$ = Sum score of the experts' opinion

N = Number of the experts

Thus, the IOC value for available questions was 0.50 –1.00 and the question with IOC value lower 0.05 had to be improved or cutout.

Furthermor, the open-ended questions was analysed.

3.3.4 Questionnaire reliability test

Reliability test was made by having been improved, the model, before evaluated by tri-research member over the country, was evaluated by 30 persons in tri-research member who weren't the samples 10 research supporters, 13 researchers and 7 output applicators evaluated the model with questionnaires for the result of reliability based on Cronbach's method (Crobach, 1974). The data will be tested by using Alpha-Coefficient to find the reliability of the questionnaire or to evaluate the 10 parts of research model; the coefficient value is ranged between 0.82-0.95.

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Table 2. Table for Reliability of the Questionnaire

Content of 10 parts	Alpha Coefficient Value	Number Of Items
1. Research Policy	0.9558	47
2. Researchers	0.8296	56
3. Research Budget	0.9346	59
4. Research Organizations	0.8794	38
5. Research Information, Materials and Equipment	0.9531	33
6. Research Performance	0.9231	32
7. Research Output	0.8345	30
8. Research Output Distribution	0.8898	19
9. Research Output Application	0.9124	32
10. Research Evaluation	0.8537	29

3.3.5 Evaluation Model of Environmental Education Research Promotion by Tri-Research Member Over the Country

The member of national research consists of research supporters, researchers and research output applicators all of them were presented in 3.2. research methodologies are as follows:

3.3.5.1 Population and Sample

Samples were chosen by two-stage random sampling.

Stage 1. Stratified Random Sampling. The samples were taken from the tri-research member research supporters, researchers, and the research output applicators.

Stage 2. Because the information on the number of tri-research member in Thailand has never been surveyed, so that the researcher uses criteria of Yamane' (1973: 36) That if the population size is infinity (∞) use the sample of 400 member population so the researcher start to sampling random with purposive sampling from tri-research member all over the country.

3.3.5.2 Data Collection Instrument

The data collection instrument was questionnaire. The questionnaire was consisted of data of model's content of 10 parts of the research promotion and each part cover 4 aspect: principle/ concept, guideline/means, strategy/ measure and indicator. The questionnaire characterizes rating scale in order to evaluate the tri-research member opinions on the model. The questionnair is divided into 5 levels of opinion and 5 score level. Each level of opinion has the following score:

5 scores meant very high agreement with the item.
4 scores meant high agreement with the item.
3 scores meant moderately agreement with the item.
2 scores meant low agreement with the item.
1 scores meant very low agreement with the item.

Scores allocated from the evaluation were calculated to get average value ($\bar{x}$). The interpretation of average value were according to Best's criteria(Best, 1970 : 90) as follows:

$\bar{x}$ between 4.50 - 5.00 meant the result of the evaluation was at the ***"very high agreement"***

$\bar{x}$ between 3.50 – 4.49 meant the result of the evaluation was at the ***"high agreement"***

$\bar{x}$ between 2.50 – 3.49 meant the result of the evaluation was at the ***"modorately agreement"***

$\bar{x}$ between 1.50 – 2.49 meant the result of the evaluation was at the ***"low agreement"***

$\bar{x}$ between 1.00 - 1.49 meant the result of the evaluation was at the ***"very low agreement"***

3.3.5.3 Data Collection

Questionnaires were sent to the tri-research member of environmental education all over the country then the questionnaires collected by researcher in Bangkok and urban. The questionnaires could be collected 452 copies from the 550 copies sent out or the percentage is at 82.18 which are:

1) The research supporters: 114 copies from 135 copies sent.
2) The researchers: 160 copies from 216 copies sent.
3) The research output applicators: 178 copies from 199 copies sent.

3.3.5.4 Data Research Analysis and Statistic Use

The data was calcuated on the SPSS PC Program and has a statistic analysed as:

1) Mean ($\bar{x}$) and standard deviation (S.D.) and numbers (n) of tri-research member answering the questionnaire, were sum in each group of tri-research member on each item.

2) The items which had mean ($\bar{x}$) from 4.25 up or at the percentage of 85 up from the total score 5 or 100, respectively, all of which considered to be the content of model.

3) Some items or the necessary items or being considered but is not right to the criteria in 2) they could be the content of model as well.

4) The total mean of all tri-research member in each item of model was articulated after selecting under the criteria in 2) and 3).

3.3.5.5 Use of Analyed Data

The result from 3.3.5.4 was summarized in detail of the model evaluated by the tri-research member, then, further evaluated by connoisseurs.

And then analysed the content for the open-ended questions.

3.3.6 Evaluation on Model of Environmental Education Research Promotion by Connoisseurs.

In order to be the perfect model, it was also evaluated by related connoisseurs who were divided into 3 groups, or tri-research member. They were qualified as the same reason as in-depth interviewed experts in 3.3.2 and 3.3.3

The evaluation conducting the following:

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3.3.6.1 Population and Sample

The format evaluation using connoisseurship Model is a Natural Research. This type of evaluation uses the connoisseurs' consideration to improve the correction, appropriation, reliability and most completion. Purposive sampling was used for coding connoisseurs under the definite quality as the expert's quality, The researcher sampling 25 connoisseurs in order to have the 17 co-operative samples or more, which is the appropriate amount under Thomas T. Macmillan's concept (Macmillan, 1971: quoted in Thosporn Sirisumphan, 1992). Thomas T. Macmilllan studied and revealed a research output about the numbers of the connoisseurs that if there are since 17 connoisseurs or more, the research would be more reliable because the decreasing rate of error will be the least and there will be consistency at 0.02 as the table following.

Table3. Numbers of the Connoisseurs: Discriminated Under the Errors.

Numbers of the Connoisseurs	Errors	Error Decreased
1 - 5	1.20 - 0 70	0.50
5 - 9	0.70 - 0 .58	0.12
9 - 13	0.58 - 0.54	0.04
3 - 17	0.54 – 0.50	0.04
17 - 21	0.50 – 0.48	0.02
21 - 25	0.48 – 0.46	0.02
25 - 29	0.46 - 0. 44	0.02

Resource: Thomas T. Macmilllan. The Delphi Technique - quoted in Thosporn Sirisumphan, Policy Analyzing Technique, 1992.

3.3.6.2 Data Collection Instrument

It was an evaluation form of model of environmental education research promotion and inserted the analyzed and synthesized model by the tri-research members all over the country. For this type of the evaluation, there were nine items to evaluate: (1) appropriation model structure or factors,(2) completion of model contents,(3) empirical contents of model,(4) contents consistency in each factor of model,(5) consistency of model and environmental education goal,(6) consistency of model and national environmental education research status,(7) possibility of model application supporting the national environmental education research,(8) possibility of model application supporting an environmental education research in community and any levels of education educational organization and,(9) model benefit for perspective view of environmental education research.

Besides the evaluative items above, the evaluation format was characterized ***"Rating Scale"*** to evaluate the connoisseur's opinion, which were divided into 5 opinion level and 5 score level as follow:

Score 5 meant very high agreement with the item.
Score 4 meant high agreement with the item.
Score 3 meant moderate agreement with the item.

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Score 2 meant low agreement with the item.
Score 1 meant very low agreement with the item.

Then the data was calculated to get everage value ($\bar{x}$) and interpreted everage value ($\bar{x}$) according to Best's criteria (Best, 1970: 90) as follows:

$\bar{x}$ between 4.50 - 5.00 meant the result of the evaluation was at the ***"very high agreement"***

$\bar{x}$ between 3.50 – 4.49 meant the result of the evaluation was at the ***"high agreement"***

$\bar{x}$ between 2.50 – 3.49 meant the result of the evaluation was at the ***"moderate agreement"***

$\bar{x}$ between 1.50 – 2.49 meant the result of the evaluation was at the ***"low agreement"***

$\bar{x}$ between 1.00 - 1.49 meant the result of the evaluation was at the **"very low agreement"**

3.3.6.3 Data Collection

The evaluation form and the model were given to connoisseurs and brought back by the researcher. It appeared that 23 connoisseurs gave the co-operation. The group of connoisseurs including the in-depth interviewed experts who evaluated the draft of model, were listed in this research appendix.

3.3.6.4The Data Analysis and Statistic Use

To analyze the data, percentage and mean were used statistically and content analysis was used for more comment on open-ended questions.

3.3.6.5 The Application of the Analysis Result

The results of data analysis by connoisseurs were systhesized and improved to be this research output, then.

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CHAPTER IV
RESULTS

A model of environmental education research promotion was a policy research focused on model construction. Appropriate and complete model could be constructed under the procedures of documentary studies, experts interview, model evaluation by experts, tri-research member of environmental education all over the country and by connoisseurship model.

There were 5 stages presented on the research findings:

Stage 1

The data for making the model of environmental education research promotion were from qualitative data on documentary study and expert in-depth interview.

Stage 2

The draft of model were made Through documentary and the data in stage 1. Then, the draft of model was evaluated item by item and had more suggestions by related experts. Lastly, it was improved to be more complete or tri-research experts of environmental education.

Stage 3

The draft of model in stage 2, which was improved and tested, was namely model. For much more completeness Model I was evaluated by tri-research number related to environmental education which were research supporters, researchers, and research output applicators all over the country.

Stage 4

The improved model in stage 3, namely Model II, was evaluated again by related connoisseurs. After the improvement it was called Model III

Stage 5

The presentation of the last improved model, Model III, including its application.

Stage 1

4.1 Data Analysis of Documentary and Expert In-depth Interview

The result of documentary and in-depth interview from related experts in research/ education/ environment/ environmental education could be summarized:

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4.1.1 Context of Environmental Education Research Promotion from Documentary

1) Condition and Environmental Education Problem in Education System

Since 1978, environmental education has obviously appeared in Thai education system, which is influenced on international organizations, environment problems in Thailand, and awareness of environmental private organizations and private sectors. Many environment courses were employed for primary to high school in all sections. As being the fundamental courses in higher education, moreover, they were lectured for bachelor's degree, master's degree and doctor's degree. Serious interested in environmental education, model scheme of environmental education project was formed (1991-1996) by Ministry of Education and was announced in February 1991. Besides, there were other organizations together responded in giving the environment knowledge to people, included private organizations, environment private sector, and many media. Though, people have been given the environment knowledge for 20 years now, however the problems which haven't been reduced, still critical because people don't aware of it and have no skills to prevent and solve these problems. That is because, the curriculum lacks of integration, content continuity, suitable activities, personnel, budget, as well as problems of teaching techniques and coordination. Thus, all mentioned problems should be improved immediately. (Raphiphan Suwannatthachote, 2000: 281)

Vinai Veeravatnanond. (1996: 2) addressed the difficulties of environmental education procedure as follows: carry on the Environment studied followed

(1) Lacking of environmental data-based number of data, and network of Thailand.
(2) Lacking of empirical continuity of environment education curriculum in school systems.
(3) Lacking of environment authorities:- environment researchers, environment teachers, environment planners, and person who collects local environmental information.
(4) Lacking of organization co-ordination in education administration coordination among various education institutes included as well as unclear policy and environment plan of other levels of education institutes.

Uncertain environment policy of politician in Ministry of Education and the distinguish of its administrators interesting cause uncontinue focus and policy

2) Environmental Education Research Problems and Condition

Research being body of knowledge base in national development, offering environment education is the problem that causes administration strategy. Meanwhile, environmental education research is one major components which guides empirical direction for environmental education administration included forming body of knowledge. It mostly employed in policies and plans, such as: the Eighth Period of Education Religion and Culture Developing Plan (1997-2001), the Eighth National Education Developing (1997-2001), all national research policies and guidelines, and national research for national revival crisis. Moreover, the speech of government policy by H.E. the Prime Minister Pol. Lt. Col. Taksin Shinawat on February, 26 2001 stated about the importance of natural resources and environment preservation as well.

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Thus, condition, which intervenes in educational research, is the major condition of environmental education research as well as natural resources and environment research, and couldn't separate individually. Because of environment current and immediate economic development specified in industry which effects to world environment balance make natural resources and environment preservation process for sustained developing. Moreover, human and environment can harmoniously live together. That causes the important role of environmental education, eg., mentioned obviously in natural resources and environment international conferences and charters. Then, environmental education is considered as a major tool for sustainable preservation in order to improve desirable behavior. It also relates to education development plan, government policy, national economic and social development plan, research policy and included other major plans and policies which focus on the development of ***"human being"*** and ***"human quality"*** in the sense of human being is the major factor and result of national development.

As environmental education is considered essential for natural resources and environment preservation, environmental education research which is one part of environmental education administration also takes a major role and couldn't be overlooked in such a knowledge based society.

Therefore, main plan and action plan of environmental education (1997-2001) were formed by Department of Environmental Quality Promotion, Ministry of Science, Technology and Environment. (n.d.:13) and were employed environmental education research policy for executives and performers' application. Its measures are the following

(1) Promoting the study of environmental education model based on ***"The person who causes damage must be responsible."***
(2) Promoting environmental education research.
(3) Promoting organizations and education institutes to form guideline project for environmental education development research.
(4) Promoting the studies of environmental education administration
(5) Promoting the collecting and distributing of environment research and environmental education research.

In part of Ministry of Education, it has hold policy, model scheme, and environmental education curriculum on the purpose of supporting the study and searching for data system management, information, analysis and follow-up problems of personnel forming and development. In additions, related experts experiences and knowledge as well as environment policy and means of organizations are applied to develop the co-ordination between environmental education and environmental conducting within national and international work system (Thanalai Sukphatthee, 1991: 22-27) Moreover, environmental research and study is in top ten ordering by Ministry of Education based on the importance of title.

Consequently, it is said that research is a principal factor of environmental education, especially research for searching administration model, which is major factor for achievement of all aspects of environmental education research system. Because of a content of natural resources and environment research concerns and intervenes in all factors of national development research, it is necessary to integrate this content with others. Thus, environment education research, which is part of education research as well as natural resources and environment research, lacks of unity and empirical direction for performance. However, environmental education

research moves to the best role because of environmental current in a present time and future. Thus, such role should be more considered.

4.1.2 Context of Environmental Education Research Promotion by Expert Interview

1) Environmental Education Status in Education System

1.1) Problem Condition

1. Almost directors and teachers in school thought every teacher could teach environment education. The fact is that environmental education could be successful by teaching of experienced teachers and ones who graduated in this field..

2. Environment education teachers in school didn't know how to transfer the knowledge to make students aware to be conscious of natural resources and environment preservation.

3. Integration of environment education with other courses depended on the administrators and interest of other teachers. Learning objectives on integration of environmental education should be specified in school policy in order to made students understand and be aware of environment preservation.

1.2) Solution Guideline

1. Environment education centers in each province should mostly conduct their role on environment education in the area level.

2. Environment education should be integrated in every course.

3. Environment education in all levels to prepare good conscious mind through environment.

4. Teaching by emphasized on the importance of physical environment before will make high efficient in environment education learning followed by knowledge, understanding and awareness of environment preservation.

5. Schools should be as complete environment education learning resources.

6. Environment education activities should allow the learners practise by themselves and use local learning sources also.

7. Environment education curriculum should be pressured to be more designed in local higher education such as Ratchabhat Institute for occurring of environment education.

8. Specific environment education organization should be established.

2) General Status of Environmental Education

2.1) The achievement of general environmental education administration was less because of the different limitation on environmental education understanding.

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2.2) Most people think environment and natural resources are publicity, which are free for them and would be get as much as they can. Moreover, they are worthless used that is very dangerous to environment.

2.3) Local environment problems should be soluted by environmental education provision in school, community, especially, Tambon Administration Organization which takes more important role on local preservation.

2.4) All related persons should be provide environmental education.

3) Status of Environmental Education Research in Education System

3.1) Problem Condition

- Attitude of directors and teachers were whichever research several researches was complicated and boring.
- Environmental education research policy in educational system was not obvious caused unclear policy interpretation, and performance. So, performance depended on interest of administrators and teachers.

3.2) Solution Guideline

- Classroom research on environmental education should be designed according to Education Act 1999.
- Environment research should began with kindergarten, primary school to higher education and all people.
- School administrators and teachers should adjust better attitude through research.

4) General Status of Environmental Education Research

4.1) Problem Condition

- Environmental government policy, especially, environmental education research policy in educational system was not unique, obvious, and definite.
- Research output was used on purpose of reference much more than performance and also it was hard to understand that the application was incompletely and sometime wasn't occurred.

4.2) Solution Guideline

- Environmental education research should begin with unique research policy from government policy to policy of ministry : Ministry of Education, Ministry of Science, Technology and Environment, Ministry of University Affairs, etc. and all departments, education institutes and research organization related further. Then, the performance results should impact through policy level for improvement.
- Administration in environment and environmental education should be distributed to every center in regions.
- Research to find body of knowledge should be conducted firstly to be basic of environmental education research supporting..
- Research should be conducted in various forms depended on situation and local condition.

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- Research application should be emphasized on environmental education protection and solution
- Research recommendations should be obvious in performance: what to do and how to do.
- Budget should be allocated to research conducting continuously, 3 to 5 years and over.

5) Guideline to Frame Model of Environmental Education Research Promotion

Structure or factor of model was considered firstly by starting from principle, concept or policy of environmental education research promotion till strategy or methodology and lastly summarized by achievement indicators. Model factor as mentioned might apply from environmental education managing model, policy specification, strategy plan forming and environmental education main point, all of which were from world conference, etc. Content was considered the factors within national and international research system to be guideline which consisted of many important aspects, such as; research policy, budget, personnel, organization/ research unit, and monitoring, for example. Besides, research supporters and research applicators who were research promotion goal were also considered.

6) Model Application Guideline

Environment education research promotion was national policy, applicators should start from national policy that they would allowed by Cabinet first. Then, model was transferred to perform in level of research units/ academic institutes. Ministry of Education was appropriate to be the leader of model application, the reason was it directly related to environmental education administration both formal and non-formal education.

Stage 2

With respect to the data from stage1, the model's draft was formed. It composed of 4 aspects which were principle/ concept, guideline/ measure, strategy/ means, and indicator. All of them were inserted in 10 parts of research promotion content that were; (1) research policy, (2) researcher, (3) research budget, (4) research organization (5) research information, material and equipment, (6) research performance, (7) research output, (8) research output distributing, (9) research output application and (10) research evaluation . The model's draft was evaluated and stated some suggestions in item by 14 related experts. Then the result was statistically summed to find Index of Item – Objectives Congruence (IOC) based on criteria of question validity, that is, question valued IOC 0.5-1.00 was selected. Obviously, IOC of all items were 0.5 and over, assumed that most experts were agreed with each model item. Details and IOC were revealed as the following.

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4.2 Data Analysis of Expert Evaluation and Recommendation on Environmental Education Research Promotion Model

4.2.1 Environmental Education Research Promotion on Research Policy.

Principle/Concept

The promotion of environmental education in research policy was the first major element of research promotion in very aspects because it was the first key to lead to other aspects, eg., expense, researcher, research organization because every conduction were always started from policy so environmental education research policy should depend on the following principles.

1. Research policy should dictated by all relevance who were policy personnel, supporter, researcher, and research output applicator (0.86).
2. Research policy should be clearly unique and isolate from others be various in performance. (0.71)
3. Research direction should be obvious.(0.93)
4. The time to conduct research according to it policy should be fixed (0.93)
5. Policy should based on long life education. (0.86)
6. Policy should based on sustainable development.(1.00)
7. Research was considered as the tool for human's thinking process development. (0.79)
8. Research policy was dynamics.(0.93)
9. Research administration should emphasize on the policy. (0.86)
10. The policy should focus on applicators' need. (0.79)
11. Other.....

Guideline/Measure	Strategy/Means	Indicator
1. Participation promotion among research supporters, researchers, and research output users both in government and private organizations for environmental education research policy making. (1.00)	1. Making connection among research supporters, researchers and research output users for setting up the research policy. (1.00) 2. Promoting local and national research policy at the same time. (0.64) 3. Promoting the research condition and guideline study for research policy making (0.79) 4. Appointed the research policy	1.Proportion of research policy makers among research supporters, researchers and research output users. (0.64) 2.Participatory regularity and continuity of research policy making (0.79) 3.Reserch policy concession of the related persons. (0.86) 4.Number and quality research condition and guideline study for research policy making. (0.57) 5.Policy research output used for research policy making. (0.93)

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4.2.1 Environmental Education Research Promotion on Research Policy.(Cont.)

Guideline/Measure	Strategy/Means	Indicator
	coordinating committee in all level (0.79) 5. Other……..	6. Number of meeting, seminar, training, operating, observation, and public relation for research policymaking. (0.64) 7. Efficiency of research policy coordinating committee at all levels. (0.79) 8. Others…….
2. Promoting the environmental education research policy making based rush and necessary problems with directing to national potential. (0.93)	1. Determining the research policy accordance with the national research guideline and policy. (0.93) 2. Emphasizing to proactive research policy. (1.00) 3. Promoting the conference or seminar on research policy determination and adaptation. (1.00) 4 Others……..	1. Research performance according to the research policy. (1.00) 2. Research budget allocation being accordance with the research policy. (0.86) 3. Research findings being available for problem solution. (1.00) 4. Flexible research administration in the frame of research policy. (0.57) 5. Number of conference or seminar for policy clarification and adaptation. (0.79) 6. Others……..
3.Promoting proacting and developing on group formation to be as a center for environmental education research policy determination. (0.86)	1. Educational and Environmental research organizations being the core leader for central unit formation. (0.79) 2. Environmental education research policy being forced to be partial policy related. (0.86)	1. Foreing operation condition. (0.86) 2. Empirical unity of environmental research in related policy (0.86) 3. Clearly of research policy. (0.86) 4. Strong intention of politician. (0.57) 5. Others……

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4.2.1 Environmental Education Research Promotion on Research Policy.(Cont.)

Guideline/Measure	Strategy/Means	Indicator
	3. Educational and political mechanism forcing to form a central unit for environmental education research policy determination. (0.79) 4. Others.....	
4. Promoting and proacting on research policy transformation to performance. (1.00)	1. Promoting the commission or staff for research policy evaluation (0.93) 2. Forming a group studying the research evaluation process. (0.93) 3 Others.....	1. Effective commission or staff (1.00) 2. Good procedures of evaluation process. (0.93) 3. Effective evaluation. (1.00) 4. The evaluation results can be available for research policy determination. (1.00) 5. Accepted evaluation results. (1.00) 6. Others.....

4.2.2 Environmental Education Research Promotion on Researcher

Principle/Concept

1. Researchers were important input in research system. (0.86)
2. Research was occupation. (0.64)
3. Researchers had enough quality. (0.56)
4. Researchers had enough quantity. (0.86)
5. Researchers were supported in every part. (0.71)
6. Researchers were environment studied developing indicators of the country. (0.64)
7. Researchers were always developed. (0.86)
8. Researchers had enough code of ethics. (0.93)
9. Researchers were important factor that affected to other research resources.(0.93)
10. Other.....

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4.2.2 Environmental Education Research Promotion on Researcher

Guideline/Measure	Strategy/Means	Indicator
1. Promoting to produce the environmental education research. (0.79)	1. Promoting the career path of environmental education researchers (0.86) 2. Forming the research institute for environmental education researchers. (0.71) 2. Forming the association of environmental education researcher. (0.71) 4. Others.....	1. Number of freelance and profession researchers. (0.79) 2. Balancing research organization of Environmental education (0.79) 3. Number of researchers working as major career. (0.86) 4. Number of researchers on basic knowledge. (0.86) 5. Research continuing. (0.79) 6. Number of researcher in educational organization. (0.86) 7. More employment rate of students who finish an environmental education programme. (0.50) 8. Others.....
2. Promoting continuously to produce and develop the research motivation for environmental education researchers. (0.93)	1. Constructing the research motivation and atmosphere as income, welfare etc. (0.93) 2 Developing the research finance. (0.93) 3. Others.....	1. Income for researcher. (0.93) 2. Social welfare for researcher. (0.93) 3. Certificate or prize for researcher. (0.93) 4. Convenient finance for research. (0.93) 5 Others.....
3. Promoting both quality and quantity of environmental education researcher. (0.86)	1. Promoting the formation of organization certifying the research standard. (0.57) 2. Promoting an environmental education programme in university. (0.86)	1. Number of researcher promoted the highest position as research administrator. (0.71) 2. Number of research special experts. (0.79) 3. Frequency of training for researcher. (0.79) 4. Number of new researcher. (0.79)

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4.2.2 Environmental Education Research Promotion on Researcher (Cont.)

Guideline/Measure	Strategy/Means	Indicator
	3. Developing quality of researcher production in university. (0.86) 3. Promoting the researchers joining a mega project. (0.86) 4. Budget allocation for researcher quality and quantity development. (0.79) 5. Studying the future trend and vision for researcher production and development. (0.86) Others.....	5. Balance of researcher in the country. (0.79) 6. Evaluation of researcher quality. (0.93) 7. Number of environmental education graduates.(0.79) 8. Short and long term plan for research development. (0.93) 9. Research continuing. (0.86) 10. Number of environmental education programme available in university. (0.79) 11. Number of action research in environmental education class. (0.79) 12. Others.....
4. Promoting both domestic and international network of environmental education researcher. (1.00)	1. Promoting the researcher network in domestic and international levels. (1.00) 2. Pushing the researchers to join an environmental education project. (1.00) 3. Promoting the researcher operation among government private and university. (1.00) 4. Others.....	1. Operative levels of researchers both in domestic and international areas. (0.93) 2. Number of network researcher team. (0.93) 3. Proportion of team research and disciplinary research. (1.00) 4. Number of high skilled researchers. (1.00) 5. Others.....
5. Developing an environmental education system supporting to scientific thought process. (1.00)	1. Pushing the scientific process of thought in environmental education activities. (1.00) 2. Others.....	1. Number of environmental education activities based scientific process of thought. (0.86) 2. Others.....

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4.2.3 Environmental Education Research Promotion on Research budget

PrinciplesConcept

1. Research budget was major input of research system. (0.86)
2. Research budget should be adequate. (0.93)
3. Budget apportion for environmental education research should be distinct. (0.86)
4. Variety of research supporting resources. (1.00)
5. Budget for research followed environmental education importance for sustainable development. (0.93)
6. Research budget was indicator of environmental education level index of country. (0.79)
7. Research budget was important factor that impact to other research resources. (0.79)
8. Having budget cooperation for private and foreign researches. (0.86)
9. Allocating budget for supporting research administration. (0.86)
10. Other.....

Guideline/Measure	Strategy/Means	Indicator
1.Supporting specially the budget for environment education research. (0.79)	1. Forming a central unit for environmental education research. (0.57) 2. Others.....	1 Appearing a central unit for environmental education research. (0.64) 2 Others.....
2. Supporting to have various forms of budget source for research system. ( )	**1. Forming or developing the budget source for research support. (0.93)** 2. Development the efficiency of budget source for research support. (0.93) 3. Promoting the discovery oversea research budget sources. (0.86) 4. Doing public relation of research budget sources. (1.00) 5. Others.....	1. Number of adequate research budget source. (0.79) 2. Number of research project applying for budget support. (0.79) 3. Operation of international research budget sources. (0.93) 4. Balance of research budget sources. (0.93) 5. Other.....

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4.2.3 Environmental Education Research Promotion on Research Budget (Cont.)

Guideline/Measure	Strategy/Means	Indicator
3. Supporting the adequate and covers budget for environmental educational research (1.00)	1. Specifying the goal of research budget.(1.00) 2. Studying the balance of research investment. (0.93) 3. Studying the future trend of research budget allocation.(0.93) 4. Increase of research budget in graduate study level.(0.93) 5. Promoting the research scholarship for junior researchers. (0.86) 6. Others.....	1. Amount of research budget nearly as the goal specified. (0.93) 2. Research findings being available for research budget allocation. (1.00) 3. Empirical plan of research investment. (0.93) 4. Number of graduate students getting research scholarship. (0.93) 5. Others.....
4. Developing the management and regulation to be convenient for environmental education research budget support. (0.86)	1. Improving and developing the regulation and problem on research budget support. (1.00) 2. Improving actively the research financial measure. (0.93) 3. Research budget of block grant being available for researchers and research organizations. (0.93) 4. Others.....	1. Being actively independent to get research support.(1.00) 2. Flexible regulation for research support.(1.00) 3. Specifying the standard rate for researchers. (1.00) 4. Others.....
5.Supporting the environmental education research investment participation among domestic and international organizations. (0.86)	1. Supporting a set of research project for holistic solution. (0.93) 2. There is a central unit committee-working group for research coordination. (0.86) 3. Doing the public relation for research investment. (0.86) 5. Others.....	1. Levels of cooperation among organizations. (0.93) 2. Levels of effective coordination. (0.86) 3. Effective public relation. (0.93) 4. Amount of international subsidy. (0.79) 5. Others.....

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4.2.3 Environmental Education Research Promotion on Research Budget (Cont.)

Guideline/Measure	Strategy/Means	Indicator
6. Promoting the administration of budget allocation on environmental education research. (0.86)	1. Promoting a research project development based achieved task. (1.00) 2. Promoting long term budget allocation (over 2 years) for a large research project. (0.86) 3. Promoting the budget allocation for research administration which was separated from the research performance.(0.93) 4. Promoting an urgent research for urgent problem solution. (1.00) 5. Constructing a connection among the research subsidy sources. (1.00) 6. Others.....	1. Quality of research works and researchers. (0.86) 2. Research usage. (0.86) 3. Confidence to operate research. (0.64) 4. Efficiency of research administration or research conduction. (1.00) 5 . Sufficient budget allocation for research administration. (1.00) 6. Consistency of research supported scholarship direction and scholarship resources. (0.93) 6. Others.....

4.2.4 Environmental Education Research Promotion on Research Organization

Principle/Concept

1. Research organizations were knowledge centers, collected, developed and transferred research activities. (0.79)

2. Specific organizations for environmental education research which were independent and flexible in order to develop, join, convey research flexibility (1.00) and certified research works and new technology. (0.93)

3. Environmental education research organizations should be established in region. (0.86)

4. Environmental education research organizations should cooperate to develop every research field. (0.93)

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4.2.4 Environmental Education Research Promotion on Research Organization

Guideline/Measure	Strategy/Means	Indicator
1. Promoting to have a specialized organization with independent performance for developing, coordinating and connecting the research process and distributing the research output and modern. (0.93)	1. Promoting the power storming among researchers, administrators and research output users for forming the specialized unit of environmental education. (0.93) 2. Studying the appropriate form of specialized unit. (0.86) 3. Getting some recommendations from national research supporter. (0.93) 4. Doing the public hearing. (0.86) 5. Getting the cabinet approval. (0.79) 6. Others.....	1. Operational levels of power unity. (0.79) 2. An appropriate form of specialized organization. (0.79) 3. Acceptation of nation research supporter. (0.79) 4. Passing the public hearing from all related. (0.79) 5. Others.....
2. Promoting to have the regional unit of environmental education research for connecting to the central unit determining the policy and public relation. (0.93)	1. Request some supports from the national research organization. (0.79) 2. Creating the mechanism for power storming among researchers, administrators and research output users. (0.86) 3. Others.....	1. Operational levels of regional research organization and national research supporter. (0.93) 2. Decentralization of research administration. (0.93) 3. Others.....
3. Developing all organizations related environmental education working efficiently. (0.86)	1. Studying the strategy for potential reform of related research organizations. (0.79) 2. Promoting the operative reform policy of research organization. (0.93)	1. Empirical and practical strategy. (0.79) 2. Demonstration of related organizations. (0.79) 3. Operation and direction of research organization performance. (1.00)

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4.2.4 Environmental Education Research Promotion on Research Organization (Cont.)

Guideline/Measure	Strategy/Means	Indicator
	3. Promoting to be the government policy for effective research in any organizations. (0.93) 1. Promoting the educational organizations to be local wisdom sources of environmental education. (1.00) 2. Developing the research organizations to be academic centers of environmental education. (0.93) 3. Forming the network and mechanism to connect all research organization direction and performance. (1.00) 4. Others.....	4. Convenient and active performance of research organizations. (1.00) 5. Effective presentation for environmental conservation. (1.00) 6. Number of participants in environmental conservation. (0.93) 7. Development of excellent organization in environmental education. (0.93) 8. Others.....
4. Promoting the learning sources of environmental education in a community. (0.93)	1. Promoting the environmental learning center in a community. (0.93) 2. Promoting the mobile unit of environmental learning center. (0.93) 3. Others.....	1. Participatory levels for center formation. (0.93) 2. Levels of environmental problem in a community. (0.86) 3. Others.....

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4.2.5 Environmental Education Research Promotion on Reserach Information, Material and Equipment

Principle/Concept

1. Research information technology was more important in present and future. (1.00)
2. There were research information technology resources in both central and provincial. (1.00)
3. Conveying of research information technology base to be efficient system. (1.00)
4. Research information technology should be always up-to-date. (1.00)
5. Research materials, equipment, and accommodation were sufficient. (1.00)
6. Research materials, equipment, and accommodation. (1.00)
7. Materials, equipment, and accommodation were modern. (1.00)
8. Other.....

Guideline/Measure	Strategy/Means	Indicator
1. Promoting the central unit of environmental education research. (0.93)	1. Promoting the national research office to be a central unit of research information. (0.93) 2. All research organizations sending research information to the central unit. (0.93) 3. Others.....	1. Number of research reports sending to the central unit. (0.93) 2. Number of research information applicator. (0.93) 3. Desire of research information technology users. (0.93) 4. Operation levels of research organization sending the research information to the central units. (1.00) 5. Others.....
2. Promoting the efficiency and inodernization of environmental education research information technology. (1.00)	1. Promoting the study related needs of research information application. (1.00) 2. Promoting the research data base performance for effective service of customer needs. (0.93) 3. Promoting the effective system of network connecting in research information service. (1.00)	1. Number of research information applicators. (0.86) 2. Operative levels of research information applicators. (0.93) 3. Service quality of research information application. (1.00) 4. Satisfaction levels of research information application. (1.00) 5. Others.....

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4.2.5 Environmental Education Research Promotion on Research Information , Material and Equipment (Cont.)

Guideline/Measure	Strategy/Means	Indicator
	4. Promoting the effective service of research information. (1.00) 5. Others.....	
3. Promoting the development of environmental education research facilities. (0.93)	1. Promoting the research organizations borrowing some research facilities. (0.86) 2. Checking the quality of research facilities all times. (0.93) 3. Promoting to budget increase for research facilities based actual incident. (1.00) 4. Promoting the import tax reduction for research facilities in private sectors. (1.00) 5. Others.....	1. Participatory levels of the research organization borrowing some research facilities each other. (0.86) 2. Satisfaction levels of research borrowing the research facilities. (0.71) 3. Levels of research facility readiness and quality. (0.93) 4. Amount of budget for research facilities. (1.00) 5. Desire of private organization. (0.71) 6. Others.....

4.2.6 Environmental Education Research Promotion on Research Performance

Principle/Concept

1. Research conduction was important step of research system that produced research output. (0.86)

2. Researchers, supporting of administers, research experience and external supporting organizations were contributed in research conduction. (0.86)

3. Complete condition for research conduction effected to quality of success or failure of research. (0.86)

4. Research project leader and research groups were important factors to reach the target of research conduction. (0.86)

5. Research conducting aspects should be from research applicators. (0.64)

6. Other.....

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4.2.6 Environmental Education Research Promotion on Research Performance

Guideline/Measure	Strategy/Means	Indicator
1. Promoting the connection of environmental education researchers and applicators. (1.00)	1. Promoting to have the specialized organization for connection of environmental education researchers and applicators. (1.00) 2. Others……..	1. Operational levels of central unit of environmental education research connection. (0.93) 2. Operational levels of researchers and research output applicators. (1.00) 3. Innovative approaches for research development. (1.00) 4. Others……..
2. Promoting an environmental education research atmosphere. (0.93)	1. Promoting the environmental education research training to researchers and organizations. (0.93) 2. Forming research advisor teams. (0.93) 3. Promoting the research team of senior and junior researchers. (0.93) 4. Developing the relation of researchers and research administrators. (0.93) 5. Improving the research regulation in government sector. (0.93) 6. Promoting the continuing and integrated research. (0.93) 7. Others……..	1. More experiences for researchers.(0.86) 2. More interest in research training for researchers.(0.93) 3. Quality of researchers and research output. (0.93) 4. Good relation of administrators and researchers.(0.93) 5. Research independence for the government officials.(0.93) 6. Satisfaction to research work (0.93) 7. Research's progression. (0.86) 8. Number of junior researchers. (0.93) 9. Number of achieved goal research. (0.93) 10. Others……..
3. Promoting the operation of governmental and private sectors for	1. Inviting the private organizations participatively doing research. (1.00) 2. Promoting the investment sharing to	1. Perspective view of private operational levels. (1.00) 2. Private sharing in research investment. (1.00)

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4.2.6 Environmental Education Research Promotion on in Research Performance (Cont.)

Guideline/Measure	Strategy/Means	Indicator
environmental education research. (1.00)	private sectors. (1.00) 3. Promoting the exchange of researchers, experts and materials to private sectors. (1.00) 4. Others……..	3. Convenient performance in private research sharing. (0.93) 4. Others…….

4.2.7 Environmental Education Research Promotion in Research Output

Principle/Concept

1. Research works were products of research conduction before publicizing for application.(1.00)
2. Good research works should have quality and be able to use. ((1.00)
3. Should check research quality by using many methods. (1.00)
4. At present, research output was more emphasized than in the past. (0.93)
5. Consider master piece annually and regularly. (1.00)
6. Research output monitoring and evaluating were fair. ((1.00)
7. Should formally protect research outputs. (1.00)
8. Other. ……..

Guideline/Measure	Strategy/Means	Indicator
1. Promoting the appropriate from development of environmental education research output. (1.00)	1. Promoting to have future researches for persist solution and future prevention of environmental problems. (1.00) 2. Promoting the research output responding to urgent issues. (1.00) 3. Promoting the interdisciplinary research for integrated solution and prevention of environmental problems. (1.00) 4. Promoting an adaptive research. (1.00) 5. Others……	1. Numbers of future research. (1.00) 2. Number of research output application for problem prevention and solution. (1.00) 3. Effects of research output application for problem prevention and solution. (1.00) 4. Number of research series. (1.00) 5. Others……..

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4.2.7 Environmental Education Research Promotion on Research Output (Cont.)

Guideline/Measure	Strategy/Means	Indicator
2. Promoting the quality of environmental education research output in various approaches. (0.93)	1. Promoting to have the continuing study of research condition. (1.00) 2. Promoting the research output synthesis for research policy determination. (1.00) 3. Promoting the research cost-benefit. (1.00) 4. .Promoting to market project evaluation by experts. (0.93) 5. Promoting the research motivation for quality research. (1.00) 6. Supporting to provide an academic conference for research output distribution and research work synthesis in local, national and research work synthesis in local, national and international levels. (1.00) 7. Others.....	1. Research findings can be available for policy and plan determination or research improvement. (0.86) 2. Number of certified research. (1.00) 3. Number of research report published in domestic and international journals. (0.93) 4. Number f research reference. (0.86) 5. Others.....
3. Developing the research output presentation. (0.86)	1. Promoting the simple presentation of research output for special target group. (0.93) 2. Others.....	1. Understanding levels of research output applicator in research output. (0.86) 2. Others.....

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4.2.8 Environmental Education Research Promotion on Research Output Distribution

Principle/Concept

1. Research distribution was opened to research application. (1.00)
2. Should be various style of research work distribution that suited to target group. (1.00)
3. Should distribution research works in both local and national part. (1.00)
4. Having organization to look after research conduction by distributing in various medias suited to target group. (1.00)
5. Other.....

Guideline/Measure	Strategy/Means	Indicator
1. Promoting network for environmental education research public relation. (1.00)	1. Promoting the operation of local and national research organization doing data collection and public relation to the target group. (1.00) 2. The center unity of national research responding to public relation. (1.00) 3. Promoting the local education organizations responding to public relation in communities. (0.86) 4. Others.....	1. Operational level of research organization network. (1.00) 2. Ability levels to stimulate the target group interest in research output application. (0.86) 3. Variety and covery of research information in the central unit of national research. (0.86) 4. Others.....
2. Promoting public relation quality of environmental education research. (1.00)	1. Promoting various forms of distribution. (1.00) 2. Promoting the selection of quality and available research output for public distribution. (1.00) 3. Promoting modern media for public distribution. (1.00) 4. Promoting the budget for public distribution. (1.00) 5. Others.....	1. Number of seminar participants and journal publishing. (0.79) 2. Public response on various forms of distribution. (0.86) 3. Active distribution. (0.93) 4. Others.....

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4.2.9 Environmental Education Research promotion on Research Output Application.

Principle/Concept

1. Research application was terminal target and received many understanding in present and future. (1.00)
2. Should publicize research works for application widely. (1.00)
3. Should have the meeting among research applicators and researchers regularly. (1.00)
4. Research applicators should assign research problems. (0.93)
5. Should create much research application culture for solving and protecting problems. (1.00)
6. Most research application was further research basic and solved problems in organization conduction. (0.93)
7. Important problems applicators in research application were lacking of supporting in research distribution to applicators. (0.93)
8. Other.....

Guideline/Measure	Strategy/Means	Indicator
1. Promoting participation on environmental education research output application. (1.00)	1. Promoting the specialized organization of environmental education research responding the research output application. (0.79) 2. Constructing the promoted mechanism of research output application based governmental and private participation. (1.00) 3. Commission for research output application being formed by the operation of policy maker, research supporter and researcher. (1.00) 4. Others.....	1. Operational levels of organization for research output application. (0.93) 2. Effective mechanism of research output application promotion. (0.93) 3. Operational levels of commission forming for research output application. (0.93) 4. Results of research output application in various levels. (0.93) 5. Others.....

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4.2.9 Environmental Education Research promotion on Research Output Application. (Cont.)

Guideline/Measure	Strategy/Means	Indicator
2. Promoting the researches seeking effective approaches for environmental education research output application. (1.00)	1. Promoting the specialized organization of environmental education research creating the approaches for checking research output needs and research output application. (1.00) 2. Promoting a set or project research performance. (1.00) 3. Promoting an environmental education researchers researching on the research output needs (0.93) 4. Promoting the complete system of research performance as; - Budget allocating from the research starting to the research output application. (1.00) - Motivating the research output application for the research responsible organization. (0.93) - Allocating an adequate budget for research output distribution. (0.93) 5. Promoting the research output applicators specifying participatively the research problem. (1.00)	1. To know needs and guidelines of research output application. (0.93) 2. More performance of environmental education research in set or project. (0.93) 3. Number of specialized researchers performing the researches based user's needs. (0.93) 4. Compels research output with empirical application. (1.00) 5. Most research problems based research output application need. (0.79) 6. Environmental education based scientific thinking process and innovative culture for research output application in environmental problem prevention and solution. (0.93) 7. Efficiency of intellectual property protection from the government. (0.93) 8. Others…… ……..

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4.2.9 Environmental Education Research Promotion on Research Output Application. (Cont.)

Guideline/Measure	Strategy/Means	Indicator
	6. Promoting the significance of research process in all levels of educational system. (0.93) 7. Promoting the efficiency improvement of intellectual property protection from the government. (0.93) 8. Others.....	

4.2.10 Environmental Education Research Promotion on Research Evaluation

Principle/Concept

1. Research evaluation was an important mechanism that supported research to achieve purposes. (1.00)

2. Research evaluation assisted everybody to gain knowledge from achieved research and failed research. (1.00)

3. Should arrange research evaluation in mega level every year. (0.93)

4. Research supporting organizations should evaluate research works of research projects that they supported every year. (0.93)

5. Research organization should evaluate research works of organizations every year. (0.93)

6. Evaluation should be conducted on the purpose of creation for developing research quality and efficiency. (1.00)

7. Evaluation helped research organizations to develop administration system and organizations condition which contributed to qualitative and efficient researches. (1.00)

8. Should use evaluation output to improve research policy, method and administration. (1.00)

9. Should arrange research effect evaluation for giving payment which occurred from research investment. (0.93)

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4.2.10 Environmental Education Research Promotion on Research Evaluation

Guideline/Measure	Strategy/Means	Indicator
1. Promoting the specialized organization of environmental organization of environmental education getting effective performance. (1.00)	1. Designing an accredited system of research evaluation based research expert and peer review. (1.00) 2. Promoting the research evaluation system based commission. (1.00) 3. Promoting the research evaluation in phase with expertized persons. (1.00) 4. Others.....	1. Acceptation of evaluation system from all related. (1.00) 2. Quality performances of research experts peer reviewers and commission. (0.93) 3. Others.....
2. Promoting the evaluating results of environmental education research being available for budget allocation. (1.00)	1. Recommending the integrated a approaches of budget allocation based the research evaluation results and research policy. (0.93) 2. Others.....	1. Research budget allocation being accordance with research evaluation. (0.93) 2. Others.....
3. Promoting the standard criteria of environmental education research among all related organizations. (0.93)	1. Promoting all research organizations having the same form of research evaluation. (0.93) 2. Promoting the positive atmosphere of creative evaluation. (0.93) 3. Allocating an adequate budget for research evaluation. (0.93) 4. Others.....	1. Having accredited forms of research evaluation. (0.93) 2. Participation levels of research evaluation. (0.93) 3. Adequate budget for research evaluation. (0.93) 4. Others.....
4. Developing the specialized organization for environmental education research evaluation. (1.00)	1. Promoting the development and formation of research quality and standard organization based educational zones. (0.79) 2. Forming an accredited board of research evaluation. (1.00) 3. Others.....	1. Number of research quality and standard evaluation organization. (0.93) 2. Others.....

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Stage 3

4.3 Data Analysis of Tri-Research member Group Evaluation on Environmental Education Research Promotion Model.

The draft of model that was improved and corrected by experts evaluation in stage 2 was designed to questionnaire for evaluating model. 30 of tri-research member of environmental education group (not sampling group) tested model used and improved to be first model or "Model I" in form of evaluated questionnaires. Then, they were sent to 550 of tri-research member of environmental education group as research supporters, researchers, research output applicators who were from purposive sampling, then questionnaire were sent back for 452 or 82.18%. Personnel data of questionnaire answers presented as following.

Table 4 Personal Information of Sampling Group of Tri-research Member of Environmental Education Research.

Items	Number	Percentage
Sex		
Male	337	74.5
Female	115	25.4
Academic Position		
1. Leturer/Assistant Professor	187	41.4
2. Associate Professor	11	2.4
3. Professor	3	0.7
4. etc.	251	55.5
Institute/ Organization		
1. Higher education	36	8.0
2. Department / Ministry	413	91.4
3. Private sector	3	0.7
Region		
1. Bangkok	60	13.3
2. North	64	14.2
3. South	56	13.4
4. North-East	121	26.8
5. Central	151	33.4
Total	**452**	**100.0**

From 452 personnel data of sampling group of tri-research member groups found that most were male, academic authorities in department and ministry, especially, in Ministry of Education because Ministry of Education had direct responsibility in environmental education research administration that was educational research part. Besides, sampling group was from all regions, Central was the most and North-East was the second.

Evaluation of environmental education research promotion model by tri-research member group found that total three groups agreed with content in each item of this model separate to in high level. That lowest mean ($\bar{X}$) was 4.06 and highest mean ($\bar{X}$) was 4.71 and separate to each group was the same. Besides, for to 418 total items, of model, mean ($\bar{X}$) of mostly items were over 4.25 for 320 items as the table follows:

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Table 5 Summarizing the Total Opinion of Tri-research Member Groups of Environmental Education Research Promotion.

Total mean Min-Max	Research Supporters (N=144)		Researchers (N=160)		Research Output Applicators (N=178)		Number of items relevant in Opinion mean from 4.25
	Mean Min-Max	Number of Answer Min-Max	Mean Min-Max	Number of Answer Min-Max	Mean Min-Max	Number of Answer Min-Max	
4.06-4.17	4.00-4.75	103-114	3.97-4.80	147-160	4.10-4.70	166-178	322

Besides, it was found that researchers had opinion to each item lower than other groups in following data analysis tables. Number of relevance column could be describe as:

3 meant "three groups" of tri-research member had opinion to each item over 4.25
2 meant "two groups" of tri-research member had opinion to each item over 4.25
1 meant "only one group" of tri-research member had opinion to each item over 4.25
0 meant no group tri-research member had opinion to each item over 4.25

Table 6 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Policy

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
Principle/Concept										
1. The environmental education research policy should be participatively specified by all levels of research process such as policy makers, supporters, researchers and research output applicators. ($\bar{X}$ = 4.56)	4.55	0.59	109	4.58	0.71	160	4.55	0.60	173	3
2. The policy should be empirical appearance. ($\bar{X}$ =4.59)	4.53	0.59	109	4.63	0.60	160	4.59	0.62	174	3
3. The policy should make various performances. ($\bar{X}$ =4.46)	4.44	0.79	111	4.41	0.77	160	4.52	0.71	176	3

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Table 6 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Policy (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
4. There should be clarified policy for research direction. ($\bar{X}$=4.56)	4.59	0.55	111	4.63	0.60	160	4.48	0.70	175	3
5. Performance duration should be specified in the policy. ($\bar{X}$=4.33)	4.43	0.64	114	4.23	0.78	158	4.34	0.73	174	2
6. It Should be life-long education policy. ($\bar{X}$=4.46)	4.54	0.67	114	4.36	0.81	160	4.49	0.74	174	3
7. The policy should be based on sustainable development principle. ($\bar{X}$=4.55)	4.54	0.78	114	4.53	0.76	160	4.57	0.65	176	3
8. The research should be considered to be as a major instrument for creative thinking development. ($\bar{X}$=4.38)	4.39	0.73	111	4.38	0.74	160	4.38	0.73	173	3
9. Dynamics based policy. ($\bar{X}$=4.28)	4.42	0.65	111	4.21	0.69	159	4.26	0.69	172	2
10. Emphasize on research administration followed the policy. ($\bar{X}$=4.43)	4.47	0.57	110	4.41	0.69	157	4.43	0.70	170	3

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Table 6 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Policy (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	$\bar{X}$	S.D	N	
11. The research output applicator based policy. ($\bar{X}$ =4.23)	4.43	0.63	111	4.09	0.85	159	4.23	0.72	172	1
Guideline/Measure 1										
1. Participation promotion among research supporters, researchers, and research output users both in government and private organizations for environmental education research policy making. ($\bar{X}$ =4.65)	4.63	0.55	111	4.65	0.61	159	4.66	0.51	174	3
Strategy/Means										
1. Making connecting among research supporters, researcher and research output users for setting up the research policy. ($\bar{X}$ =4.42)	4.41	0.62	113	4.40	0.66	160	4.45	0.59	175	3
2. Promoting local and national research policy at the same time. ($\bar{X}$ =4.34)	4.52	0.69	114	4.31	0.74	160	4.27	0.79	177	3
3. Promoting the reseach condition and guideline study for research policy making. ($\bar{X}$ =4.35)	4.34	0.66	114	4.36	0.64	160	4.34	0.65	177	3

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Table 6 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Policy (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
4. Appointed the research policy coordinating committee in all levels. ($\bar{X}$ =4.23)	4.16	0.87	114	4.17	0.83	160	4.30	0.77	176	1
Indicator										
1. Proportion of research policy makers among research supporters, researchers and research output users. ($\bar{X}$ =4.38)	4.19	0.83	113	4.20	0.72	160	4.15	0.75	177	0
2. Participatory regularity and continuity of research policy making. ($\bar{X}$ =4.23)	4.33	0.67	113	4.38	0.67	160	4.40	0.67	177	3
3. Research policy Concession of the Related persons. ($\bar{X}$ =4.23)	4.24	0.72	111	4.24	0.77	160	4.22	0.70	176	0
4. Number and Quality research Condition and Guideline study for Research policy Making. ($\bar{X}$ =4.23)	4.35	0.65	113	4.20	0.75	160	4.19	0.68	177	1
5. Policy research output for research policy making. ($\bar{X}$ =4.38)	4.42	0.72	113	4.43	0.60	160	4.30	0.73	177	3

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Table 6 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Policy (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
6. Number of meeting, seminar, training, operating, observation, and public relation for research policy making ($\bar{X}$=4.23)	4.13	0.97	111	4.13	0.81	159	4.39	0.72	176	1
7. Efficiency the Coordinated Research policy Committee. ($\bar{X}$ = 4.31)	4.43	0.67	111	4.22	0.76	159	4.33	0.77	175	2
Guideline/Measure 2										
2. Promoting the environmental education research policy making based rush and necessary problems with directing to national potential. ($\bar{X}$=4.68)	4.67	0.51	113	4.66	0.54	160	4.70	0.51	178	3
Strategy/Measure										
1. Determining the Research policy Accordance with the National research Guideline and Policy ($\bar{X}$=4.68)	4.75	0.43	114	4.58	0.54	160	4.64	0.56	178	3
2. Emphasizing to proactive research policy. ($\bar{X}$=4.65)	4.61	0.51	114	4.47	0.62	160	4.51	0.62	178	3

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Table 6 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Policy (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
3. Promoting the conference or seminar on research policy determination and adaptation ($\bar{X}$ =4.32)	4.42	0.64	114	4.22	0.79	160	4.35	0.67	178	2
Indicator										
1. Research performance according to the research policy. ($\bar{X}$ =4.50)	4.54	0.63	112	4.47	0.60	158	4.50	0.61	176	3
2. Research budget allocation being accordance with the research policy. ($\bar{X}$ =4.53)	4.60	0.62	113	4.49	0.66	159	4.51	0.64	177	3
3. Research findings being available for problem solution. ($\bar{X}$ =4.55)	4.64	0.57	113	4.51	0.67	158	4.53	0.67	175	3
4. Flexibility research administration in the frame of research policy ($\bar{X}$ =4.28)	4.26	0.68	112	4.28	0.69	159	4.28	0.73	177	3
5. Number of conference or seminar for policy clarification and adaptation. ($\bar{X}$ =4.08)	4.05	0.88	113	4.01	0.85	159	4.16	0.74	177	0
Guideline/ Measure 3										
3. Promoting proacting and developing on group formation to be	4.55	0.55	113	4.34	0.76	160	4.51	0.61	177	3

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Table 6 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Policy (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
as a center for environmental education research policy determination. ($\bar{X}$ =4.46)										
Strategy/ Means										
1. Educational and Environmental research organizations being the core leader for central unit formation. ($\bar{X}$ =4.35)	4.43	0.59	114	4.33	0.72	160	4.33	0.72	178	3
2. Environmental education research policy being forced to be partial policy related. ($\bar{X}$ =4.31)	4.39	0.69	114	4.22	0.72	160	4.33	0.65	178	2
3. Educational and political mechanism forcing to form a central unit for environmental education research policy determination. ($\bar{X}$ =4.17)	4.22	0.87	114	4.13	0.83	160	4.17	0.80	177	0
Indicator										
1. Foreign operation condition. ($\bar{X}$ =4.24)	4.30	0.77	114	4.22	0.73	159	4.21	0.71	177	1
2. Empirical unity of environmental research in related policy . ($\bar{X}$ =4.20)	4.29	0.81	114	4.26	0.82	160	4.32	0.69	177	3

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Table 6 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Policy (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
3. Strong intention of politician ($\bar{X}$ =4.06)	4.05	0.94	114	3.97	0.98	160	4.14	0.86	177	0
Guideline / Measure 4										
4. Support, accelerate the communication to pall the policy to the operation. ($\bar{X}$ =4.59)	4.61	0.56	110	4.53	0.65	155	4.64	0.58	176	3
Strategy/Means										
1. Promoting the participatory conference or seminar for research performance and policy units. ($\bar{X}$ =4.49)	4.54	0.63	114	4.39	0.68	160	4.54	0.58	175	3
2. Constructing the motivation for performance unit. ($\bar{X}$ =4.51)	4.61	0.60	114	4.40	0.71	158	4.56	0.62	176	3
Indicator										
1. Research policy operation of performance unit. ($\bar{X}$ =4.47)	4.58	0.59	113	4.40	0.70	159	4.45	0.66	177	3
2. Empirical motivation for performance unit. ($\bar{X}$ =4.36)	4.46	0.71	114	4.23	0.83	158	4.41	0.73	177	2
Guideline / Measure 5										
5. Promoting and proacting on research policy transformation to performance. ($\bar{X}$ =4.61)	4.63	0.56	112	4.62	0.56	156	4.59	0.62	178	3

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Table 6 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Policy (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
Strategy/ Means										
1. Promoting the commission or staff for research policy evaluation. ($\bar{X}$ =4.52)	4.52	0.60	112	4.47	0.58	158	4.56	0.58	177	3
2. Forming a group studying the research evaluation process. ($\bar{X}$ =4.33)	4.32	0.85	112	4.28	0.71	158	4.38	0.71	177	3
3. Performance unit can get partial or authentic evaluation. ($\bar{X}$ =4.28)	4.15	0.79	112	4.27	0.83	157	4.38	0.78	176	2
Indicator										
1. Effective committee or staff. ($\bar{X}$ =4.51)	4.47	0.67	11	4.50	0.68	155	4.55	0.63	171	3
2. Effective evaluation. ($\bar{X}$ =4.52)	4.54	0.61	112	4.51	0.64	156	4.52	0.63	176	3
3. The evaluation results can be available for research policy determination. ($\bar{X}$ =4.55)	4.54	0.58	112	4.53	0.59	158	4.57	0.60	178	3
4. Accepted evaluation results. ($\bar{X}$ =4.36)	4.27	0.75	112	4.35	0.66	158	4.43	0.71	176	3

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Table7 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Researchers

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
Principle / Concept	4.53	0.66	113	4.43	0.79	155	4.41	0.74	176	3
1. Researchers should be considered to be an occupation in society. ($\bar{X}$=4.45)										
2. Appropriate should be considered to be an occupation in society . ($\bar{X}$=4.43)	4.58	0.62	113	4.36	0.76	155	4.39	0.74	173	3
3. All related aspects should be supported to researchers . ($\bar{X}$ đęĚČ	4.59	0.66	113	4.80	0.43	155	4.61	0.68	176	3
4. The environmental education researchers are the indicator for national environmental education development. ($\bar{X}$=4.41)	4.60	0.58	111	4.35	0.71	155	4.34	0.67	177	3
5. Researchers should be continuously and adequately developed. ($\bar{X}$=4.36)	4.48	0.69	111	4.19	0.86	153	4.42	0.69	175	2
6. Professional ethic necessary for researchers. ($\bar{X}$=4.53)	4.55	0.77	113	4.49	0.64	147	4.54	0.64	176	3

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Table7 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Researchers (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
7. Researchers are the major factor effecting to research resources or any other factor. ($\bar{X}$=4.68)	4.63	0.57	108	4.75	0.55	155	4.63	0.61	177	3
8. Researchers or any other factors. ($\bar{X}$=4.35)	4.41	0.69	110	4.28	0.72	156	4.28	0.67	174	3
Guideline/ Measure 1										
1. Promoting to produce the environmental education research.. ($\bar{X}$=4.40)	4.34	0.72	112	4.47	0.71	157	4.39	0.75	178	3
Strategy/ Means										
1. Promoting the Career path of Environmental Education Researchers. ($\bar{X}$=4.32)	4.33	0.75	112	4.36	0.72	157	4.29	0.75	178	3
2. Forming the Research institute for environmental education researchers. ($\bar{X}$=4.34)	4.22	0.78	112	4.30	0.74	157	4.45	0.67	177	2
3. Forming the association of Environmental Education Researcher. ($\bar{X}$=4.09)	4.00	0.82	114	4.05	0.83	160	4.19	0.78	177	0

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Table7 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Researchers (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
4. Promoting to Balance the Researchers in Educational Organizations. ($\bar{X}$=4.36)	4.30	0.88	114	4.33	0.73	159	4.42	0.65	177	3
Indicator										
1. Number of free-lanc and professional researchers. ($\bar{X}$=4.15)	4.07	0.89	112	4.22	0.69	156	4.14	0.80	177	0
2. Balancing research organization of Environmental education. ($\bar{X}$=4.30)	4.16	0.77	110	4.31	0.69	156	4.38	0.70	177	2
3. Forming the association of environmental education researcher. ($\bar{X}$=4.18)	4.18	0.75	112	4.15	0.74	156	4.20	0.79	177	0
4. Number of Researchers Working as major Career. ($\bar{X}$ =4.20)	4.13	0.82	112	4.22	0.70	156	4.22	0.79	177	0
5. Number of researchers on basic knowledge. ($\bar{X}$ =4.15)	4.20	0.81	110	4.13	0.77	156	4.12	0.77	175	0
6. Research continuting. ($\bar{X}$=4.43)	4.44	0.65	112	4.39	0.70	160	4.47	0.63	177	3

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Table7 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Researchers (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
7. Number of researcher in educational organization. ($\bar{X}$ =4.12)	4.13	0.75	112	4.11	0.78	160	4.13	0.75	177	0
8. More employment rate of students who finish an environmental education programme. ($\bar{X}$ =4.07)	4.10	0.76	112	4.02	0.80	160	4.10	0.84	177	0
9. Number of researchers in academic work-unit and academic institute. ($\bar{X}$ =4.11)	4.07	0.72	112	4.09	0.75	159	4.15	0.84	177	0
Guideline/Measure 2										
2. Promoting continuously to produce and develop tlie research motivation for environmental education researchers. ($\bar{X}$ =4.55)	4.54	0.58	111	4.47	0.65	158	4.63	0.53	175	3
Stratery/Means										
1. Constructing the research motivation and atmosphere as income, welfare etc. ($\bar{X}$ =4.44)	4.35	0.73	114	4.39	0.67	160	4.56	0.59	176	3

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Table7 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Researchers (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
2. Developing the research finance. ($\bar{X}$ =4.31)	4.25	0.76	114	4.33	0.67	160	4.32	0.69	176	3
Indicator										
1. Income for researcher. ($\bar{X}$ =4.32)	4.35	0.70	114	4.28	0.73	159	4.32	0.76	177	3
2. Social welfare for researcher. ($\bar{X}$ =4.25)	4.19	0.82	113	4.20	0.74	160	4.34	0.72	177	1
3. Certificate or prize for researcher. ($\bar{X}$ =4.32)	4.27	0.77	114	4.24	0.82	160	4.42	0.72	176	2
4. Convenient finance for research. ($\bar{X}$ =4.30)	4.17	0.93	114	4.34	0.77	158	4.34	0.67	177	2
Guideline / Measure 3										
3. Promoting both quality and quantity of environmental education researcher. ($\bar{X}$ =4.56)	4.53	0.64	111	4.54	0.59	160	4.58	0.57	173	3
Strategy/ Means										
1.Promoting the formation of organization certifying the research standard. ($\bar{X}$ =4.37)	4.29	0.73	114	4.31	0.79	160	4.47	0.60	177	3

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Table7 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Researchers (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
2. Promoting an environmental education programme in university. ($\bar{X}$ =4.49)	4.30	0.73	114	4.54	0.64	160	4.58	0.57	177	3
3. Developing quality of researchers production in university. ($\bar{X}$ =4.50)	4.41	0.71	114	4.50	0.61	160	4.56	0.53	177	3
4. Promoting the researchers joining a mega project. ($\bar{X}$ =4.35)	4.33	0.76	114	4.33	0.75	160	4.39	0.75	177	3
5. Budget allocation for researcher quality and quantity development. ($\bar{X}$ =4.36)	4.32	0.70	112	4.34	0.68	160	4.41	0.62	176	3
6. Studying the future trend and vision for researcher production and development. ($\bar{X}$ =4.39)	4.28	0.75	112	4 38	0.65	160	4.47	0.61	176	3
7. Designing the Approaches treating administrators and environmental instructors	4.36	0.67	114	4.41	0.69	160	4.51	0.59	176	3

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Table7 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Researchers (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
getting more interest in research. ($\bar{X}$=4.44)										
8. Promoting the action research in environmental education class. ($\bar{X}$ =4.35)	4.22	0.77	109	4.29	0.80	160	4.48	0.67	172	2
Indicator										
1. Number of researchers promoted the highest position as research administrator. ($\bar{X}$ =4.23)	4.21	0.72	114	4.24	0.72	160	4.22	0.77	177	0
2. Number of research special experts. ($\bar{X}$ = 4.29)	4.21	0.73	112	4.26	0.66	160	4.37	0.68	177	2
3. Frequency of training for researcher. ($\bar{X}$ = 4.08)	4.11	0.81	109	4.01	0.78	160	4.11	0.80	175	0
4. Number of new researcher. ($\bar{X}$ = 4.10)	4.17	0.88	112	4.01	0.84	159	4.12	0.80	177	0
5. Balance of researcher in the country. ($\bar{X}$ = 4.21)	4.26	0.88	112	4.12	0.82	160	4.27	0.78	177	2
6. Researcher quality Evaluation. ($\bar{X}$ = 4.36)	4.25	0.81	114	4.37	0.74	160	4.43	0.67	176	3

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Table7 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Researchers (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
7. Number of environmental education graduates. ($\bar{X}$ = 4.14)	4.13	0.83	112	4.06	0.78	160	4.22	0.75	175	0
8. Short and long term plan for research development. ($\bar{X}$ = 4.31)	4.21	0.86	112	4.35	0.79	156	4.33	0.72	171	2
9. Research continuity. ($\bar{X}$ = 4.36)	4.26	0.73	114	4.33	0.78	160	4.45	0.63	176	3
10. Number of environmental education programme available in university. ($\bar{X}$ = 4.22)	4.06	0.74	112	4.22	0.78	160	4.32	0.74	175	1
11. Number of environmental education administers and teachers. ($\bar{X}$ = 4.12)	3.99	0.90	114	4.03	0.86	160	4.28	0.74	174	1
12. Number of action research in environmental education class. ($\bar{X}$ = 4.26)	4.26	0.82	112	4.16	0.86	160	4.36	0.76	175	2
Guideline/ Measure 4										
4. Promoting both domestic and international network of environmental education	4.43	0.64	114	4.36	0.72	158	4.47	0.68	172	3

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Table7 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Researchers (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
researcher. ($\bar{X}$ = 4.42)										
Strategy/Mean										
1. Promoting the research network in domestic and international levels. ($\bar{X}$ = 4.40)	4.46	0.60	114	4.32	0.69	160	4.44	0.68	174	3
2. Pushing the researchers to join an environmental education project. ($\bar{X}$ = 4.43)	4.45	0.53	114	4.40	0.67	160	4.45	0.67	174	3
3. Promoting the researcher operation private and university. ($\bar{X}$ = 4.40)	4.44	0.61	114	4.35	0.71	160	4.43	0.66	174	3
Indicator										
1. Operative levels of researchers both in domestic and internation areas. ($\bar{X}$ = 4.36)	4.39	0.74	114	4.34	0.72	160	4.36	0.70	175	3
2. Number of network researcher team. ($\bar{X}$ = 4.26)	4.25	0.74	114	4.18	0.72	160	4.34	0.68	174	2
3. Number of high skelled researchers. ($\bar{X}$ = 4.35)	4.28	0.76	114	4.31	0.76	160	4.44	0.68	174	3
4. Proportion of team Research and disciplinary	4.16	0.99	114	4.18	0.80	1.59	4.25	0.74	174	1

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Table7 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Researchers (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
Research. ($\bar{X}$ = 4.20)										
5. Approaches for network connection. ($\bar{X}$ = 4.25)	4.29	0.99	114	4.16	0.83	159	4.30	0.76	172	2
Guideline/ Measure 5										
5.Developing an environmental education system supporting to scientific thought process. ($\bar{X}$ = 4.63)	4.62	0.55	114	4.59	0.60	160	4.66	0.57	174	3
Strategy/Means										
1. Pushing the scientific process of thought in environmental education activities. ($\bar{X}$ = 4.64)	4.64	0.58	114	4.59	0.61	160	4.67	0.53	174	3
Indicator										
1.Number of environment education activities based scientific process of thought. ($\bar{X}$ = 4.57)	4.48	0.67	114	4.53	0.62	160	4.67	0.55	173	3
2.Number of education organization providing the field trip course of environmental education. ($\bar{X}$ = 4.55)	4.42	0.66	114	4.55	0.62	160	4.63	0.57	174	3

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Table7 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Researchers (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
3.Number of educational organization using the research findings to be partial course environmental education. ($\bar{X}$ = 4.43)	4.27	0.83	113	4.41	0.67	160	4.53	0.63	174	3

Table 8 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Budget

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
Principle/Concepts										
1. Research budget should be enough and adequate. ($\bar{X}$ = 4.55)	4.48	0.75	112	4.60	0.58	160	4.54	0.64	175	3
2. The environmental education research budget should be specially allocated. ($\bar{X}$ = 4.43)	4.43	0.74	112	4.38	0.74	160	4.48	0.65	175	3
3. The research budget for environmental education should be made priority based its significance both in present and future for sustainable	4.49	0.71	114	4.56	0.65	160	4.55	0.59	174	3

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Table 8 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Budget (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
Development. ($\bar{X}$ =4.54)										
4. There should be vireos forms of research supporting source. ($\bar{X}$ =4.54)	4.35	0.76	114	4.49	0.61	160	4.52	0.60	176	3
5. The research budget can be the indicator for environment education development in country. ($\bar{X}$ = 4.29)	4.46	0.69	114	4.11	0.82	160	4.35	0.74	176	3
6. The research budget can be the indicator for environmental education development in courntry. ($\bar{X}$ = 4.39)	4.42	0.79	114	4.34	0.68	159	4.43	0.63	174	3
7. The budget for research output application should made through educational organizations, environmental education for research development. ($\bar{X}$ = 4.39)	4.31	0.98	112	4.34	0.74	158	4.49	0.65	174	3

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Table 8 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Budget (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
8. Education organization should coordinate to both private and internatinal organizations for research budget support. ($\bar{X} = 4.41$)	4.43	0.73	112	4.32	0.69	160	4.47	0.64	176	3
9. The government Should coordinate to both provate and international organization for research budget support.($\bar{X} = 4.47$)	4.57	0.67	112	4.36	0.68	159	4.51	0.63	174	3
10. The research budget is a major factor effecting to other research. factors.($\bar{X} = 4.36$)	4.47	0.68	112	4.22	0.76	157	4.42	0.67	174	2
Guideline/Measure 1										
1. Supporting specially the budget for environment education research. ($\bar{X} = 4.44$)	4.34	0.68	114	4.41	0.68	160	4.53	0.64	177	3
Strategy/ Means										
1. Forming a central unit for environmental education research. ($\bar{X} = 4.30$)	4.39	0.74	113	4.13	0.78	160	4.39	0.67	176	2

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Table 8 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Budget (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
2. Studying the relation of environmental education budget application and research. ($\bar{X}$ = 4.23)	4.19	0.82	113	4.14	0.70	159	4.34	0.65	176	1
Indicator										
1. Appearing a central unit for environmental education research. ($\bar{X}$ = 4.26)	4.35	0.78	112	4.11	0.83	159	4.35	0.69	175	2
2. Appearing the Budget system of Environmental education research and development with indicators. ($\bar{X}$ =4.29)	4.29	0.67	112	4.26	0.71	156	4.33	0.69	174	3
Guideline/ Measure 2										
2. Supporting to have various forms of budget source for research system. ($\bar{X}$ = 4.51)	4.53	0.60	114	4.42	0.65	159	4.58	0.56	176	3
Strategy/Meaans										
1. Forming or developing the budget Source for research support. ($\bar{X}$ = 4.41)	4.41	0.72	113	4.36	0.65	160	4.46	0.62	177	3

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Table 8 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Budget (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
2.Development the efficiency of budget source for research support. ($\bar{X}$ = 4.39)	4.44	0.68	113	4.27	0.67	158	4.46	0.59	176	3
3. Promoting the discovery oversea research budget sources. ($\bar{X}$ = 4.34)	4.30	0.67	113	4.28	0.77	160	4.42	0.67	177	3
4. Doing public relation of research budget sources. ($\bar{X}$ = 4.39)	4.38	0.75	113	4.38	0.70	160	4.41	0.65	176	3
Indicator										
1.Number of adequate research budget sources. ($\bar{X}$ = 4.33)	4.34	0.64	113	4.26	0.70	160	4.38	0.64	175	3
2.Number of research projects applying for budget support. ($\bar{X}$ = 4.29)	4.35	0.72	112	4.21	0.69	159	4.33	0.66	175	2
3.Operation of international research budget sources. ($\bar{X}$ = 4.27)	4.26	0.85	109	4.18	0.79	158	4.35	0.70	175	2
4.Researchers knowing in research budget sources. ($\bar{X}$ = 4.24)	4.20	0.77	103	4.20	0.75	148	4.31	0.68	162	1
5.Balance of research budget sources. ($\bar{X}$ = 4.31)	4.34	0.70	113	4.25	0.78	159	4.36	0.66	173	3

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Table 8 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Budget (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
Guideline/Measure 3										
3. Supporting the adequate and covers budget for environmental educational research. ($\bar{X}$=4.44)	4.38	0.59	113	4.48	0.63	158	4.45	0.73	171	3
Strategy/Means										
1. Specifying the goal of research budget. ($\bar{X}$=4.47)	4.54	0.55	112	4.39	0.63	158	4.50	0.62	173	3
2. Studying the balance of research. ($\bar{X}$=4.47)	4.40	0.74	112	4.45	0.67	157	4.53	0.62	173	3
3. Studying the future trend of reserch budget alloction. ($\bar{X}$=4.35)	4.32	0.80	112	4.31	0.68	159	4.40	0.72	173	3
4.Increase of research budget in graduate study level. ($\bar{X}$=4.26)	4.23	0.65	111	4.19	0.77	155	4.33	0.71	172	1
5. Promoting the research scholarship for junior researchers. ($\bar{X}$=4.25)	4.29	0.71	112	4.18	0.79	159	4.30	0.82	173	2
6. Promotion the research budget support in classes, schools and schools. ($\bar{X}$=4.40)	4.39	0.65	109	4.28	0.81	159	4.53	0.65	172	3

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Table 8 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Budget (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
Indicator										
1. Amount of research budget nearly as the goal specified. ($\bar{X}$=4.36)	4.35	0.60	113	4.33	0.69	159	4.39	0.69	173	3
2. Research findings being available for research budget allocation. ($\bar{X}$=4.33)	4.32	0.65	112	4.30	0.71	159	4.37	0.68	171	3
3. Empirical plan of research investment. ($\bar{X}$=4.43)	4.39	0.61	112	4.39	0.68	159	4.48	0.64	171	3
4. Number of graduated students getting research scholarship. ($\bar{X}$=4.20)	4.14	0.80	112	4.21	0.75	159	4.22	0.75	170	0
5.Number of junior researchers getting research subsidy in environmental education.($\bar{X}$=4.14)	4.13	0.90	113	4.08	0.80	159	4.19	0.83	171	0
6.Number of environmental education projects getting research scholarship. ($\bar{X}$=4.33)	4.51	2.89	111	4.23	0.74	159	4.31	0.74	170	2
Guideline/ Measure 4										
4.Developing the management and regulation to be convenient for environmental	4.42	0.56	112	4.39	0.65	158	4.53	0.60	172	3

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Table 8 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Budget (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
education research budget support. ($\bar{X}$ =4.45)										
Strategy/ Means										
1. Improving and developing the regulations and problems on research budget supports. ($\bar{X}$ =4.49)	4.47	0.54	112	4.51	0.65	159	4.47	0.62	172	3
2. Improving actively the research financial measure. ($\bar{X}$ =4.38)	4.30	0.77	111	4.38	0.69	159	4.43	0.63	172	3
3. Research budget of block grant being. ($\bar{X}$ =4.32)	4.27	0.67	111	4.29	0.75	158	4.39	0.66	172	3
4. Block grant research funds allocated to researchers and organizations. ($\bar{X}$ =4.14)	4.20	0.69	110	4.11	0.81	158	4.12	0.83	172	0
Indicator										
1.Being actively independent to get research support. ($\bar{X}$ =4.34)	4.34	0.74	111	4.40	0.68	156	4.29	0.73	170	3
2.Flexible regulations for research support. ($\bar{X}$ =4.33)	4.31	0.68	111	4.37	0.75	158	4.31	0.74	171	3

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Table 8 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Budget (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
3.Specificaton of researcher income standard rate for researchers. ($\bar{X}$=4.28)	4.25	0.72	111	4.31	0.77	158	4.28	0.74	171	3
Guideline/ Measure 5										
5. Supporting the environmental education research investment participation among domestic and international organization($\bar{X}$=4.43)	4.41	0.58	109	4.35	0.68	156	4.51	0.64	172	3
Strategy/ Means										
1. Supporting a set of research project for holistic solution.($\bar{X}$=4.42)	4.38	0.67	108	4.44	0.63	159	4.43	0.65	172	3
2. There is a central unit committee-working group for research coordination. ($\bar{X}$=4.35)	4.31	0.62	106	4.25	0.74	159	4.45	0.61	172	3
3. Doing the public relation for research investment. ($\bar{X}$=4.34)	4.23	2	1	4.33	0.68	159	4.41	0.68	174	2
Indicators										
1. Levels of cooperation among organization. ($\bar{X}$=4.38)	4.41	0.61	111	4.38	0.64	157	4.36	0.68	171	3
2.Levels of effective coordination($\bar{X}$=4.27)	4.21	0.73	111	4.30	0.72	157	4.29	0.73	171	2

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Table 8 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Budget (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
3. Effective public relation. ($\bar{X}$ =4.25)	4.10	0.88	111	4.30	0.72	158	4.30	0.75	172	2
4. Amount of international subsidy.($\bar{X}$ =4.22)	4.20	0.87	111	4.22	0.77	158	4.25	0.74	173	1
Guideline/ Measure 6										
6. Promoting the administration of budget allocation on environmental education research. ($\bar{X}$ =4.45)	4.41	0.58	113	4.39	0.63	157	4.54	0.62	172	3
Strategy/ Means										
1.Promoting a research project development based achieved task. ($\bar{X}$ =4.39)	4.34	0.77	113	4.34	0.69	160	4.46	0.65	178	3
2.Promoting long term budget allocation (over 2 years) for a large research project. ($\bar{X}$ =4.23)	4.21	0.82	113	4.23	0.76	159	4.24	0.71	178	0
3.Promoting the budget allocation for research administration which was separated from the research performance. ($\bar{X}$ =4.30)	4.26	0.75	113	4.19	0.79	160	4.44	3.00	178	2
4. Promoting an urgent research for urgent problem solution. ($\bar{X}$ =4.43)	4.50	0.71	113	4.40	0.68	160	4.42	0.68	178	3

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Table 8 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Budget (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
5. Constructing a connection among the research subsidy sources. ($\bar{X}$ =4.32)	4.40	0.68	111	4.27	0.67	159	4.31	0.74	177	3
Indicator										
1.Quality of research work and reserchers. ($\bar{X}$ =4.49)	4.43	0.60	111	4.43	0.68	158	4.58	0.60	174	3
2. Research usage. ($\bar{X}$ =4.46)	4.39	0.69	113	4.44	0.68	160	4.53	0.61	178	3
3.Confidence to operate research. ($\bar{X}$ =4.31)	4.42	0.68	109	4.24	0.73	157	4.31	0.71	177	2
4.Efficiency of research administration or research conduction. ($\bar{X}$ =4.42)	4.66	0.55	107	4.30	0.66	159	4.38	0.65	177	3
5.Sufficient budget allocation for research administration. ($\bar{X}$ =4.39)	4.59	0.64	110	4.29	0.68	159	4.37	0.67	178	3
6.Consistency of research supported) scholarship direction and scholarship resources. ($\bar{X}$ =4.32	4.41	0.80	112	4.19	0.66	159	4.37	0.67	177	2

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Table 9 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Organization

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
Principle/Concept										
1.The research organizations are as a center for collecting developing and transferring research knowledge to application. ($\bar{X}$=4.47)	4.43	0.72	107	4.51	0.57	158	4.46	0.67	172	3
2.There should be a specialized organizations with independent performance for developing, coordinating and connecting in the research process and distributing the research output and modern technology. ($\bar{X}$=4.46)	4.44	0.78	106	4.41	0.64	155	4.51	0.70	169	3
3.There should be some organization promoting all levels of environmental education performance. ($\bar{X}$=4.52)	4.65	0.62	108	4.40	0.61	156	4.54	0.66	171	3
4.The direction of environmental education development should be the same among all organization related. ($\bar{X}$=4.48)	4.52	0.72	107	4.45	0.65	156	4.49	0.68	176	3

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Table 9 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Organization (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
5. Action unit of environmental education should be also a research unit. ($\bar{X}$ 4.47)	4.43	0.71	104	4.38	0.71	152	4.58	0.62	175	3
6. Organizations related to environmental education research that should direct consistent research development ($\bar{X}$ =4.45)	4.39	0.69	105	4.39	0.65	153	4.53	0.63	175	3
7. Environmental education conduction organization should be the research unit. ($\bar{X}$ =4.40)	4.38	0.92	107	4.30	0.76	151	4.49	0.70	172	3
Guideline/ Measure 1										
1.Promoting to have a specialized organization with independent performance for developing, coordinating and connecting the research process and distributing the research output and modern. ($\bar{X}$ =4.55)	4.50	0.63	112	4.50	0.63	159	4.64	0.58	175	3
Strategy/ Means										
1. Promoting the power storming among researchers, administrators and	4.44	0.71	113	4.41	0.69	158	4.51	0.66	176	3

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Table 9 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Organization (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
research output users for forming the specialized unit of environmental education.($\bar{X}$ =4.46)										
2. Studying the appropriate form of specialized unit. ($\bar{X}$ =4.32)	4.35	0.70	113	4.28	0.67	157	4.34	0.69	175	3
3. Getting some recommendations from national research supporter. ($\bar{X}$ =4.25)	4.35	0.74	113	4.13	0.70	156	4.29	0.70	175	2
4. Doing the public hearing. ($\bar{X}$ =4.30)	4.28	0.84	113	4.22	0.70	156	4.38	0.76	174	2
5.Getting the cabinet approval. ($\bar{X}$ =4.24)	4.25	0.84	113	4.21	0.76	154	4.26	0.77	175	2
Indicator										
1. Operational levels of power unity ($\bar{X}$ =4.37)	4.46	0.80	112	4.27	0.73	157	4.40	0.63	176	3
2. An appropriate form of specialized organization. ($\bar{X}$ =4.32)	4.33	0.89	111	4.23	0.67	140	4.39	0.67	174	2
3. Acceptation of nation research supporter($\bar{X}$ =4.28)	4.37	0.81	106	4.15	0.75	157	4.36	0.69	176	2
4. Passing the public hearing from all related. ($\bar{X}$ =4.30)	4.36	0.75	104	4.21	0.73	157	4.36	0.74	174	2

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Table 9 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Organization (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
5. Cabinet approved. ($\bar{X}$=4.23)	4.33	0.78	106	4.08	0.83	157	4.32	0.70	173	2
Guideline/Measure 2										
1. Promoting to have the regional unit of environmental education research for connecting to the central unit determining the policy and public. ($\bar{X}$=4.51)	4.49	0.66	111	4.49	0.64	158	4.55	0.61	173	3
Strategy/Means										
1. Creating the mechanism for power storming among researchers, administrators and research output users. ($\bar{X}$=4.41)	4.41	0.81	111	4.40	0.63	154	4.44	0.69	174	3
2. Studying the appropriate form of regional research organization. ($\bar{X}$=4.38)	4.45	0.68	113	4.32	0.64	154	4.38	0.69	173	3
3. Request some supports from the national research organization. ($\bar{X}$=4.35)	4.39	0.74	113	4.29	0.68	155	4.39	0.70	174	3
Indicator										
1. Operational levels of power unity. ($\bar{X}$=4.38)	4.49	0.77	106	4.27	0.72	156	4.40	0.70	174	3

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Table 9 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Organization (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
2. An appropriate form of regional research organization. ($\bar{X}$ =4.32)	4.33	0.89	111	4.23	0.67	140	4.39	0.67	174	2
3. Operational levels of regional research organization and national research supporter. ($\bar{X}$ =4.28)	4.37	0.81	106	4.15	0.75	175	4.36	0.69	176	2
4. Decentralization of research administration. ($\bar{X}$ =4.30)	4.36	0.75	104	4.21	0.73	157	4.36	0.74	174	2
Guideline/Measure										
3.Developing all organization related environmental education working efficiently. ($\bar{X}$ =4.57)	4.65	0.53	114	4.54	0.56	159	4.57	0.66	176	3
Strategy/Means										
1. Studying the strategy for potential reform of related research organization. ($\bar{X}$ =4.40)	4.42	0.76	114	4.35	0.61	159	4.43	0.69	176	3
Indicator										
1. Operational levels of power unity. ($\bar{X}$ =4.38)	4.49	0.77	106	4.27	0.72	156	4.40	0.70	174	3

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Table 9 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Organization (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
2.Suitable provincial organization models. ($\bar{X}$=4.34)	4.45	0.71	106	4.22	0.73	157	4.38	0.72	175	3
3. Operational levels of regional research organization and national research supporter. ($\bar{X}$=4.35)	4.39	0.87	106	4.24	0.73	157	4.42	0.69	175	2
4. Decentralization of research administration ($\bar{X}$=4.36)	4.39	0.86	105	4.27	0.74	157	4.43	0.66	175	3
Guideline/Measure 3										
3. Developing all organizations related environmental education working efficiently. ($\bar{X}$=4.57)	4.61	0.53	114	4.54	0.56	159	4.57	0.66	176	3
Strategy/ Means										
1.Studying the strategy for potential reform of related research organizations. ($\bar{X}$=4.40)	4.42	0.76	114	4.35	0.61	159	4.43	0.69	176	3
2.Promoting the operative reform policy of research organization. ($\bar{X}$=4.47)	4.54	0.63	114	4.42	0.63	159	4.49	0.70	176	3
3. Promoting to be the government policy for effective research in any organizations. ($\bar{X}$=4.44)	4.46	0.73	114	4.40	0.66	159	4.47	0.70	176	3

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Table 9 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Organization (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
4. Promoting the educational organizations to be local wisdom sources of environmental education. ($\bar{X}$ =4.53)	4.47	0.63	114	4.50	0.66	159	4.59	0.59	176	3
5.Developing the research organization to be academic centers of environmental education. ($\bar{X}$ =4.45)	4.40	0.67	114	4.41	0.64	157	4.53	0.60	176	3
6.Forming the network and mechanism to connect all research organization direction and performance. ($\bar{X}$ =4.40)	4.28	0.76	114	4.39	0.69	159	4.50	0.61	176	3
Indicator										
1. Empirical and practical strategy. ($\bar{X}$ =4.49)	4.50	0.72	107	4.47	0.62	159	4.51	0.64	172	3
2. Operation and direction of research organization performance. ($\bar{X}$ =4.41)	4.45	0.73	109	4.35	0.63	159	4.44	0.66	172	3
3. Convenient and active performance of research organization. ($\bar{X}$ =4.41)	4.47	0.65	109	4.41	0.63	158	4.36	0.68	171	3

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Table 9 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Organization (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
4. Effective presentation for environmental conservation. ($\bar{X}$ 4.41)	4.34	0.78	109	4.42	0.70	159	4.45	0.69	170	3
5. Number of participants in environmental conservation. ($\bar{X}$ =4.33)	4.40	0.81	104	4.26	0.75	142	4.34	0.86	157	3
6. Development of excellent organization in environmental education. ($\bar{X}$ =4.38)	4.44	0.84	109	4.31	0.83	159	4.39	0.74	171	3
Guideline/Measure 4										
4. Promoting the learning sources of environmental education in a community. ($\bar{X}$ =4.71)	4.65	0.55	112	4.68	0.56	158	4.78	0.47	172	3
Strategy/ Means										
1. Promoting the environmental learning center in a community. ($\bar{X}$ =4.52)	4.56	0.57	111	4.44	0.65	158	4.57	0.67	175	3
2. promoting the mobile unit of environmental learning center. ($\bar{X}$ =4.32)	4.38	0.72	114	4.15	0.84	158	4.45	0.74	176	2
3. promoting the integrated sources of environmental learning in a	4.47	0.64	112	4.54	0.64	158	4.55	0.63	175	3

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Table 9 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Organization (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	
community. ($\bar{X}$=4.53)										
Indicator										
1.participatory levels for center formation. ($\bar{X}$=4.52)	4.55	0.73	112	4.49	0.67	158	4.52	0.69	174	3
2.Levels of environmental problem in a community. ($\bar{X}$=4.49)	4.55	0.61	110	4.45	0.71	158	4.47	0.72	173	3
3.Number of environmental learning source in a community. ($\bar{X}$=4.47)	4.44	0.71	112	4.48	0.62	158	4.49	0.74	173	3

Table 10 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Information, Material and Equipment.

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
Principles/ Concepts										
1. There should be researched information sources both in central and regional area. ($\bar{X}$=4.60)	4.62	0.69	109	4.63	0.56	156	4.57	0.61	175	3
2. The research Information should be	4.66	0.57	107	4.63	0.56	156	4.55	0.63	175	3

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Table 10 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion on Research Information, Material and Equipment. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
connected as a network. ($\bar{X}$ =4.61)										
3.The research information should be undated all time. ($\bar{X}$ =4.58)	4.51	0.63	107	4.62	0.64	156	4.58	0.63	175	3
4.The research information should be conveniently available. ($\bar{X}$ =4.60)	4.66	0.63	106	4.64	0.57	156	4.52	0.66	174	3
5.The research facility should be adequate. ($\bar{X}$ =4.50)	4.47	0.79	103	4.53	0.57	156	4.49	0.69	175	3
6.The research facility should be conveniently available. ($\bar{X}$ =4.51)	4.50	0.67	103	4.49	0.63	156	4.53	0.66	175	3
7.The research facility should be appropriate to research condition. ($\bar{X}$ =4.53)	4.50	0.79	105	4.53	0.61	156	4.54	0.63	173	3
Guideline/Measure 1										
1. Promoting the central unit of environmental education research. ($\bar{X}$ =4.56)	4.47	0.66	112	4.61	0.55	159	4.58	0.62	177	3
Strategy/ Means										
1. Promoting the national research office to be a central unit of research information ($\bar{X}$ =4.45)	4.33	0.80	113	4.51	0.63	159	4.46	0.69	177	3

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Table 10 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion on Research Information, Material and Equipment. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	N	$\bar{X}$	S.D	N	
2.All research organizations sending research information to the central unit. ($\bar{X}$ =4.41)	4.33	0.81	113	4.45	0.65	158	4.43	0.70	177	3
Indicator										
1. Number of research reports sending to the central unit. ($\bar{X}$ =4.38)	4.32	0.67	111	4.37	0.63	157	4.44	0.70	177	3
2. Number of research information applicator. ($\bar{X}$ =4.35)	4.44	0.73	111	4.29	0.74	156	4.34	0.74	178	3
3. Operation levels of research organization sending the research information to the central units. ($\bar{X}$ =4.36)	4.35	0.79	111	4.35	0.66	157	4.38	0.72	178	3
Guideline/Measure2										
1. Promoting the efficiency and modernization of environmental education research information technology . ($\bar{X}$ =4.62)	4.49	0.67	111	4.64	0.53	157	4.68	0.56	175	3
Strategy/Means										
1. Promoting the study related needs of research information application. ($\bar{X}$ =4.48)	4.42	0.68	111	4.49	0.60	157	4.50	0.65	177	3

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Table 10 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion on Research Information, Material and Equipment. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
2. Promoting the research data base performance for effective service of customer needs. ($\bar{X}$=4.49)	4.50	0.68	113	4.48	0.60	158	4.51	0.64	176	3
3.Promoting the effective system of network connecting in research information service. ($\bar{X}$=4.49)	4.51	0.66	110	4.49	0.61	149	4.48	0.65	164	3
4.Promoting the effective service of research information. ($\bar{X}$=4.48)	4.50	0.75	113	4.49	0.58	158	4.46	0.66	177	3
Indicator										
1. Number of research information technology applicators. ($\bar{X}$=4.36)	4.42	0.73	111	4.29	0.69	157	4.38	0.73	177	3
2. Operative levels of research information applicators. ($\bar{X}$=4.35)	4.24	0.90	111	4.30	0.69	158	4.45	0.68	176	2
3. Service quality of research information application. ($\bar{X}$=4.42)	4.36	0.88	111	4.43	0.65	158	4.44	0.69	177	3

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Table 10 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion on Research Information, Material and Equipment. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	
4. Satisfaction levels of research information application. ($\bar{X}$=4.42)	4.41	0.70	109	4.40	0.65	159	4.44	0.68	177	3
Guideline/Measure 3										
3. Promoting the development of environmental education research facilities ($\bar{X}$=4.50)	4.42	0.61	113	4.48	0.62	160	4.58	0.61	175	3
Strategy/Means										
1. Promoting the research organizations borrowing some research facilities. ($\bar{X}$=4.38)	4.39	0.70	113	4.30	0.74	160	4.44	0.70	177	3
2. Checking the quality of research facilities all times. ($\bar{X}$=4.36)	4.26	0.80	113	4.34	0.65	160	4.44	0.67	177	3
3 Promoting to budget increase based actual incident.($\bar{X}$=4.35)	4.35	0.70	113	4.30	0.68	160	4.40	0.74	176	3
4 Promoting the import tax reduction for research facilities in private sectors. ($\bar{X}$=4.24)	4.27	0.85	113	4.16	0.76	160	4.29	0.74	177	2
5.Export rates of research facilities	4.28	0.78	113	4.44	0.71	160	4.48	0.67	177	3

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Table 10 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion on Research Information, Material and Equipment. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
invention. ($\bar{X}$ =4.42)										
Indicator										
1. Participatory levels of the research organization borrowing some research facilities each other. ($\bar{X}$ =4.33)	4.36	0.78	113	4.29	0.68	160	4.34	0.76	178	3
2. Satisfaction levels of research borrowing the research facilities. ($\bar{X}$ =4.33)	4.48	0.66	107	4.22	0.72	160	4.29	0.76	178	2
3. Level of research facility readiness and quality. ($\bar{X}$ =4.38)	4.39	0.69	113	4.31	0.70	160	4.43	0.65	178	3
4. Amount of budget for research facilities.($\bar{X}$ =4.32)	4.46	0.69	110	4.17	0.75	160	4.36	0.71	178	2
5. Export rates of research facilities in private sectors. ($\bar{X}$ =4.20)	4.41	0.85	113	3.96	0.85	160	4.27	0.76	178	2
6. Increase rates of invention. ($\bar{X}$ =4.32)	4.37	0.78	109	4.22	0.82	148	4.38	0.71	170	2
7. Number of invented property right. ($\bar{X}$ =4.31)	4.31	0.91	112	4.25	0.82	157	4.36	0.72	174	2

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Table 11 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Performance.

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	
Principle/Concept										
1. Environment education research performance needs completeness of related parts as research, and internal and external supporters. ($\bar{X}$=4.49)	4.48	0.68	107	4.49	0.65	160	4.49	0.63	173	3
2. The appropriate condition for research performance may effect to quality and effective research. ($\bar{X}$=4.41)	4.47	0.57	103	4.39	0.73	159	4.40	0.70	174	3
3. Major investigator and researcher are major factors to achieve goal of environmental education research. ($\bar{X}$=4.37)	4.45	0.73	102	4.37	0.70	156	4.32	0.70	173	3
4. Most aspects of environmental education research should be provided by the research output applicator. ($\bar{X}$=4.20)	4.24	0.86	103	4.09	0.83	156	4.28	0.73	173	1
5. Environmental science should be research to be based information for environmental education research. ($\bar{X}$=4.36)	4.41	0.70	106	4.32	0.69	152	4.37	0.69	168	3

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Table 11 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Performance. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
Guideline/ Measure 1										
1.Promoting the connection of environmental education researchers and applicators. ($\bar{X}$=4.41)	4.37	0.66	112	4.41	0.59	160	4.44	0.67	178	3
Strategy/ Means										
1.Promoting to have the specialized organization for connection of environmental education researchers and applicators. ($\bar{X}$=4.40)	4.30	0.77	113	4.37	0.65	160	4.48	0.67	178	3
Indicator										
1. Operational levels of central unit of environmental education research connection. ($\bar{X}$=4.62)	4.34	0.71	108	4.38	0.63	159	4.33	0.74	177	3
2. Operational levels of researchers and research output applicators. ($\bar{X}$=4.36)	4.44	0.64	111	4.33	0.66	159	4.34	0.72	177	3
3. Innovative approaches for research development. ($\bar{X}$=4.33)	4.29	0.68	109	4.30	0.67	148	4.38	0.76	169	3

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Table 11 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Performance. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
4. New concept and method for developing research conduction. ($\bar{X}$ =4.37)	4.37	0.83	111	4.33	0.63	160	4.41	0.67	176	3
Guideline/Measure2										
2. Promoting an environmental education research atmosphere. ($\bar{X}$ =4.47)	4.44	0.60	108	4.46	0.59	160	4.49	0.63	178	3
Strategy/Means										
1. Promoting the environmental education research training to researchers and organizations. ($\bar{X}$ =4.39)	4.27	0.72	113	4.38	0.63	159	4.48	0.63	178	3
2. Promoting the research team of senior and junior researchers. ($\bar{X}$ =4.40)	4.39	0.60	113	4.40	0.62	159	4.41	0.72	178	3
3. Developing the relation of researchers and research. ($\bar{X}$ =4.39)	4.27	0.81	113	4.35	0.64	159	4.51	0.65	178	3
4. Improving the research regulation in government sector. ($\bar{X}$ =4.42)	4.40	0.66	113	4.41	0.65	158	4.45	0.66	178	3

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Table 11 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Performance. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	N	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	
5.Promoting the continuing and integrated research. ($\bar{X}$=4.41)	4.37	0.73	113	4.37	0.68	158	4.46	0.65	177	3
6.Promoting the sample package of environmental education research. ($\bar{X}$=4.35)	4.25	0.88	113	4.30	0.69	156	4.46	0.67	177	3
Indicator										
1.More experiences for researchers. ($\bar{X}$=4.39)	4.35	0.79	114	4.40	0.65	159	4.40	0.67	176	3
2.More interest in research training for researchers. ($\bar{X}$=4.36)	4.44	0.67	112	4.31	0.64	159	4.35	0.72	176	3
3.Quality of researchers and research output. ($\bar{X}$=4.43)	4.54	0.77	112	4.41	0.66	159	4.38	0.71	176	3
4.Good relation of administrators and researchers. ($\bar{X}$=4.35)	4.33	0.77	114	4.27	0.66	159	4.43	0.68	178	3
5.Research independence for the government officials. ($\bar{X}$=4.35)	4.30	0.71	112	4.34	0.66	159	4.38	0.68	178	3
6.Satisfaction to research work. ($\bar{X}$=4.32)	4.25	0.70	114	4.32	0.70	159	4.38	0.69	177	3

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Table 11 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Performance. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
7. Research's progression. ($\bar{X}$ =4.31)	4.22	0.80	114	4.26	0.70	159	4.40	0.68	177	2
8.Number of junior researchers. ($\bar{X}$ =4.26)	4.19	0.74	114	4.21	0.74	159	4.34	0.73	176	1
9.Number of achieved goal research. ($\bar{X}$ =4.36)	4.38	0.74	113	4.36	0.66	157	4.35	0.69	174	3
Guideline/Measure 3										
3. Promoting the operation of governmental and private sector for environmental education research. ($\bar{X}$ =4.42)	4.39	0.71	114	4.40	0.66	144	4.46	0.67	178	3
Strategy/Means										
1. Inviting the private organizations participatively doing research. ($\bar{X}$ =4.36)	4.33	0.69	114	4.31	0.70	160	4.42	0.70	175	3
2. Promoting the investment sharing to private sectors. ($\bar{X}$ =4.33)	4.35	0.64	113	4.31	0.70	160	4.34	0.69	177	3
3. Promoting the exchange of researchers, experts and materials to private. ($\bar{X}$ =4.38)	4.36	0.74	114	4.32	0.72	160	4.45	0.69	177	3
Indicator										
1.Perspective view of private operational levels. ($\bar{X}$ =4.33)	4.31	0.79	114	4.31	0.73	160	4.37	0.71	176	3

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Table 11 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Performance. (Cont.)

En.Ed. Of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	
2.Private sharing in research investment. ($\bar{X}$ =4.31)	4.45	0.63	109	4.18	0.77	156	4.33	0.77	166	2
3.Convenient performance in private research sharing. ($\bar{X}$ =4.33)	4.37	0.77	114	4.30	0.82	160	4.34	0.76	177	3
4.Number /proportion of sharing research of government and private sectors. ($\bar{X}$ =4.29)	4.37	0.69	114	4.19	0.82	160	4.34	0.74	177	2
5.Number /proportion of researcher/experts and material exchange on government and private sectors. ($\bar{X}$ =4.28)	4.34	0.71	110	4.16	0.77	160	4.34	0.79	177	2

Table 12 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Output.

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
Principle/ Concept										
1. The research output should be quality and available. ($\bar{X}$ =4.67)	4.55	0.59	109	4.80	0.45	160	4.63	0.55	175	3
2. Various approaches should available for	4.49	0.72	112	4.63	0.53	160	4.56	0.60	175	3

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Table 12 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Output. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	
research output inspection. ($\bar{X}$ =4.57)										
3. The research output is presently caring to be more available than in the past. ($\bar{X}$ =4.40)	4.43	0.74	109	4.37	0.74	157	4.41	0.67	172	3
4. The excellent research output should be selected annually and continuously. ($\bar{X}$ =4.48)	4.32	0.87	114	4.54	0.60	160	4.53	0.64	175	3
5. Transpirated approaches are necessary for research output evaluation. ($\bar{X}$ =4.61)	4.58	0.61	112	4.65	0.53	160	4.60	0.58	173	3
6. The research output must be protected by the government. ($\bar{X}$ =4.56)	4.47	0.69	111	4.59	0.64	160	4.58	0.66	172	3
Guideline/Measure 1										
1. Promoting the appropriate from development of environment education research output. ($\bar{X}$ =4.56)	4.54	0.61	113	4.55	0.58	159	4.57	0.60	176	3
Strategy/ Means										
1. Promoting to have future researches for persist solution	4.54	0.60	112	4.58	0.58	160	4.52	0.61	177	3

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Table 12 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Output. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
and future prevention of environmental problems. ($\bar{X}$ =4.55)										
2. Promoting the research output responding to urgent issues. ($\bar{X}$ =4.55)	4.61	0.53	114	4.58	0.57	160	4.49	0.62	177	3
3. Promoting the interdisciplinary research for integrated solution and prevention of environmental problems. ($\bar{X}$ =4.48)	4.47	0.63	114	4.51	0.63	160	4.47	0.64	176	3
4. Promoting an adaptive research. ($\bar{X}$ =4.31)	4.43	0.65	112	4.35	0.65	160	4.37	0.66	177	3
Indicator										
1. Numbers of future research. ($\bar{X}$ =4.35)	4.29	0.76	114	4.32	0.70	159	4.40	0.72	173	3
2. Numbers of research output application for problem prevention and solution. ($\bar{X}$ =4.43)	4.51	0.66	114	4.42	0.64	159	4.38	0.72	176	3
3. Effects of research output application for problem prevention and solution. ($\bar{X}$ =4.33)	4.29	0.82	112	4.35	0.64	158	4.33	0.73	176	3

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Table 12 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Output. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	
4. Numbers of research series. ($\bar{X}$ =4.31)	4.25	0.85	112	4.35	0.68	158	4.31	0.74	177	3
Guideline/Measure 2										
2. Promoting the quality of environmental education research output in various approaches. ($\bar{X}$ =4.58)	4.58	0.56	113	4.58	0.55	160	4.59	0.63	172	3
Strategy/ Means										
1. Promoting to have the continuing study of research condition. ($\bar{X}$ =4.49)	4.46	0.72	111	4.49	0.68	160	4.50	0.65	176	3
2. Promoting the research output synthesis for research policy determination. ($\bar{X}$ =4.52)	4.53	0.71	114	4.52	0.58	159	4.51	0.63	176	3
3. Promoting the research cost-benefit. ($\bar{X}$ =4.46)	4.44	0.66	109	4.42	0.66	147	4.52	0.59	166	3
4. Promoting to market project evaluation by experts. ($\bar{X}$ =4.45)	4.52	0.63	113	4.43	0.65	159	4.44	0.66	177	3
5. Promoting the research motivation for quality research. ($\bar{X}$ =4.47)	4.50	0.75	113	4.41	0.65	157	4.50	0.61	175	3

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Table 12 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Output. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
6. Supporting to provide an academic conference for research output distribution and research work synthesis in local, national and research work synthesis in local, national and international levels. ($\bar{X}$ =4.49)	4.52	0.71	113	4.46	0.62	158	4.49	0.64	177	3
Indicator										
1. Research findings can be available for policy and plan determination or research improvement . ($\bar{X}$ = 4.40)	4.35	0.78	111	4.43	0.63	159	4.41	0.66	177	3
2. Number of certified research. ($\bar{X}$ =4.36)	4.28	0.81	113	4.39	0.75	159	4.39	0.72	176	3
3. Number of research report published in and international journals. ($\bar{X}$ =4.42)	4.41	0.68	113	4.44	0.70	160	4.41	0.68	177	3
4. Number of research reference. ($\bar{X}$ =4.34)	4.30	0.79	113	4.37	0.64	160	4.34	0.77	177	3
5. Research output application. ($\bar{X}$ =4.44)	4.35	0.72	113	4.53	0.59	160	4.42	0.67	175	3

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Table 12 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Output. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
Guideline/Measure 3										
3. Developing the research output presentation. ($\bar{X}$ =4.48)	4.39	0.66	112	4.57	0.58	158	4.46	0.67	173	3
Strategy/ Means										
1. Promoting the simple presentation of research output for special target group. ($\bar{X}$ =4.61)	4.58	0.59	113	4.60	0.57	159	4.64	0.58	177	3
Indicator										
1. Understanding levels of research output applicator in research output. ($\bar{X}$ =4.39)	4.19	0.94	114	4.43	0.66	160	4.49	0.63	175	2
2. Research output application of target group. ($\bar{X}$ =4.42)	4.31	0.68	114	4.47	0.67	159	4.46	0.65	175	3

Table 13 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Output Distribution.

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	
Principle/ Concept										
1. The research output should be distributed in various approaches. ($\bar{X}$ =4.59)	4.54	0.61	111	4.66	0.54	155	4.55	0.60	173	3
2. The research output should be	4.56	0.58	111	4.50	0.63	155	4.55	0.63	173	3

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Table 13 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Output Distribution. (Cont.

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	
distributed both in local and national levels. ($\bar{X}$=4.54)										
3. There should be a responsible unit for research output distribution. ($\bar{X}$=4.50)	4.55	0.68	114	4.52	0.64	155	4.44	0.70	174	3
4. The research output distribution should focus on learning improvement for both formal student and general public. ($\bar{X}$=4.59)	4.59	0.56	114	4.63	0.56	154	4.56	0.66	173	3
Guideline/Measure 1										
1. Promoting network for environmental education research public relation. ($\bar{X}$=4.60)	4.52	0.58	112	4.64	0.54	159	4.63	0.60	177	3
Strategy/Means										
1. Promoting the operation of local and national research organization doing data collection and public relation to the target group. ($\bar{X}$=4.57)	4.45	0.65	109	4.59	0.53	160	4.61	0.59	177	3

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Table 13 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Output Distribution. (Cont.

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	
2. The center unity of national research responding to public relation. ($\bar{X}$=4.44)	4.36	0.70	111	4.45	0.62	158	4.47	0.73	174	3
3. Promoting the local education organizations responding to public relation in communities. ($\bar{X}$=4.51)	4.40	0.78	109	4.49	0.64	160	4.59	0.64	176	3
4. Promoting the environmental education curriculum development based research output application. ($\bar{X}$=4.56)	4.53	0.62	110	4.56	0.57	160	4.59	0.58	174	3
Indicator										
1. Operational level of research organization network.($\bar{X}$=4.37)	4.24	0.73	111	4.39	0.63	160	4.43	0.70	174	2
2. Ability levels to stimulate the target group interest in research output application ($\bar{X}$=4.35)	4.19	0.91	111	4.43	0.65	159	4.39	0.73	175	2
3. Variety and covery of research information in the central unit of national research. ($\bar{X}$=4.34)	4.20	0.81	111	4.41	0.68	160	4.38	0.71	176	2

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Table 13 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Output Distribution. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	
4. Numbers of the public relations activities participatively joined in the research organization network. ($\bar{X}$=4.32)	4.19	0.71	114	4.35	0.68	160	4.37	0.72	175	2
5. Environmental education curriculum development based the research output. ($\bar{X}$=4.42)	4.25	0.85	114	4.48	0.68	160	4.47	0.67	176	3
Guideline/Measure 2										
2. Promoting public relation quality of environment education research. ($\bar{X}$=4.58)	4.54	0.54	112	4.56	0.56	160	4.61	0.56	176	3
Strategy/Means										
1. Promoting various forms of distribution. ($\bar{X}$ = 4.58)	4.57	0.55	112	4.46	0.62	160	4.56	0.56	177	3
2. Promoting the selection of quality and available research distribution. ($\bar{X}$ = 4.53)	4.49	0.60	111	4.47	0.62	155	4.56	0.59	174	3
3. Promoting modern media for public distribution. ($\bar{X}$ = 4.51)	4.40	0.62	112	4.47	0.59	160	4.51	0.58	177	3

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Table 13 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Output Distribution. (Cont.

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	
4. Promoting the budget for public distribution. ($\bar{X}$ = 4.47)	4.30	0.76	112	4.34	0.65	160	4.44	0.63	176	3
5. Promoting the public distribution for special target group with simple. ($\bar{X}$ = 4.50)	4.46	0.60	112	4.48	0.64	159	4.53	0.58	177	3
Indicator										
1. Numbers of the seminar Participants and journal publishing. ($\bar{X}$ = 4.27)	4.12	0.95	114	4.31	0.67	160	4.33	0.74	176	2
2. Public responds on various forms of distribution. ($\bar{X}$ = 4.33)	4.29	0.80	114	4.29	0.70	160	4.40	0.72	177	3
3. Active distribution. ($\bar{X}$ = 4.30)	4.25	0.84	114	4.28	0.66	159	4.34	0.74	175	3
4. Attitude change in public. ($\bar{X}$ = 4.32)	4.32	0.72	113	4.23	0.79	159	4.41	0.74	172	2

Table 14 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Output Application.

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	N	$\bar{X}$	S.D	N	$\bar{X}$	S.D	n	
Principle/Concept										
1. Research output application is the ultimate goal of research and it will	4.50	0.63	113	4.63	0.56	159	4.60	0.61	176	3

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Table 14 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Output Application. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
be rather more interesting from the public. ($\bar{X}$ = 4.58)										
2. Research output Application should Be widely distributed. ($\bar{X}$ = 4.59)	4.48	0.58	113	4.66	0.54	160	4.60	0.57	176	3
3.The research problem should be specified by research output applicators. ($\bar{X}$ = 4.47)	4.50	0.58	113	4.45	0.61	160	4.47	0.63	176	3
4.The research problem should be specified by research output applicators. ($\bar{X}$ = 4.34)	4.44	0.78	113	4.24	0.71	160	4.36	0.74	176	2
5. New culture related research output application for social problem solution and prevention should be more created. ($\bar{X}$ =4.50)	4.51	0.62	111	4.50	0.61	159	4.49	0.67	177	3
6. Lack of research output application promotion is the major problem for research output application in society. ($\bar{X}$ = 4.46)	4.44	0.71	112	4.43	0.73	152	4.49	0.61	170	3

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Table 14 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Output Application. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
7. Research output application should be available for instructional curriculum both formal and non-formal education system. ($\bar{X} = 4.50$)	4.41	0.70	112	4.54	0.66	147	4.52	0.67	166	3
Guideline/Measure 1										
1. Promoting participation on environmental research output application. ($\bar{X} = 4.62$)	4.60	0.53	114	4.61	0.53	160	4.64	0.55	177	3
Strategy/Means										
1. Promoting the specialized organization of environmental education research responding the research output application. ($\bar{X} = 4.41$)	4.39	0.65	112	4.39	0.66	160	4.45	0.66	177	3
2. Constructing the promoted mechanism of research output application based governmental and private participation. ($\bar{X} = 4.44$)	4.43	0.73	112	4.39	0.63	160	4.51	0.63	176	3

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Table 14 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Output Application. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
3. Commission for research output application being formed by the operation of policy maker, research supporter and researcher. ($\bar{X}$ = 4.38)	4.31	0.84	111	4.31	0.66	160	4.50	0.59	177	3
4. Promoting the meeting of researchers and research output applicators. ($\bar{X}$ = 4.36)	4.37	0.70	110	4.26	0.68	159	4.45	0.64	175	3
Indicator										
1. Operational levels of organization for research output application. ($\bar{X}$ = 4.36)	4.23	0.69	114	4.36	0.64	160	4.45	0.69	175	2
2. Effective mechanism of research output application promotion. ($\bar{X}$ = 4.38)	4.35	0.76	114	4.33	0.71	160	4.45	0.71	174	3
3. Operational levels of commission forming for research output application. ($\bar{X}$ = 4.30)	4.25	0.80	114	4.22	0.76	160	4.39	0.72	173	2

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Table 14 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Output Application. (Cont.)

En.Ed. Of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
4. Results of research output application in various levels. ($\bar{X}$ = 4.36)	4.35	0.78	114	4.36	0.72	159	4.41	0.69	173	3
5. Meeting frequency of researchers and research output applicators. ($\bar{X}$ = 4.36)	4.32	0.84	114	4.17	0.81	159	4.29	0.73	175	2
Guideline/ Measure 2										
1. Promoting the researches seeking effective approaches for environmental education research output application. ($\bar{X}$ =4.51)	4.50	0.61	144	4.48	0.67	159	4.55	0.61	177	3
Strategy/Means										
1. Promoting the specialized organization of environmental education research creating the approaches for checking researches output needs and research output application. ($\bar{X}$ =4.45)	4.45	0.58	113	4.39	0.66	159	4.51	0.61	175	3
2. Promoting a set or project research performance. efficiently. ($\bar{X}$ =4.46)	4.51	0.60	113	4.37	0.65	159	4.50	0.61	176	3

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Table 14 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Output Application. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
3. Promoting an environmental education researchers researching on the research output needs. ($\bar{X}$ =4.46)										
4. Promoting the complete system of research performance as; - Budget allocating from the research starting to the research output application. - Motivating the research output application for the research responsible organization. - Allocating an adequate budget for research output distribution. ($\bar{X}$ = 4.50)	4.46	0.61	112	4.45	0.69	159	4.57	0.60	178	3
5. Promoting the research output applicators specifying participatively the research problem. ($\bar{X}$ = 4.43)	4.46	0.65	110	4.35	0.68	159	4.47	0.69	177	3

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Table 14 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Output Application. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
6. Promoting the significance of research process in all levels of educational system. ($\bar{X}$ = 4.53)	4.53	0.60	110	4.52	0.60	159	4.54	0.68	178	3
7. Promoting the efficiency improvement of intellectual property protection from the government. ($\bar{X}$ =4.49)	4.47	0.67	109	448	0.6	159	4.53	0.64	178	3
Indicator										
1. To know needs and guidelines of research output application. ($\bar{X}$ =4.39)	4.31	0.70	113	4.37	0.70	160	4.47	0.67	176	3
2. More performance of environmental education research in set or project. ($\bar{X}$ =4.34)	4.27	0.82	114	4.34	0.65	160	4.39	0.67	176	3
3. Number of specialized researchers performing the researches based user's needs. ($\bar{X}$ =4.36)	4.39	0.73	114	4.28	0.67	160	4.40	0.70	176	3
4. Compels research output	4.38	0.82	112	4.52	0.64	157	4.54	0.63	175	3

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Table 14 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Output Application. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
with empirical application. ($\bar{X}$=4.50)										
5. Most research problems based research output application need. ($\bar{X}$=4.35)	4.37	0.70	113	4.29	0.73	158	4.38	0.69	177	3
6. Environmental education based scientific thinking process and innovative culture for research output application in environment problem solution. ($\bar{X}$=4.46)	4.39	0.72	110	4.43	0.61	158	4.52	0.63	177	3
7. Efficiency of Intellectual property protection from the government. ($\bar{X}$=4.40)	4.33	0.77	108	4.37	0.69	158	4.47	0.67	178	3

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Table 15 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Evaluation.

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
Principle/Concept										
1. Research evaluation is the mechanism promoting the research-achieving goal. ($\bar{X}$=4.57)	4.61	0.54	110	4.62	0.54	157	4.50	0.66	175	3
2. Research evaluation can make all parts learning both effective and failure research. ($\bar{X}$=4.49)	4.55	0.83	110	4.47	0.61	156	4.47	0.69	173	3
3. The macro evaluation of research should be made annually. ($\bar{X}$=4.45)	4.52	0.77	111	4.42	0.67	159	4.42	0.71	176	3
4. The research supporters should monitor annually all supported research. ($\bar{X}$=4.48)	4.60	0.63	114	4.43	0.70	156	4.45	0.67	177	3
5. The research organization should follow annually their research output. ($\bar{X}$=4.50)	4.51	0.63	114	4.47	0.65	159	4.51	0.65	178	3
6.The research evaluation should	4.49	0.71	111	4.55	0.61	159	4.52	0.58	178	3

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Table 15 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Evaluation. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
Be creative to develop quality and efficiency of research. ($\bar{X}$=4.52)										
7. The research evaluation should develop an administrative system and make condition supporting to produce the quality and efficient research ($\bar{X}$=4.50)	4.50	0.76	111	4.50	0.68	159	4.51	0.62	177	3
8. The evaluation results should be available to improve the policy. ($\bar{X}$=4.50)	4.65	0.53	109	4.46	0.67	158	4.51	0.65	178	3
9. There should be an effective evaluation on the research to show the result from the research investment. ($\bar{X}$=4.45)	4.50	0.64	111	4.41	0.65	158	4.46	0.65	175	3
Guideline/ Measure 1										
1. Promoting the specialized organization of environmental organization of environmental education getting	4.57	0.56	114	4.52	0.66	160	4.63	0.61	177	3

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Table 15 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Evaluation. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
effective performance. ($\bar{X}$ =4.58)										
Strategy/ Means										
1. Designing an accredited system of research evaluation based research expert and peer review. ($\bar{X}$ =4.48)	4.51	0.68	114	4.49	0.68	159	4.45	0.71	178	3
2. Promoting the research evaluation system. ($\bar{X}$ =4.43)	4.41	0.69	114	4.40	0.70	160	4.47	0.62	177	3
3. Promoting the research evaluation in phase with expetized persons. ($\bar{X}$ =4.47)	4.45	0.63	112	4.41	0.73	160	4.55	0.59	177	3
Indicator										
1. Acceptation of evaluation system from all related. ($\bar{X}$ =4.48)	4.56	0.70	110	4.53	0.63	160	4.45	0.75	177	3
2. Quality performances of research experts peer reviewers and	4.55	0.64	110	4.44	0.67	160	4.47	0.64	174	3

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Table 15 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Evaluation. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
commission. ($\bar{X}$ =4.48)										
Guideline/ Measure 2										
1. Promoting the evaluating results of environmental education research being available for budget allocation. ($\bar{X}$ =4.52)	4.49	0.55	114	4.48	0.63	160	4.59	0.60	176	3
Strategy/Means										
1. Recommending the integrated a approaches of budget allocation based the research evaluation results and research policy. ($\bar{X}$ =4.45)	4.39	0.65	114	4.45	0.63	159	4.50	0.67	178	3
Indicator										
1. Research budget allocation being accordance with research evaluation. ($\bar{X}$ =4.40)	4.41	0.79	111	4.40	0.67	159	4.41	0.65	175	3
Guideline/ Measure 3										
1. Promoting the standard	4.43	0.65	114	4.54	0.58	158	4.61	0.59	178	3

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Table 15 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Evaluation. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
criteria of environmental education research among all related organizations. ($\bar{X}$=4.54)										
Strategy/ Means										
1. Promoting all research organizations having the same form of research evaluation. ($\bar{X}$=4.47)	4.32	0.68	114	4.48	0.59	159	4.56	0.60	178	3
2. Promoting the positive atmosphere of creative evaluation. ($\bar{X}$=4.54)	4.40	0.66	106	4.57	0.62	151	4.59	0.57	167	3
3. Allocating an adequate budget for research evaluation. ($\bar{X}$=4.47)	4.48	0.54	114	4.42	0.62	159	4.50	0.61	178	3
Indicator										
1. Having accredited forms of research evaluation. ($\bar{X}$=4.50)	4.50	0.74	114	4.51	0.67	158	4.49	0.64	174	3
2. Participation levels of research evaluation. ($\bar{X}$=4.44)	4.44	0.68	114	4.46	0.66	157	4.44	0.64	174	3

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Table 15 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Evaluation. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	
3. Adequate budget for research evaluation. ($\bar{X}$=4.40)	4.36	0.74	111	4.44	0.62	158	4.39	0.69	175	3
Guideline/ Measure 4										
4. Developing the specialized organization for environmental education research evaluation. ($\bar{X}$=4.44)	4.39	0.63	114	4.40	0.70	158	4.50	0.63	177	3
Strategy/ Means										
1. Promoting the development and formation of research quality and standard organization based educational zones. ($\bar{X}$=4.33)	4.34	0.75	114	4.19	0.83	158	4.45	0.66	178	2
2. Forming an accredited board of research evaluation. ($\bar{X}$=4.38)	4.42	0.64	114	4.29	0.78	158	4.43	0.72	178	3
3. Constructing a systemic network of research evaluation. ($\bar{X}$=4.45)	4.43	0.62	114	4.41	0.67	157	4.50	0.63	178	3

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Table 15 Opinion of Research Supporters, Researchers and Research Output Applicators on Environmental Education Research Promotion in Research Evaluation. (Cont.)

En.Ed. of Research Promotion	Research Supporters			Researchers			Research Output Applicators			Relevance
	$\bar{X}$	S.D	n	$\bar{X}$	S.D	n	$\bar{X}$	S.D	N	
Indicator										
1. Numbers of research quality and standard evaluation organization. ($\bar{X}$ =4.33)	4.28	0.80	114	4.32	0.73	158	4.38	0.70	175	3
2. Numbers of organization network for research. ($\bar{X}$ =4.35)	4.44	0.79	112	4.29	0.70	157	4.35	0.74	174	3
3. Quality and standard evaluation. ($\bar{X}$ =4.35)	4.40	0.65	111	4.45	0.71	156	4.36	0.80	174	3

Stage 4

4.4 Criteria for Result of Model Evaluation by Tri-research Member of Environmental Education Promotion over the Country.

According to the data of model evaluation by related group or tri-research, it was found that in each group, nearly had the average score of opinion towards each format item from 4.00 up. Besides, the total average was between 4.06 to 4.71. Therefore, it could be said that the model, which was first improved from the experts evaluation and then was sent to the tri-research members for another evaluation is accepted from the tri-research members a lot. As a result of being more appropriate and clearer, the researchers posed the criteria in order to synthesize the result of the model evaluation by the tri-research members once more. The criteria were :

1) Choose only the items of each model that each group of tri-research members had the average score of opinion from 4.25 or 85 percent from 5 or 100 total score. This assumed that the tri-research members' agreement at the high level enough and reliable, all of which considered to be the content of model.

2) Some items could be in the content of the model even though its average score was less than 4.25 under the first criteria if there was some necessity and appropriation.

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3) Rearrange the selected items under the 10 parts of model of the environmental education research promotion according to the total average score of the tri-research members' score of opinion like this:

3.1) Choose 5 items from the principle/ concept that had many items. But it is possible to choose more if there is some necessity and appropriation.

3.2) Rearrange all the principles/ concepts according with the total average score.

3.3) Choose 3 items from the strategy/ means and indicator. However, it could be chosen more or less under the necessity and appropriation.

4) It should be improved again in accordance with the content on each parts of model.

From the model evaluation by the tri-research member, there was an important suggestion that should be included for more completion. That was, ***the purpose*** of the environmental education research promotion on each 10 parts, which should be related to principle/ concept of each research promotion parts. Therefore, the new improved model will have 5 aspects in each part.

Moreover, the tri-research members all over the country proposed a model accordingly with the related experts' comment. The model should first implement with national policy, which is a part of tri-research member, that was, the research supporter. The tri-research member all over the country identified suggestions, stage details and model application clearly, which would be presented in the model application topic.

4.5 Data Analysis of Connoisseur Evaluation on Environmental Education Research Promotion Model

Sending the already synthesized model under the criteria no. 4.4, Model II to evaluate by the connoisseurs on research, education, environment, or environmental education, the model was improved to be the most complementary and reliable.

The 23 experts from 25 experts requesting evaluated the model II by using the evaluation form. Thomas T. Macillan proposed that if the numbers of the experts are 17 people up, the research work would be more reliable. (The detail was informed in chapter III.)

Results of the model evaluation by the 23 experts were most experts agreed with the model at the high degree that was the total average score came up to 4.1. And three items were at the maximum average of 4.3- the appropriateness model structure of factors, the completion of the model contents and the model benefit for perspective view of environmental education research. There was one item underlying at the average of 4.2 - that was the possibility of model application supporting an environmental education research in community and any levels of education organization. There were three minimum average items at 4.0 - the empirical contents of model, the consistency of model and environmental education goal and the consistency of model and national environmental education research status. The results are as the following table:

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Table 16 Numbers and Average Score of Environmental Education Research Promotion Model Evaluated by the Connoisseurs.

Evaluating Item	Score Level					Average
	5	4	3	2	1	
1. Appropriateness model structure or factors.	11 (47.8)	9 (39.1)	2 (8.7)	1 (4.3)	-	4.3
2. Completion of the model contents.	9 (39.1)	12 (52.2)	2 (8.7)	-	-	4.3
3. Empirical contents of model.	5 (21.7)	13 (56.5)	5 (21.7)	-	-	4.0
4. Contents consistency in each factor of model.	9 (39.1)	9 (39.1)	4 (17.4)	1 (4.3)	-	4.1
5. Consistency of model and environmental education goal.	7 (30.4)	9 (39.1)	6 (26.1)	1 (4.3)	-	4.0
6. Consistency of model and national environmental education research status.	6 (26.1)	12 (52.2)	4 (17.4)	1 (4.3)	-	4.0
7. Possibility of model application supporting the national environmental education research.	9 (39.1)	9 (39.1)	4 (17.4)	1 (4.3)	-	4.1
8. Possibility of model application supporting an environmental education research in community and any levels of education organization.	9 (39.1)	10 (43.5)	3 (13.0)	1 (4.3)	-	4.2
9. Model benefit for perspective view of environmental education research.	11 (47.8)	9 (39.1)	2 (8.7)	1 (4.3)	-	4.3
Total Average						**4.1**

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In addition, the experts suggested some useful recommendations for the environmental education research as follows:

1. **The Recommendations Under the Evaluating Items.** The recommendations are :

(1) Appropriation model structure or factors.

- The researcher should provide the wholly structure. (total of the 9 items) in order to make a conclusion.

(2) Completion of model contents.

- Some strategies/ means are too broad to use. Therefore, they should be applied more specifically and concretely.

(3) Empirical contents of model.

- Some items have the similar content. So the application should be more properly in content.

(4) Contents consistency in each factor of model.

- The model should be focused on rising general people public-minded over the environment by using the people participation process.

- There should be a clear concept on "the environmental education". Most people just understand this term only that ***"to study about the environment".*** In fact, the environmental education is a wide process and covering both learning ***in*** the environment and ***for*** the environment.

- The concept which should be mostly promoted is Learning Resource Development in various forms in order to support formal, non-formal and in-formal education environmental for the target group.

(5) Consistency of model and environmental education goal.

- One important thing, is Participation Action Research (P.A.R.) among the researcher, local educational institute, and community emphasizing on the interdisciplinary research and local wisdom.

(6) Possibility of model application supporting the national environmental education research.

- It is possible to use the model, however, this should be careful because we can't use the same model with every educational area. So, there should be a research to find a special model appropriate to the context.

(7) Possibility of model application supporting an environmental education research in community and any levels of educational organization.

- Although it is highly possible to apply the model, there should be some obvious and assorted example - such as environmental education research in the primary/ secondary/ advanced/ general people research because different target may use different method.

- There should be an emphasis on the educational institute roles especially school
roles because children are the important target of the environmental education

(8) Model benefit for perspective view of environmental education research.

- Research usefulness should be clear and the period of the research ought to be as short as it can, accordingly the research result could be used in time.

- Participation of other of environmental education interdisciplinary as well as other science should be integrated. This is to extent the educational vision and to solve all the problems.

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2) The Whole Recommendations are:

(1) The environmental education research should be under the co-ordination with educational institutes - such as schools, university etc. because these institutes directly concern with this field.

(2) In the model, it should consider about the understanding on environmental education purpose of Thai people in every career and age.

(3) The model of the environmental education research promotion should be brought for defining the operating policy and guideline, then, research and evaluate for improvement and more efficiency.

(4) There should be open-minded to see the problems, violence, and context situation then indicate the advanced research.

(5) The study in policy part should be focused on sustainable consumption attitude for the long- term development.

(6) The research problem setting should mainly focussed on the preventing and solving natural resources and environment which could be the research problem under the national strategy (national problem) and the local research problem.

(7) It is good to define the strategies for developing/ finding new researcher. But, it could be seen that nowadays the ***"market"*** for the researcher/ environmentalist is very narrow and the master degree curriculum on the environmental education of many institutes is not outstanding enough. Each institute has different directive so the work on the environmental education is not outstanding as well. Of course, the strategy for developing advanced researcher ought to be clear and flexible enough for the application.

(8) For the environmental education curriculum, not only the advanced level, but every level should also be developed. The informing and the realization should start since primary until the advanced level for worldwide development. And the environment teaching process ought to be varied and appropriate to the local atmosphere.

3) The Recommendations on the Model Application.

The experts' suggestion on the model application is relevant to the tri-research member that this model is very broad under the national policy, which could not be specifically used. Thus, it should be first implement from the national policy leaded by the Ministry of Education. The useful recommendation on model application by the connoisseurs will be presented in the next topic.

4.6 A Model of Environmental Education Research Promotion.

The connoisseurs (experts) evaluated the model on the whole and there was a high degree of agreement as shown in 4.5, this means the model is very appropriate and complete. However, the researcher had improved some details under the experts' recommendation. Then, there was the model 3 or model III which is the appropriate and reliable model for the environmental education research promotion. A concluding charts with the model explanation and detail can be revealed as the following.

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A Model of Environmental Education Research Promotion

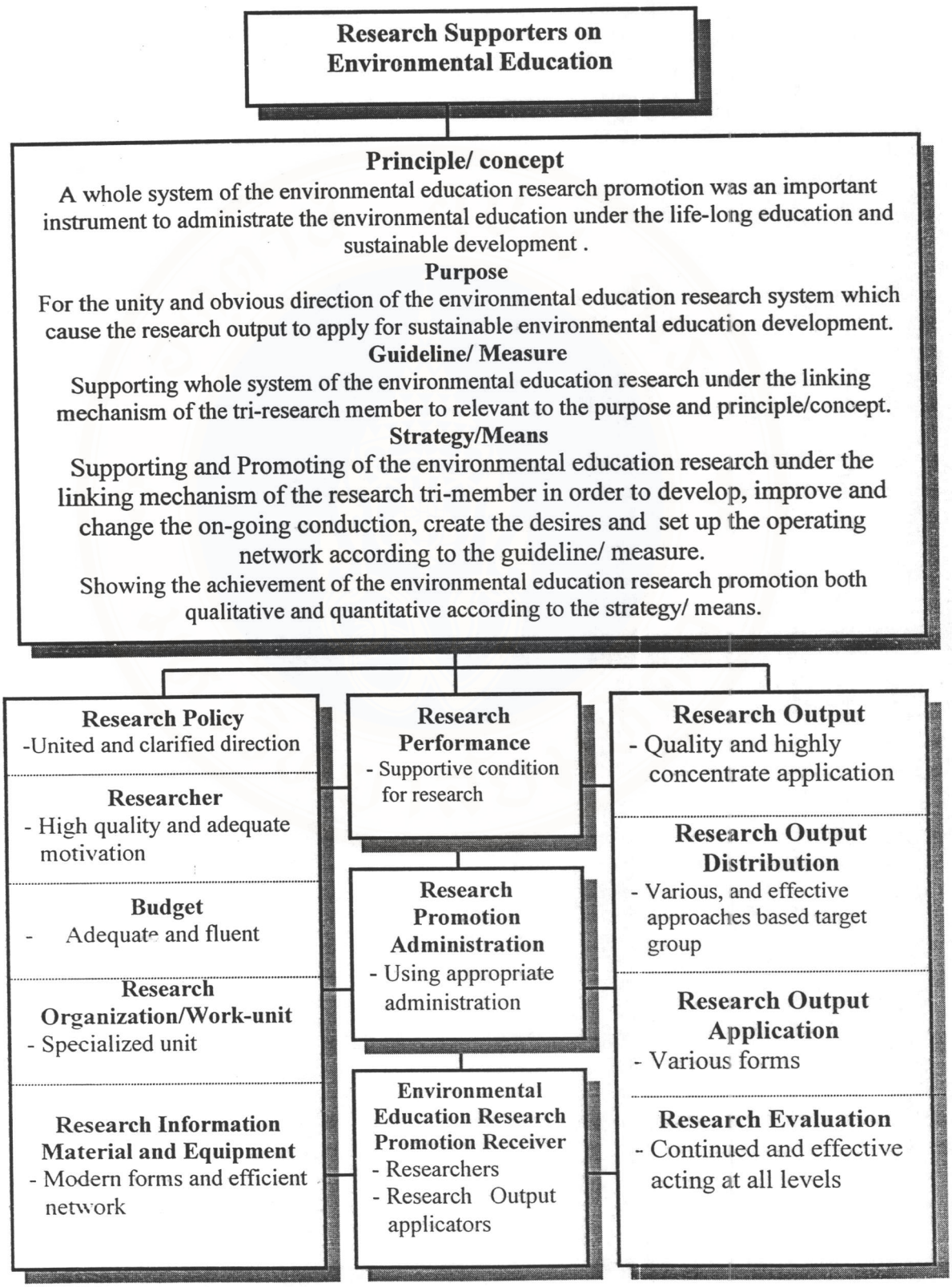

Figure 10 A Model of Environmental Education Research Promotion

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4.6.2 The Explanation of a Model of Environmental Education Research Promotion.

The model of environmental education research promotion constructed from this research consisted 2 major parts as follows:

1) The highlighted issues of research promotion model were classified into ten parts as follows:

(1) Research policy
(2) Researcher
(3) Research budget
(4) Research organization
(5) Research information, material and Equipment
(6) Research performance
(7) Research output
(8) Research output distribution
(9) Research output application
(10) Research evaluation

2) Five model aspects, which are principle/concept, purpose guideline/measure. Strategy/means, and indicator.

Furthermore, the 5 model aspects were include in each 10 parts of the research promotion. These contents would indicate the research administrative guideline in these parts also. For the supporters, who supported the environmental education research in many ways : formulated research policy/ plan, supported fund, and managed the conditions for research operating until the result could be applicated, and the research promotion receivers who were the researchers and the applicators. All of these were the tri-research member presented in the research conceptual framework and the details in the chapter III. The model could be presented in short like this 10 parts : 5 aspects : 3 groups (5 : 10 : 3)

4.6.3 Detail of a Model of Environmental Education Research Promotion

1) Environmental Education Research Promotion on Research Policy

Principle/ Concept

The environmental education research policy should be unity, obvious in direction and be various in performance. It was defined by all related parts the policy level, the research supporters, the researchers, and the applicators. In addition, is the research administration should be emphasized to accord with the policy and the research was an important instrument for developing thinking process of human based on the sustainable development and the whole life education.

Purpose

To have the environmental education research policy, which has a unity and obvious direction by co-operation of all related parts.

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1) Environmental Education Research Promotion on the Research Policy.

Guideline/Measure	Strategy/Means	Indicator
1. Promoting the environmental education research policy making based rush and necessary problems with directing to national potential.	1. Determining the research policy accordance with the national research guideline and policy. 2. Emphasizing to proactive research policy. etc.	1. Research findings being available for problem solution. 2. Research budget allocation being accordance with the research policy. 3. Research performance according to the research policy. 4. Flexible research administration in the frame of research policy. etc.
2. Participation promotion among research supporters, researchers, and research output users both in government and private organizations for environmental education research policy making.	1. Making connection among research supporters, researchers and research output users for setting up the research policy. 2. Promoting the research condition and guideline study for research policy making 3. Promoting local and national research policy at the same time. etc.	1. Participatory regularity and continuity of research policy making 2. Policy research output used for research policy making. 3. Efficiency of research policy coordinating committee at all levels. etc.
3. Promoting and proacting on research policy transformation to performance.	1. Promoting the commission or staff for research policy evaluation 2. Forming a group studying the research evaluation process. etc.	1. The evaluation results can be available for research policy determination. 2. Effective evaluation. 3. Effective commission or staff. etc.

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1) Environmental Education Research Promotion on the Research Policy.(Cont.)

Guideline/Measure	Strategy/Means	Indicator
4. Support, accelerate the communication to pass the policy to the operation.	1. Constructing the motivation for performance unit. 2. Promoting the participatory conference or seminar for research performance and policy units. etc.	1. Research policy operation of performance unit. 2. Empirical motivation for performance unit. etc.
5. Promoting proacting and developing on group formation to be as a center for environmental education research policy determination.	1. Educational and Environmental research organizations being the core leader for central unit formation. 2. Environmental education research policy being forced to be partial policy related. etc.	1. Foreing operation condition. 2. Empirical unity of environmental research in related policy. etc.

Note:

1. The word ***"research"*** in the model means ***"the environmental education research".***

2. ***"etc.".*** in the model means ***"there are more item besides the ones presented in model and could be adjusted appropriately".***

2)Environmental Education Research Promotion on Researcher.

Principle/ Concept

Environmental education researchers were the most necessity that affected other research sources or other research necessities. Therefore, the researchers should be ethical and qualified. Concurrently, the researchers should be developed appropriately and continually with some concerning motivation. Moreover, researchers should be acceptable like any other profession.

Purpose

To produce qualified, ethical and progressive researchers on the environmental education.

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2) Environmental Education Research Promotion on Researcher.

Guideline/Measure	Strategy/Means	Indicator
1. Developing an environmental education system supporting to scientific thought process.	1. Pushing the scientific process of thought in environmental education activities. 2. Publicizing the information, learning .resources which are useful for every level field-work. etc.	1. Number of environmental education activities based scientific process of thought. 2. Number of educational organization providing the field trip course of environmental education. 3. Number of educational organization using the research findings to be partial course environmental education. etc.
2. Promoting both quality and quantity of environmental education researcher.	1. Developing quality of researcher production in university. 2. Promoting an environmental education programme in university. 3. Designing the approaches treating administrators and environmental instructors getting more interest in research. 4. Studying the future trend and vision for researcher production and development. 5. Promoting the action research in environmental education class. etc.	1. Evaluation of researcher quality. 2. Research continuing. 3. Short and long term plan for research development. 4. Number of research special experts. 5. Number of action research in environmental education class. 6. Number of researcher promoted the highest position as research administrator. 7. Number of environmental education programme available in university. etc.

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2) Environmental Education Research Promotion on Researcher. (Cont.)

Guideline/Measure	Strategy/Means	Indicator
3. Promoting continuously to produce and develop the research motivation for environmental education researchers.	1. Constructing the research motivation and atmosphere as income, welfare etc. 2 Developing the research finance. etc.	1. Income for researcher. 2. Certificate or prize for researcher. 3. Convenient finance for research. etc.
4. Promoting both domestic and international network of environmental education researcher.	1. Pushing the researchers to join an environmental education project. 2. Promoting the researcher network in domestic and international levels. 3. Promoting the researcher operation among government private and university. etc.	1. Operative levels of researchers both in domestic and international areas. 2. Number of high skilled researchers. 3. Number of network researcher team. 4. Approaches for network connection. etc.
5 Promoting to produce the environmental education research.	1. Promoting to balance the researchers in educational organizations. 2. Forming the research institute for environmental education researchers. 2. Promoting the career path of environmental education researchers etc.	1. Research continuing 2. Balancing research organization of Environmental education 3. Number of researchers working as major career. 4. Number of freelance and profession researchers. 5. More employment rate of students who finish an environmental education programme. etc.

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3) Environmental Education Research Promotion on Research Budget.

Principle/ Concept

There should be special, enough and appropriate budget according to the importance of the environment both in present and for future from various research supports. The government should co-ordinate for the research budget with the private section and the foreign organization. Moreover, the educational section should have fund for developing the research etc.

Purpose

To have enough budget for environmental education research and proficiency to spend.

Guideline/Measure	Strategy/Means	Indicator
1. Supporting to have various forms of budget source for research system.	1. Forming or developing the budget source for research support. 2. Development the efficiency of budget source for research support. 3. Doing public relation of research budget sources. etc.	1. Number of adequate research budget source. 2. Balance of research budget sources. 3. Number of research project applying for budget support. etc.
2. Promoting the administration of budget allocation on environmental education research.	1. Promoting a research project development based achieved task. 2. Promoting an urgent research for urgent problem solution. 3. Constructing a connection among the research subsidy sources. etc.	1. Quality of research works and researchers. 2. Research usage. 3. Efficiency of research administration or research conduction. 4. Sufficient budget allocation for research administration. 5. Consistency of research supported scholarship direction and scholarship resources. etc.
3. Developing the management and regulation to be convenient for environmental education research budget support.	1. Improving and developing the regulation and problem on research budget support. 2. Research budget of block grant being available for researchers and research organizations. etc.	1. Being actively independent to get research support. 2. Flexible regulation for research support. 3. Specifying the standard rate for researchers. etc.

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3) Environmental Education Research Promotion on Research Budget. (Cont.)

Guideline/Measure	Strategy/Means	Indicator
4.Supporting specially the budget for environment education research.	1. Forming a central unit for environmental education research. 2. Studying the relation of environmental education budget application and research. etc.	1. Appearing the budget system of environmental education research and development with indicators. 2. Appearing a central unit for environmental education research. etc.
5. Supporting the adequate and covers budget for environmental educational research	1. Specifying the goal of research budget. 2. Studying the balance of research investment. 3. Promoting the research budget support in classes, schools and schools. 4. Studying the future trend of research budget allocation. etc.	1. Empirical plan of research investment. 2. Amount of research budget nearly as the goal specified. 3. Research findings being available for research budget allocation. 4. Number of environmental education projects getting research getting research scholarship. etc.
6.Supporting the environmental education research investment participation among domestic and international organizations.	1. Supporting a set of research project for holistic solution. 2. There is a central unit committee-working group for research coordination. 1. Doing the public relation for research investment. etc.	1. Levels of cooperation among organizations. 2. Levels of effective coordination. 3. Effective public relation. 4. Amount of international subsidy. 5. Cooperation level of research fund supporting on major problem among developing countries etc.

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4) Environmental Education Research Promotion on Research Organization.

Principle/ Concept

Research organization/ work-unit was the center and office for collecting and developing body of knowledge in order to transfer it through application. So there should be a specific independent and flexible research organization/ institute since local level to national level. The organizations/ work-unit had the same direction and supported each other for developing and conveying to be proficient in research work and to serve new research output and technology. In addition, the environmental education work-unit should be the research unit as well.

Purpose

To support/ promote the research organization/ work-unit especially on the environmental education to be flexible and accorded in direction.

Guideline/Measure	Strategy/Means	Indicator
1. Promoting the learning sources of environmental education in a community.	1. Promoting the integrated sources of environmental learning in a community. 2. Promoting the environmental learning center in a community. 3. Promoting the mobile unit of environmental learning center. etc.	1. Participatory levels for center formation. 2. Levels of environmental problem in a community. 3. Number of environmental learning source in a community. etc.
2. Developing all organizations related environmental education working efficiently.	1. Promoting the educational organizations to be local wisdom sources of environmental education. 2. Promoting the operative reform policy of research organization. 3. Developing the research organizations to be academic centers of environmental education. 4. Promoting to be the government policy for effective research in any organizations.	1. Empirical and practical strategy. 2. Operation and direction of research organization performance. 3. Convenient and active performance of research organizations. 4. Effective presentation for environmental conservation. etc.

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4) Environmental Education Research Promotion on Research Organization. (Cont.)

Guideline/Measure	Strategy/Means	Indicator
	5. Forming the network and mechanism to connect all research organization direction and performance. etc.	
3. Promoting to have a specialized organization with independent performance for developing, coordinating and connecting the research process and distributing the research output and modern.	1. Promoting the power storming among researchers, administrators and research output users for forming the specialized unit of environmental education. 2. Studying the appropriate form of specialized unit. 3. Doing the public hearing. 4. Getting some recommendations from national research supporter. etc.	1. Operational levels of power unity. 2. An appropriate form of specialized organization. 3. Passing the public hearing from all related. 4. Acceptation of nation research supporter. etc.
4. Promoting to have the regional unit of environmental education research for connecting to the central unit determining the policy and public relation.	1. Creating the mechanism for power storming among researchers, administrators and research output users. 2. Studying the appropriate form of regional research organization. 3. Request some supports from the national research organization. etc.	1. Operational levels of power unity. 2. Decentralization of research administration. 3. An appropriate form of regional research organizations. 4. Operational levels of regional research organization and national research supporter. etc.

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5) Environmental Education Research Promotion on Research Information, Material and Equipment.

Principle/ Concept

There should be information technology resources for environmental education research all over the country and the research information technology is efficiently linked under the network. It should be modern and convenient for use. Moreover, the materials and the facilities should be appropriate and easy to use.

Purpose

To support the efficiency of research information system, materials and the facilities on environmental education.

Guideline/Measure	Strategy/Means	Indicator
1. Promoting the efficiency and in modernization of environmental education research information technology.	1. Promoting the effective system of network connecting in research information service. 2. Promoting the research data base performance for effective service of customer needs. 3. Promoting the study related needs of research information application. 4. Promoting the effective service of research information. etc.	1. Satisfaction levels of research information application. 2. Service quality of research information application. 3. Number of research information applicators. 4. The modernization of research information technology. 5. Research quantity in the research information service department. etc.
2. Promoting the central unit of environmental education research.	1. Promoting the national research office to be a central unit of research information. 2. All research organizations sending research information to the central unit. 3. Supporting to set up the research information network in nationwide etc.	1. Number of research reports sending to the central unit. 2. Operation levels of research organization sending the research information to the central units. 3. Number of research information applicator. 4. Numbers of research information programs on the environment education. 5. Numbers of research information network. etc.

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5) Environmental Education Research Promotion on Research Information, Material and Equipment. (Cont.)

Guideline/Measure	Strategy/Means	Indicator
3. Promoting the development of environmental education research facilities.	1. Promoting the research facility invention. 2. Promoting the research organizations borrowing some research facilities. 3. Checking the quality of research facilities all times. etc.	1. Levels of research facility readiness and quality. 2. Participatory levels of the research organization borrowing some research facilities each other. 3. Increase rates of invention . etc.

6.) Environmental Education Research Promotion on Research Performance.

Principle/ Concept

The environmental education study research should have a supporting condition for operating which can effect its accomplishment or failure. And there should be an information base of scientific research for further environmental education research.

Purpose

To support the environmental education research condition which efficiently supports the operation.

Guideline/Measure	Strategy/Means	Indicator
1. Promoting an environmental education research atmosphere.	1. Improving the research regulation in government sector. 2. Promoting the continuing and integrated research. 3. Promoting the research team of senior and junior researchers. 4. Developing the relation of researchers and research administrators. etc.	1. Quality of researchers and research output 2. More interest in research training for researchers. 3. Good relation of administrators and researchers. 4. Research independence for the government officials. etc.

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6.) Environmental Education Research Promotion on Research Performance. (Cont.)

Guideline/Measure	Strategy/Means	Indicator
2. Promoting the operation of governmental and private sectors for environmental education research.	1. Promoting the exchange of researchers, experts and materials to private sectors. 2. Inviting the private organizations participatively doing research. 3. Promoting the investment sharing to private sectors. etc.	1. Convenient performance in private research sharing. 2. Private sharing in research investment. 3. Number/ proportion of sharing research of government and private sectors. etc.
3. Promoting the connection of environmental education researchers and applicators.	1. Promoting to have the specialized organization for connection of environmental education researchers and applicators. etc.	1. Innovative approaches for research development. 2. Operational levels of researchers and research output applicators. 3. Operational levels of central unit of environmental education research connection. 4. Discussed conclusion being available for research development. etc.

7. Environmental Education Research Promotion on Research Output.

Principle/ Concept

The good environmental education research output should be qualify and useful under the quality checking process openly. And the government should protect the research output because nowadays applicators are more interested in the really use of the research output than before.

Purpose

To support the quality of the research output in order to be able to use practically.

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7. Environmental Education Research Promotion on Research Output.

Guideline/Measure	Strategy/Means	Indicator
1. Promoting the quality of environmental education research output in various approaches.	1. Promoting to have the continuing study of research condition. 2. Supporting to provide an academic conference for research output distribution and research work synthesis in local, national and research work synthesis in local, national and international levels 3. Promoting the research motivation for quality research. 4. Promoting to market project evaluation by experts. etc.	1. Research output application. 2. Number of research report published in domestic and international journals. 3. Research findings can be available for policy and plan determination or research improvement. 4. Number of certified research. etc.
2. Promoting the appropriate from development of environmental education research output.	1. Promoting the research output responding to urgent issues. 2. Promoting to have future researches for persist solution and future prevention of environmental problems. 3. Promoting the interdisciplinary research for integrated solution and prevention of environmental problems. etc.	1. Numbers of future research. 2. Number of research output application for problem prevention and solution. 3. Effects of research output application for problem prevention and solution. 4. Number of research series. etc.
3. Developing the research output presentation.	1. Promoting the simple presentation of research output for special target group. etc.	1. Research output application of target group. 2. Understanding levels of research output applicator in research output. etc.

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8. Environmental Education Research Promotion on Research Output Distribution.

Principle/ Concept

There should be various forms of research output public relations appropriate with the target group in all level. The public relations was also useful for the teacher and learner in all level to use the report as the directive to improve the teaching and learning on the environmental study.
In addition, there should be a department working on the public relations.

Purpose

In order to support the efficiency of the environmental education research public relations.

Guideline/Measure	Strategy/Means	Indicator
1. Promoting network for environmental education research public relation.	1. Promoting the operation of local and national research organization doing data collection and public relation to the target group. 2. Promoting the environmental education curriculum development based research output application. 3. The center unity of national research responding to public relation. etc.	1. Environmental education curriculum development based the research output. 2. Operational level of research organization network. 2. Ability levels to stimulate the target group interest in research output application. 3. Variety and covery of research information in the central unit of national research. 4. Numbers of public relation activities participatively joined in the research organization network. etc.
2. Promoting public relation quality of environmental education research.	1. Promoting the selection of quality and available research output for public distribution. 2. Promoting the public distribution for special target group with simple language. 3. Promoting the budget for public distribution. etc.	1. Public response on various forms of distribution. 2. Attitude change in public. 3. Active distribution. etc.

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9) Environmental Education Research Promotion on Research Output Application.

Principles/Concepts

The application of the research work is the main target of a research. Nowadays, the application of the research work is gaining more attention. Consequently, the research work on environmental education should be publicized to the wider groups of users to nurture a culture of using research work for preventing and solving problems e.g., the use of research work in developing the school curriculum both inside and outside the system. In addition, regular meetings between the researchers and the research applicators should be conducted, etc.

Purpose

In order to promote the application of the research work on environmental education and the cooperation between the researchers and the user of the research work, the following guidelines are made.

Guideline/Measure	Strategy/Means	Indicator
1. Promoting participation on environmental education research output application.	1. Constructing the promoted mechanism of research output application based governmental and private participation. 2. Promoting the specialized organization of environmental education research responding the research output application. 3. Commission for research output application being formed by the operation of policy maker, research supporter and researcher. 4. Promoting the meeting of researchers and research output applicators. etc.	1. Effective mechanism of research output application promotion. 2. Results of research output application in various levels. 3. Operational levels of organization for research output application. 3. Operational levels of commission forming for research output application. 4. Meeting frequency of researchers and research output applicators. etc.

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9) Environmental Education Research Promotion on Research Output Application. (Cont.)

Guideline/Measure	Strategy/Means	Indicator
2. Promoting the researches seeking effective approaches for environmental education research output application.	1. Promoting the significance of research process in all levels of educational system. 2. Promoting the efficiency improvement of intellectual property protection from the government. 3. Promoting the complete system of research performance 4. Promoting a set or project research performance. 5. Promoting the specialized organization of environmental education research creating the approaches for checking research output needs and research output application. 6. Motivating the research output application for the research responsible organization. 7. Promoting an environmental education researchers researching on the research output needs. 8. Promoting the research output applicators specifying participatively the research problem. etc.	1. Compels research output with empirical application. 2. Environmental education based scientific thinking process and innovative culture for research output application in environmental problem prevention and solution. 1. Efficiency of intellectual property protection from the government. 4. To know needs and guidelines of research output application. 5. Number of specialized researchers performing the researches based user's needs. 6. Most research problems based research output application need. 7. More performance of environmental education research in set or project. etc.

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10) Environmental Education Research Promotion on Research Evaluation.

Principles/Concepts

The follow-up activities and evaluation on environmental education will increase research quality and efficiency and are also important mechanisms in guiding the research to achieve its targets. Evaluation and follow-up activities can help review of the policy, guidelines and research administrative system. They help all sectors to learn from the successes and failures of the accomplished research work. Thus the research organization should follow-up and evaluate their research work annually. The sponsors of the research should follow-up the research work that they have sponsored every year. The annual evaluation of research work should be done in higher level every year.

Purpose

To promote and create the evaluation system of research work on environmental education to have more roles in developing quality research on environmental study, the following table is made.

Guideline/Measure	Strategy/Means	Indicator
1. Promoting the specialized organization of environmental organization of environmental education getting effective performance.	1. Designing an accredited system of research evaluation based research expert and peer review. 2. Promoting the research evaluation system based commission. etc.	1. Acceptation of evaluation system from all related. 2. Quality performances of research experts peer reviewers and commission. etc.
2. Promoting the standard criteria of environmental education research among all related organizations.	1. Promoting the positive atmosphere of creative evaluation. 2. Allocating an adequate budget for research evaluation. 3. Promoting all research organizations having the same form of research evaluation. etc.	1. Participation levels of research evaluation. 2. Having accredited forms of research evaluation. etc.
3. Promoting the evaluating results of environmental education research being available for budget allocation.	1. Recommending the integrated a approaches of budget allocation based the research evaluation results and research policy. etc.	1. Research budget allocation being accordance with research evaluation. etc.

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10) Environmental Education Research Promotion on Research Evaluation. (Cont.)

Guideline/Measure	Strategy/Means	Indicator
4. Developing the specialized organization for environmental education research evaluation.	1. Constructing a systemic network of research evaluation. 2. Forming an accredited board of research evaluation. 3. Promoting the development and formation of research quality and standard organization based educational zones. etc.	1. Number of organization network for research. 2. Number of research quality and standard evaluation organization. etc.

6.6.4 Application of Model of Environmental Education Research Promotion

The research to construct a model of environmental education research promotion was a research in the state policy level. Therefore, applicating this established model required a top-down system starting from the country level or the high policy level, meaning cabinet level, down to the practical level in research sectors or education institutions. From the suggestions of the related experts, the tri-research member all over country, and related connoisseurs (the samples of this research), the guidelines to apply the model into practice can be stated as follows.

1) State Policy Level. Responsible persons and implementation procedures should be identified as follows.

(1) Responsible persons should be chosen from relevant sectors on the management of environmental education within and outside the educational system in many form : instruction and curriculum development on environmental education, environment management of the educational institution, and setting the educational institutions as the center of the environmental education in the community. Thus the main sector that is responsible for these works should be the Ministry of Education, which is the most appropriate core to first start policy implementation.

(2) Procedures of implementation

(2.1) When the Ministry of Education recognizes the model of environmental education research promotion, the ministry should follow the following procedures:

a. Set up a working groups consider the model.

b. Set up a National Committee of Environmental Education Research Promotion after the working groups considers and approves the model as the guidelines for promoting research on environmental education. The National Committee consists of committees from relevant sectors on environmental education research as follows:

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- Minister of Ministry of Education	Committee Chairperson
- Permanent Secretary for Education	Vice Chairperson
- The Permanent Secretary of Minister of University Affairs	Vice Chairperson
- The Director - General or the Representative of Department of Curriculum and Instruction Development	Committee
- The Director - General or Representative of Department of General Education	Committee
- The Secretary - General or Representative of Office of The National Primary Education Commission	Committee
- The Secretary - General or Representative of Rajabhat Institutes Council	Committee
- The Director- General or Representative of Non-formal Education Department	Committee
- The Secretary -General or Representative of Office of The Private Education Commission	Committee
- The Director or Representative of Academics Bureau of Bangkok	Committee
- The Director -General or Representative of Department of Environmental Quality Promotion	Committee
- The Secretary-General or Representative of Office of Environmental Policy and Planing	Committee
- The Secretary- General of the National Research Council of Thailand (NRCT)	Committee
- The Director or Representative of Office of Thailand Research Fund (TRF)	Committee
- The Budget Director or Representative of the Budget Bureau	Committee
- Comproller-General or Representative of the	Committee

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Comptroller General's Department	
-The Secretary - General or Representative of Office of the National Economic and Social Development Board	Committee
- The Secretary- General or Representative of the Office Civil Service Commission	Committee
- Representative of Private Organization of Environmental Quality	Committee
- The Secretary - General of Office of the National Education Commission	Committee and Secretariat of Department
- The Officer of the National Education Commission	Committee and Secretariat Assistant of Department

The National Committee had duties as follows:

- To find a guideline to promote the research on environmental education of the country in order to use it as a tool to develop the environmental education sustainability;
- to develop and improve the model of environmental education research promotion;
- to present the model of environmental education research promotion to the cabinet and request for approval;
- to develop and review of the details of the model and the application procedures in practical level;
- to announce the model to relevant sectors in order to encourage research on environmental education;
- other relevant implementations.

1.2.1 After the cabinet approved the model of environmental education research promotion, the national committee will appoint sub-committees to promote the research on environmental education as follows:

- Sub-committee of promoting research on environment education focusing on research policy;
- Sub-committee of promoting research on environment education focusing on budget;
- Sub-committee of promoting research on environmental education focusing on personnel of research;

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- Sub-committee of promoting research on environmental education focusing on research organizations;

The sub-committees have responsibility as follows:

- to consider the details of the contents in ten parts of research promotion; whether any issues are related to one another and should be combined to be research policy, research budget, research personnel and research organizations;

- to prepare the strategy to promote the research of each aspect so that work plans, projects, activity, budget and relevant sectors can be identified. In preparation of the strategy, the brainstorming of relevant sectors or the tri-member of research i.e., supportor, researchers and the applicator of the research should be held in form of seminars, meetings or other appropriate ways in order to gain the acceptance of all relevant sectors;

- to give the strategic plans on four aspects to the relevant sectors regarding the work plan, projects, and activities to ensure cooperation during the application;

- to present the revised strategic plans on four aspects to the National Committee to request for approval; (after the strategic plan gained approval from relevant sectors) ;

- The National Committee present the strategic plan to promote the research on environmental education to the budget bureau in order to request for further budget approval. At the same time the relevant sectors make work plans or projects in order to request for further budget approval.

2) Departmental Policy Level

After the National Committee of Environmental Education Research Promotion gained the cabinet's approval for the model and accomplishes the strategic plan, the National Committee presents the strategic plan to the relevant Departments and governmental departments, e.g. departments in Ministry of Education, Ministry of University Affairs and relevant research organizations, departments relevant environmental education in the Ministry of Science, Technology and Environment, private sectors on promoting quality of the environment , etc. Most of relevant sectors were mentioned in the list of the strategic plan. The main task was to arrange the budget allocation for research and promoting research on environmental education to the practical level in departments and governmental units.

3) Practical Level Within the Academic/Relevant Research Organizations on Environmental Education

When the educational institutions such as universities, colleges, schools, government sectors and private sectors, received the policy and the strategic plan, they have to allocate the budget for promoting research on environmental education and implement the research in their own sector in response to the strategic plan. The guidelines for application are:

1.1 The administrators personnel should announce the policy or the purposes of promoting research on environmental education;

1.2 To create understanding and awareness of the necessity on promoting research on environmental education;

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1.3 To arrange research on environmental education as part of the quality education system and as part of the environmental management system of educational institutions or the regular administrative system of the research organization so that the responsibilities are fairly distributed;

1.4 To arrange a working group on developing research on environmental education within the educational institutions or research organizations;

1.5 To arrange a core sector and network in promoting the research on environmental education within and among educational institutions or research organizations.

1.6 Direct to apply the results of environmental education research to improve its administration and promotion continuously.

1.7 Distribute the conduction to network and public to let them know and give some suggestions.

Thus, the application of it ,as mentioned, can be summarize to the following diagram.

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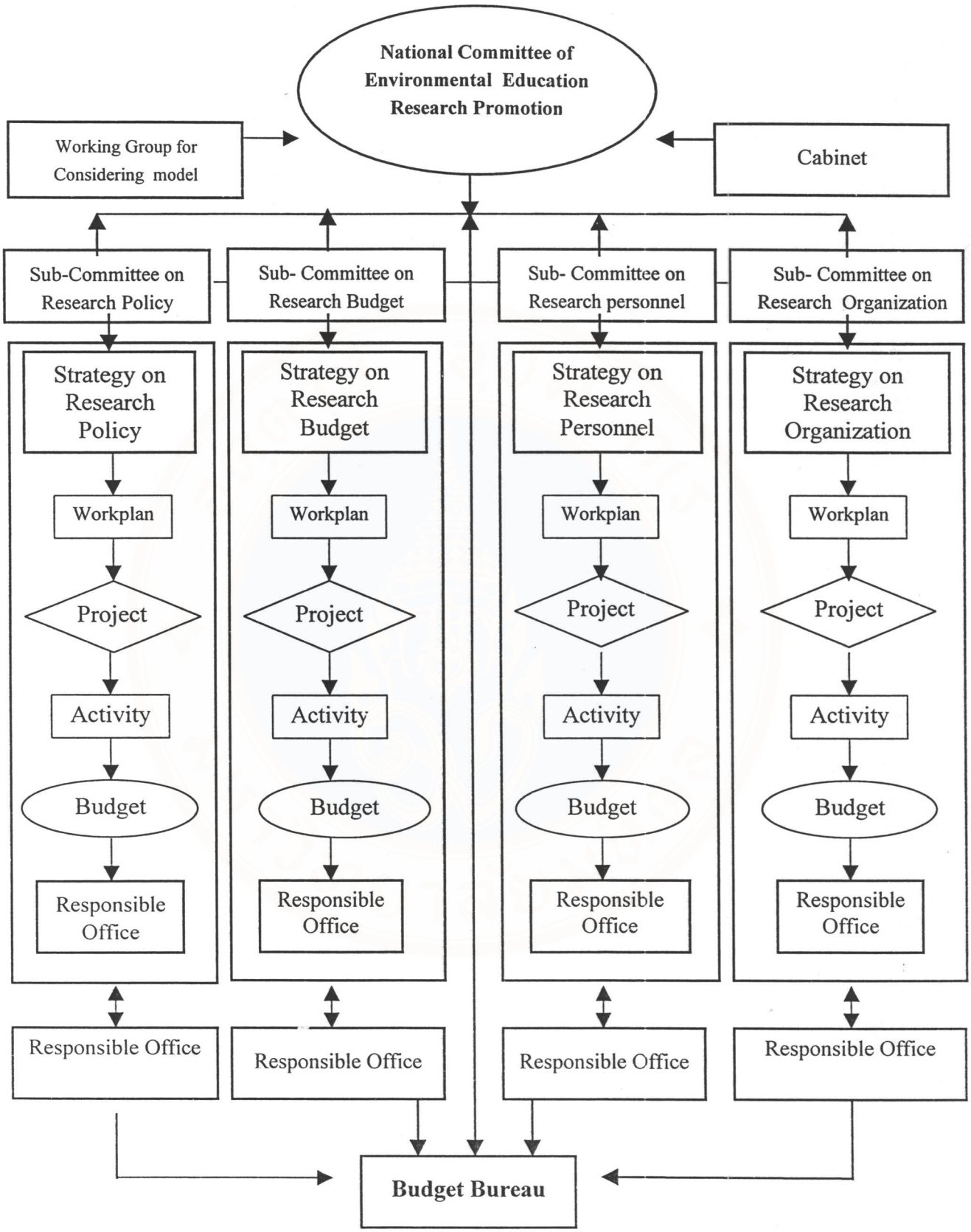

Figure 11. Display a Procedure of Applicating the Model of Environmental Education Research Promotion

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CHAPTER V
DISCUSSION

The general objective of research was to construct and propose a model of environmental education research promotion with some specific objectives: (1) to draft a model of environmental education research promotion based documentary and related expert in-depth interview, (2) to evaluate the draft model of environmental education research promotion by related experts, (3) to evaluate the model of environmental education research promotion constructed by environmental tri-research members all over the country, and (4) to evaluate the model of environmental education research promotion improved by tri-research members and related connoisseurs, propose the model and its application.

Thus, there are some aspects of research findings being discussed as the following:

5.1 Research Methodology

5.1.1 For validity and reliability of the research findings as well as reducing the limitation of either qualitative and quantitative the research in this research, which related to concept of research development and culture or human working at present, operated on integrated methodology that is suitable for social science research both in present and future also.

5.1.2 Because of upward environmental crisis, it makes environmental education role more prominent on sustainable environment development. Accordance with the current of educational reformation along Act of National Education 1999, which was employed major contents concerning with environmental education, was dictated that learning process has to create awareness on natural resources and environmental preservation (clause 7). In addition, National Constitution 1997 clause 81 is mentioned about the importance of research that ***"state has to support on any art and science researched, encourage science and technology developing for the development of country, teacher career and local wisdom, national arts and culture promotion"***. Also, government policy is emphasized on learning based society and knowledged based society that depends on a major tool research.

The concept of model construction is not specified to be in what form but the major consideration is to ask for the model components. Moreover, the designed model must be acceptable and practical, so participation from all related might be the best way to perform both data collection and model evaluation. However, the model components are consisted of ten parts; research policy, researcher, research budget, research organization, research information/material and equipment, research performance, research output, research output distribution, research output application and research evaluation. Thus, each part contains five aspects which are designed from abstract to concreat condition; principle/concept, purpose, guideline/measure,

strategy/means and indicator. Furthermore, the participation of model construction is based on tri-research members as research supporters, researchers and research output applicators.

5.1.3 For the reasons of suitable and reliable model was evaluated in 3 steps as:

- Firstly, the proposal, which was from documentary and related expert in-depth interview, was evaluated by this expert group
- Secondly, the improved proposal in step 1 namely ***"Model I"*** was evaluated by tri-research members on environmental education all over the country for model appropriateness approval.
- Lastly, ***"Model II",*** improval result from model I was finally evaluated by connoisseurs to ensure that the model is extremely suitable and reliable.

Connoisseurship evaluation was considered to use in suitable and reliable investigation. This method is mostly employed in education because a decision or a critic of connoisseurs are acceptable (Conrad and Wilsson, 1985). Thus, the model of research promotion, which was formed and evaluated in many steps, is reliable and practical. The appropriate environmental education model for the elementary schools in Bangkok metropolis, presented by Wilailak Ratanapeantamma (2000), could be one of the examples of such research.

5.1.4 The ten parts of model component basicly designed on the national research system covering the contents of principle/concept, purpose, guideline/measure, strategy/means and indicator were not complete at the proposal stage but it could be improved in the stage of model efficiency evaluation which was done by the tri-research members all over the country.

5.1.5 The same group of experts were available for both in-depth interview and draft model evaluation. This was for the model continuousness of concept to set the model components and to evaluate again the draft model together with to consider the consistency of IOC (Index of Item-Objective Congruence) on each item of model components. Moreover, some expert in the first set were the same ones at the second set for model efficiency evaluation at the last step. This was both for continuity of concept and also the limitation of small number of research experts in the national research system. However, these experts were arranged to be a research supporter group.

The major qualification of the research experts was basically classified into three groups as research supporter, researcher and research output applicator. However, some could be empirically all groups, two groups or only one group depending on their qualifications.

Moreover, all research experts had to be empirical qualifications in any fields of research, education, environment or environmental education because the environmental education concept related to all fields mentioned.

5.1.6 As contents of model was formed by the present condition such as the budget promotion of environmental education research. Therefore, it could be said that this model like reguired future forming as well as improving the present to be more efficient by the relevance agreement and approvement.

5.1.7 This research wasn't focused on one of the research output applicator. It can be applicated by all relevance but they should know its first step in order to perform the model in concrete. For this reason, this point as well as the researcher's experience were employed in the experts' interview.

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5.2 Research Findings

5.2.1 Procedure Findings.

1) Each item was related to model contents, I.O.C (Index of Congruence) = 0.5up. It could be described that the 10 model component and contents and its aspects are agreed by the related experts.

2) The agreement of research tri-research member related to all items reached to highest level ; $\bar{x}$ = 4.06 – 4.71.

3) From 418 items, there were 320 agreed ($\bar{x}$ = 4.25).

Considering to this findings there were, the model was synthesized again by the researcher in order to make it clear, brief, and suitable. The synthesis results were as follows :

- Specify in the agreement of tri-research member which values 4.25 or 85% from the total score of 5 or 100 in order. That indicates the highly level of agreement and reliability.
- Some appropriat items which are under 4.25 could be specified the model content as well.
- Indicators specified by expert interviews and related document, should be more flexible.
- The model purpose should be required for 10 promotion parts and relates to the principle and concept. Thus, the model reformation was consisted of principle/concept, purpose guideline/measure, strategy/means, and indicator.

4) After the reformation, the means ($\bar{x}$ = 4.1) of research connoisseurs' agreement on model evaluation was high level, however, less than the appropriateness model structure or factors ($\bar{x}$ = 4.3) and the following ($\bar{x}$ = 4.2) was the possibility of model application supporting on environmental education research in community and any level of education organization.

Anyway, these findings respond to the main model objective, that is to form appropriate construction/factor, complete contents of research supporting, lastly model implication and possibility.

5.2.2. Model Components

The model environmental education research promotion facing to tri-research members all over the country with 10 parts of model components being discussed as the following:

1) Research Policy

1.1) **Principle/Concept,** According to the policy of research unity as well as research prominent direction, the researcher's agreement was the highest ($\bar{x}$ = 4.63), the followings were research output applicator ($\bar{x}$ = 4.59) and research supporter ($\bar{x}$ = 4.53), respectively.

We can assume that most of research policy, in any branches, the relevance reguires himself guideline and unity to prevent and solve its problems.

1.2) **Guideline/measure, Strategy/Means and Indicator**

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Guideline/Measure of research policy was considered in the highest level ($\bar{x}$=4.50-5.00) almost every item as follow.

(1) The total agreement of tri-research member ($\bar{x}$ = 4.68) according to support forming of environmental education research policy caused by problem crisis can be presented as; research output applicator ($\bar{x}$=4.70), research supporter ($\bar{x}$=4.67), and researcher ($\bar{x}$=4.66), respectively. The result is related to the status of research output applicator.

Strategy/Means, which very high total agreement can be defined as follows :

- Research supporter's agreement is the highest ($\bar{x}$=4.75) according to specify research policy which should be related to national policy/plan ($\bar{x}$ = 4.65).

- Emphasized on proactive research policy ($\bar{x}$ = 4.52), the agreement of research supporter is the highest ($\bar{x}$=4.61).

Indecator ,which total agreement can be defined as follow:

- Research output application for problem solution ($\bar{x}$ = 4.55).

- Research budget related to research policy ($\bar{x}$ = 4.53), research supporter's agreement is higher ($\bar{x}$=4.64).

(2) Supporting the cooperation among research supporter, researcher, and research output applicator both in official and private sectors to specify environmental education research policy ($\bar{x}$ = 4.65) ; each tri-research member is equal in agreement, $\bar{x}$=4.63, 4.62, and 4.59, respectively.

(3) Supporting the administration evaluation related to research policy ($\bar{x}$ = 4.61), research trimember's agreement is approximately close; $\bar{x}$=4.63, 4.62, and 4.59 respectively.

(4) The agreement of research supporter ($\bar{x}$=4.61) and research output applicator ($\bar{x}$=4.64) related to support of co-ordination to policy performance ($\bar{x}$ = 4.59).

Strategy and means, work unit's reinforcement forming ($\bar{x}$ = 4.51), research supporter's agreement is mostly higher ($\bar{x}$=4.61).

(5) Regard to the urgent development of group/center organization forming which authorizes in specified environmental education research policy ($\bar{x}$ = 4.46).

2) Researcher

2.1) Principle/concept

The most interesting and highest in agreement was researcher should gain enough professional ethics ($\bar{x}$ = 4.68), which researcher's values is the highest ($\bar{x}$ = 4.75) as well as highest values ($\bar{x}$ = 4.80) in researcher should gain enough quality ($\bar{x}$ = 4.67). It can be concluded that researcher has considered professional ethics being as important as qualities.

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In additions, related to environmental education researcher who was considered to be the indicator for development of national environmental education ($\bar{x}$ = 4.36), the research supporter was high valued.($\bar{x}$ = 4.48). By contrast, researcher values different from the former ($\bar{x}$ = 4.19).

Another empirical disagreement between research supporter and researcher was that researcher should be supported in related reinforcement ($\bar{x}$ = 4.41) ; research supporter ($\bar{x}$ = 4.60), and researcher ($\bar{x}$ = 4.19).

In spite of, this agreement is related to this own benefit, however, researcher' value was less than research supporter.

2.2) Guideline/Measure, Strategy/Means and Indicator

The most agreement of tri-research member related to researcher ($\bar{x}$ = 4.50 – 5.00) can be presented as follows :

(1) The agreement of tri-research member in the development of environmental education system which supports to scientific thinking ($\bar{x}$ = 4.63) was valued the most highest ($\bar{x}$ = 4.62, 4.59, and 4.66).

Strategy/ means in environmental instruction force based on scientific thinking process ($\bar{x}$ = 4.64), the agreement of experts in this aspect was also highly, I.O.C (Index of Congruence) = 1.00 which included guideline/measure, and strategy/ means.

It can be assumed that both experts and tri-research members consider that environmental education management emphasized on scientific thinking skill is essential and relates to the educational reformation emphasizing on child center system.

Penny Narrot et al (2000: 5) found that the problem of environmental education is teacher's knowledge and skill in environmental curriculum application. They suggested that knowledge, especially in primary school, should be increased, eg., by seminar.

Moreover, the achieved indicators of strategy/ means and measure/ guideline were mostly agreed by tri - research member.

(2) The supporting of quality and quantity of environmental education researcher ($\bar{x}$=4.56) gained mostly research trimember's agreement; $\bar{x}$=4.53, 4.54, and 4.58 respectively by important strategy/means as follow:

- Development of researcher product quality in higher education ($\bar{x}$=4.50).
- Supporting environmental education curriculum in higher education ($\bar{x}$= 4.49).
- Supporting environmental education research in classroom ($\bar{x}$=4.35); researcher and research output applicator agreement ($\bar{x}$=4.25), and research supporter agreement ($\bar{x}$=4.22).

Penny Narrot et al (2000: 10-11) also suggested that classroom research is considered the target of education reformation. By doing classroom research, teachers would improve themselves as well as their instructions.

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At the same time, the limitation and trouble of conducting classroom research would be found, by this action research, in order to improve and correct, then.

(3) The agreement of reinforcement development and forming continuously ($\bar{x}$=4.55), researcher ($\bar{x}$=4.77) was lower than research supporter ($\bar{x}$=4.45), and research applicator (x=4.63).

(4) The agreement of making environmental education research network both in domestic and oversea ($\bar{x}$=4.42); tri-research member's agreement was quite low; $\bar{x}$=4.43, 4.36, and 4.47 respectively.

(5) The agreement of career path ($\bar{x}$=4.40); the agreement of research trimember related to guideline/measure was also quite low; $\bar{x}$=4.34, 4.47, and 4.39 at last.

3) Research Budget

3.1) Principle/concept, the very high agreement of tri-research members was adequate and appropriate amount of research budget ($\bar{x}$=4.55). Thus, the researcher group paid more acceptable ($\bar{x}$=4.60) than other two groups; research supporter group ($\bar{x}$=4.48) and research output applicator group($\bar{x}$=4.54). The major reason is that all researchers need more research budget for their research performance than the others.

3.2) Guideline/Measure, Strategy/Means and Indicator, The guideline/measure which was mostly agreed by the tri-research members was research budget source promotion in various forms and effective system ($\bar{x}$=4.51), while other approaches were agreed with near by means during 4.43-4.45.

4) Research Organization

4.1) Principle/concept, the agreement of tri-research member related to research organization specified in development, coordination, and relation ($\bar{x}$=4.52) can be defined as: research supporter ($\bar{x}$=4.65), researcher ($\bar{x}$=4.40), and research output applicator ($\bar{x}$=4.54).

The researcher assumes that forming specific research institute is the best way to improve researcher, research personnel, and budget and it would be the leader to specify environmental research policy. In additions, other related factors would be more empirically supported and improved.

4.2) Guideline/Measure, Strategy/ Means, and Indicator

Research tri-member mostly agreed with guideline/measure focussed on research organization ($\bar{x}$=4.51-4.71) as follows:

(1) Supporting of environmental sources in community ($\bar{x}$=4.71), tri-research member's agreement was mostly high($\bar{x}$=4.65, 4.68, and 4.78).

Fortunately, research output applicator's desire of environmental awareness in public sources was higher than the others. It indicates the most active research output applicator.

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Strategy/Means which was mostly agreed by research tri-member is supporting of environmental source composition in school and temple as well as forming public information center of environmental research. The public participation level is considered to be major indicator.

Considering to the research findings, we can see that community, awareness, and major public institutes, as schools and temples, are very important based on research tri-member's agreement. It also related to present government policy, which emphasized on community awareness development. Because of its importance, nine local expert teachers were selected by Bureau of National Education Commission in 2000 and 2001. They authorize in conveying knowledge in formal, nonformal education, and information education system (Office of National Education Commission, 2002: 1-2).

(2) Support and development of environmental research units which are over the country to act out completely in their roles ($\bar{x}$=4.57). The agreement of research supporter($\bar{x}$=4.61) was higher than others. Main strategy/ means was the promotion of high education institute and local institute to be local wisdom sources in environmental education ($\bar{x}$=4.53).

(2) The agreement related to the independence of research organization($\bar{x}$=4.55).

(3) The agreement related to supporting of environmental research unit forming in regional area ($\bar{x}$=4.51)

Both two aspects of guideline/measure (3) and (4) emphasized on cooperation among researcher, research administrator and research output applicator.

5) Research Information, Material and Equipment

5.1) Principle/Concept

The agreement, related to principle and concept, of research supporter and researcher were higher than research output applicator as follows:

- Efficient link of research information material and equipment based national network ($\bar{x}$=4.61).
- Research information material and equipment sources in central and local area should be formed ($\bar{x}$=4.60).
- Research information material and equipment base should up-to-date and facility ($\bar{x}$=4.60).

5.2) Guideline/Measure, Strategy/Means and Indicator

Guideline/Measure, related to support the efficiency and modern of research information ($\bar{x}$=4.62), the agreement of researcher ($\bar{x}$=4.64) and research output applicator ($\bar{x}$=4.68) were higher than research supporter ($\bar{x}$=4.49).

The reason for this may be assumed that the first two members are directly concerning with research information. This findings also relate to the agreement of experts with highly IOC.(Index of Congruence).

One of interesting aspects is the promotion of combination of environmental education research information center ($\bar{x}$= 4.56), the agreement was as

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follows: researcher ($\bar{x}$=4.61), research supporter ($\bar{x}$=4.49), and the last research output applicator ($\bar{x}$ = 4.58).

It indicates that researcher has mostly desire in many forms of research information as well.

6) Research Performance

6.1) Principle/Concept

The agreement of research performance which supported to researcher, administrator supporting, research experiences ($\bar{x}$=4.49).

6.2) Guideline/Measure, Strategy/Means and Indicator

The agreement of promotion in environmental research condition ($\bar{x}$=4.47), improvement of research regulation about the researcher independence ($\bar{x}$=4.42) and the final aspect is quality level of researcher and research output ($\bar{x}$=4.43).

The main personnel who supports environmental research condition is administrator. In education reformation era, the administrator should have administrative vision as well as strategy . Malee Toe-sakul (1992: 2) stated that administrator is the one who influence on the achievement of organization. To be success, officers should be empowered.

7) Research Output

7.1) Principle/Concept

Relate to quality and application of research output ($\bar{x}$=4.67), researcher's agreement is mostly high ($\bar{x}$=4.80), the followings are research output applicator ($\bar{x}$=4.63), and research supporter ($\bar{x}$=4.45), respectively.

The other important findings were the clearance of the research evaluation ($\bar{x}$=4.61) and the various means of the quality examining ($\bar{x}$=4.57). The informants had more agreement on the two aspects than the other two groups - that is the arithmetic means of the opinion were very high at 4.65 and 4.63. This information was extremely agreed with the important principle/ concept on the informants. The opinion of the informants was empirical on the aspect of the researcher's quality and the ethics.

7.2) Guideline/ Measure, Strategy/ Means and Indicator

The important guidelines/ measures were the quality of the environment education research support continually ($\bar{x}$=4.58), the appropriate model development ($\bar{x}$ 4.55) and the research presentation development ($\bar{x}$=4.48). For the last one, every group of the tri-member agreed with the strategy/ methodology of the research presentation which was easy to understand and suitable for the target group to apply ($\bar{x}$=4.61). That means the research presentation, which is difficult to understand, may be appropriate with the academic purpose, on the contrary, it could be a crucial problem for the applicants, who have much more agreement than the others ($\bar{x}$=4.64).

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8) Research Output Distribution

8.1) Principle/ Concept

The important principle/ concept were variety and appropriation for research distribution to the target group ($\bar{x}$=4.59), and the research output should be distributed for learning and teaching improvement in primary, secondary, advanced and general people level ($\bar{x}$=4.59). For this aspect, the informants had more agreement with those principles/ concepts than the supporters and the applicants.

8.2) Guideline/ Measure, Strategy/ Means and Indicator

The important guideline/ measure was to support the network and distribution quality of the environmental education research output under the strategy/ means of setting up all level research networks to collect the information and distribute to the target group.

9) Research Output Application

9.1) Principle/ Concept

The important principle/ concept was the research output should be extensively distributed to the applicants ($\bar{x}$=4.59). However, for the research output applicants should specify the research problem ($\bar{x}$=4.34), comparing with the other aspect the research, the tri-research member, particularly the informants, did not pay much attention on it, This implies that some research tri-members would rather to specify the research problem themselves than to follow the applicants' specification. However, in present, there was much more focus on the applicants' need in order to have the research output actually applied. Thus, the research application, which is the final outcome, is the important topic of every research problem, especially on the industrial research in order not to waste the research. As the mentioned reason, in the Sixth National Research Policy and Guidelines (2002-2006), there was a proposal for the various research applicants to specify the desirable research output to apply or desirable research output as a social investment. Then the desirable research could be proposed to the state in order to adjust the policy (The Office of National Research Council, 2001: 110).

9.2) Guideline/ Measure, Strategy/Means and Indicator

The important guideline/ measure was to support the participation on environment education application ($\bar{x}$=4.62).

10) Research Evaluation

10.1) Principle/Concept

The important principle/ concept was the important mechanism of the research monitoring and the evaluating for the final research outcome. Therefore, it should be operated creatively and then research monitoring, evaluating and supervising could be applied to improve the research policy, guideline and management.

10.2) Guideline/Measure, Strategy/ Means and Indicator

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The important guideline/ measure was to support the research department on the environmental education in order to have strong mechanism and reliance for monitoring, evaluating and supervising the research output which the national budget was supported. Moreover, the important strategy/ measure was to set up a monitoring, evaluating and supervising system, which was reliable, justified, clear and verified.

5.2.3 Model Application

Accordingly, the model was nationally set up and the experts, the research tri-member over the country and the connoisseurs gave the researcher very useful suggestions that- this should be started from the ministry of education which directly responses to the environmental education. The ministry of education should be the operator until having the practical model with the supporting budget. So, this model would be successful rapidly and practical. In addition, it should be deal with the learning process development under the education reformation purpose- that is to apply the research potentiality as the education reformation mechanism. Moreover, a mission of the research is for learning development in order to develop the academic study and learning research emphasized on the efficient learning model, the action research, the application of research output to develop the learning efficiency (Department of Curriculum and Instruction Development 2002: 11). So, on this opportunity, the model ought to be applied for the clarity and unity of the environmental education research.

5.3 Conclusion of Research findings

1) Research Procedure

From the important procedures for setting up the environmental education research promotion model which were expert interviewing, evaluating the proposal model, evaluating the model by the tri-research member and the connoisseurs, it was revealed that the model components and the content of each part were in consonance with each other, especially the tri-research member all over the country – the research supporters, the informants, and the research output applicants agreed with the model contents in the small items of all aspects between the high level and the highest level of agreement ($\bar{x}$=3.50-4.49 to $\bar{x}$=4.50-5.00), And the tri-research member agreed with the model structure or the components and gave more suggestions that make the model getting more complementary.

2) Model Contents

2.1) The content discussion emphasized to 10 parts of the model especially principle/ concept and guideline/ measure which were very important to be considered as the main instruments direct to the appropriate strategy/ means and indicator. However, the strategy/ means and indicator could be adjusted – decreased or increased according with the application and the target group levels.

2.2) The researcher's content discussion emphasized upon the important input- which were research policy, informants, research budget, research organization/ and research output- for these were the important contents extremely affect all systems

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of research. The research supporters agreed with this point of view much more than the informants or the research output applicants. As well as the research supporters directly specified the policy and searched for the input for the researcher to operate the research adequately and efficiently for high quality of research output and application.

2.3) The arithmetic means of accomplishment indicators was fairly lower than the other topic. It may be because of the research tri-member's suspense on the appropriation, accuracy or the possibility of each indicator whether it could indicate the accomplishment of the strategy/ means or not and the high or low quantity as well as the discussion on flexibility or uncertain of indicators.

2.4) According to the informants, there were many aspects to discuss because most of arithmetic means of informants' opinion on small items of the model was lower than the research supporters and the research output applicants. This may due to the informants had right experience on research work and imagined the research problem quite clearly, concluding the pre- working step and the post-working step. Or the informants did not want to improve the detail in the model that might be because they did not want to increase the task.

Moreover, an interesting aspect is the informants' arithmetic means of opinion on most small items was lower than the other two groups. In contrast, for some small items, the informants' arithmetic means of opinion was empirically higher than the others', moreover, they are the important items- those are the research policy should be unity ($\bar{x}$=4.63), the researcher should be qualified ($\bar{x}$=4.80), the sufficiency of the researcher's ethics ($\bar{x}$=4.75), the sufficiency and appropriation of the research budget ($\bar{x}$=4.60), the high quality and application of the research ($\bar{x}$=4.80). While the reinforcement, the special research department on environmental education, the research profession, and the research association, the informants' opinion was very lower than the items mentioned before. That was defined that the informants on environmental education had high intention to develop the researcher quality and the research output.

2.5) The agreement on the content between the connoisseurs who considered the draft model and the research tri-member over the country are the focus on the scientific thinking process learning and community network with all levels of educational institutes which were quite accordance with the educational reformation in present as Praves Vasri (2000: 69) mentioned that the core of the educational reformation is life and education should go together, the education from life and the education for empower the community and local means the whole of people, society, environment, culture, economics, and politics.

In addition, the scientific thinking process, which directly concerns with the research, is the intelligence development process. Therefore, the National Education Act in B.E.1999: phrase 2 - Support the teacher to be able to apply the research as a part of learning process and phrase 30- Support the teacher to be able to do a research for developing the learning appropriately with learners levels. Thus, the Department of Curriculum and Instruction Development (2001: 4) mentioned that the learning conduction under the research process indicated that the teacher would like the students to think at a highly level by using knowledge, thinking to construct the new knowledge that showed the teacher competence in learning arrangement, which was agreed with the professional teacher standard criteria or **" professional teacher."**

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On the researcher's opinion, if the professional teacher manage the learning on the environmental education using the research process, the teacher could be **"a professional researcher on environment"** as well.

2.6 The model which was formed upon the environmental education research support could be the typical model for continual operation with the systematic relationship as the quantitative model of social science.

2.7 The 10:5:3 model or the 10 parts, 5 aspects and, 3 groups of environmental education research promotion model is both the static and dynamic model. The static is the 10 parts of structure/ component of the research promotion model concluding 5 aspects. However, these components are only the typical forms, they could be increased or decreased up to the context and the target group. Especially, the strategy/ means and indicator may be adjusted to be the smaller items e.g. the indicator may be discriminated as the CFSs (Critical Success Factors) and the KPIs (Key Performance Indicators), so the aspects of the model would be clearer. For the dynamic part, the content of the model, which the evaluated output was appropriate, however, the application needs to be adapted according to the context and the target group.

Of course, the model, which was formed could be applied easily and conveniently and could specify the focus of the environmental education research promotion according to the target group appropriately. In addition, the accomplishment of the environmental education research promotion extremely needs all concerning participation.

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CHAPTER VI
CONCLUSIONS AND RECOMMENDATIONS

The general objective of this research is to construct a model of environmental education research promotion under the specific objectives which are (1) drawing up a model of the environmental education research promotion through documentary and expert in-depth interview, (2) evaluating the draft model by experts (3) evaluating the model by the research tri-member all over the country, (4) evaluating the model by the connoisseurs However, the conclusions and the recommendations can be presented as follow:

6.1 Conclusions

6.1.1 Research Methodology

The research methodology conducted in this study is combination between the qualitative research concerning with the documentary and the expert in-depth interviewing in order to draw up the model and the quantitative research in evaluating the draft model. Then the draft model is evaluated by the research tri-member all over the country and by the connoisseurs. Program SPSS PC is used for data analysis for IOC (Index Item-Objective of Congruence), standard deviation arithmetic means ($\bar{x}$) and percentage.

6.1.2 Research Process and Findings

Stage 1

The problem status of environmental education and its solution as well as the research problem of environmental education, the guideline to form the model framework and guidelines for model application appeared on qualitative data from the documentary and the expert in-depth interview related to the research/ education/ environment/ environment education in order to draw up the draft model of environmental education research promotion.

Stage 2

The information in stage 1 and documentary are evaluated by 14 experts in order to be improve the model to the complete one.

The proposal model of this stage is consisted of ten parts; research policy, researcher, research budget, research organization, research information, material and equipment, research performance, research output distribution, research output application and research evaluation. Thus, each part contains four aspects; principle/ concept, guideline/ measure, strategy/ means and indicator.

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Each aspect is consisted of various items of environmental education research promotion.

The proposal model evaluation results based Index of Item – Objective Congruence (IOC) is revealed that all items of the model contents are 0.50 up. This can be concluded that most experts agree with ten parts and four aspects of the model structure. Moreover, Some recommendations are presented to detail improvement and application.

Stage 3

Improved from stage 2, the model is formed to questionnaire and tested with the tri-research members who are not the samples group. The validity of all 10 parts of the contents of environmental education research promotion is between 0.82 – 0.92.

Then, the 452 from 550 informants of the purposive sampling categorized as; 114 research supporters, 160 researchers, and 178 research output applicators. Most of these are male who work in the central part of the country and are responsible to the academic work-unit, and ministries, especially the Ministry of Education, which is directly responsible to the environmental education research promotion. The results of the model evaluation indicate that tri-members of the environmental education research over the country agree with every sub-content at the highly level, that is at the level of very to the most agreement under the total arithmetic means of the three groups upon each item pretty high- the minimum is 4.60 and the maximum is 4.71. Moreover, each group mostly agrees with the items at the arithmetic means from 4.25 up (320 items from 418 items) . This indicates that the three groups agree with each other at the highly level and mostly reliable on items in the model.

In the stage of model evaluation by tri-members of the environmental education research over the country, besides the agreement on the structure of the model consisted of the ten promoting parts and each part covers four aspects as mentioned, the tri-research members propose some important points of view, which should be a ***purpose*** concluded on of research promote on each part. Therefore, the five aspects of ten promoting parts are: principle/ concept, purpose, guideline/ measure, strategies/ means and indicator. However, the suggestions of the tri-research member are included.

Stage 4

The researcher searches the criterias for regulation synthesis base the information in stage 3 in order to get clear, and suitable content ordering.

The criterias are as follow:

1) Specify in the agreement of tri-research member which values 4.25 or 85% from the total score of 5 or 100 in order. That indicates the highly level of agreement and reliability.

2) Some appropriate items which are under 4.25 could be specified the model content as well.

3) Ordering the ten parts and five aspects based its means.

4) Again, consider and improve the content of each part.

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Stage 5

From stage 4, the 23 connoisseurs concerning with the environmental education research evaluate the model focusing on appropriation, content completion, empirical content, relevance between content of each factor, agreement of model possibility and benefit.

The model evaluation results are found that most of the connoisseurs are highly agreed with the model at the arithmetic means 4.1 ($\bar{x}$=4.1), and the 3 highest are the appropriation of the model structure or factors, the completion of model content, and the model benefit for perspective view of environmental education research ($\bar{x}$=4.3). The second is the possibility of model application supporting an environmental education research in community and any levels of educational organization ($\bar{x}$=4.2). The least ones are the empirical content of the model, the consistency of model and environmental education goal and the consistency of national environmental education status ($\bar{x}$=4.0).

Stage 6

The presentation of environmental education research promotion model and the model application.

6.1.3 The Model of Environmental Education Research Promotion

(10 parts, 5 aspects and 3 Groups or Model 10 : 5 : 3)

The model of environmental education research promotion constructed by this research is consisted of the two major parts:

1) The promoting content consisted of 10 parts:
   (1) Research policy
   (2) Researcher
   (3) Research budget
   (4) Research organization
   (5) Research information, material and equipment
   (6) Research performance
   (7) Research output
   (8) Research output distribution
   (9) Research output Application
   (10) Research evaluation

2) The five aspects which are - principle/concept, purpose, guideline/ measure, strategy/ means and indicator. In addition, the five aspects, which indicate the administrative directions of environmental education research promotion, are occurred in all parts of the research promotion. The research supporters, who support the environment education research in different ways - since the research policy/ plan specification, the research funding, and the administration supporting the research performance as well as the capability of research application, and the research support acceptances are the researcher and the research output applicators. The combination of all mentioned is the tri-member of the environmental education research.

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The findings could be called the **10 parts, 5 aspects and 3 Groups Model (10 : 5 : 3 Model)**

The model contents could be concluded as follow:

1) Principle/concept is the systematic environmental education research promotion which is an important instrument to administrate the environmental education under the principle of life-long education and the sustainable development.

2) Purpose is for the unity and empirical direction of the environmental education research system for the research output to develop the environmental education.

3) Guideline/measure is to support and promote the systematic environmental education research by linking mechanism of the research tri-member according to the principle/ concept and purpose.

4) Strategy/means is the supporting and promoting of the environmental education research under the linking mechanism of the research tri-member in order to develop, improve and change the on-going conduction, create the desires and set up the operating network according to the guideline/ measure.

5) Indicator is the achievement of the environmental education research promotion both in qualitative and quantitative support in accordance with the strategy and means.

2) The ten parts of environmental education research promotion are:

(1) Research policy should be united and clarified direction.

(2) Researcher should be high quality and adequate motivation.

(3) Research budget should be enough and proficient.

(4) Research organization should be specialized unit.

(5) Research information, material and equipment should be modern forms and efficient network.

(6) Research performance should be supportive condition for research conducting.

(7) Research output should have quality and highly concentrate application.

(8) Research output distribution should be various and efficient approach based target group.

(9) Research output application should be various form.

(10) Research evaluation should be efficiently and continuously action at all levels.

Model application suggested by the experts, the connoisseurs, and research tri-member can be concluded as follows:

As being formed a national model, the first step of its application should start with national policy, that is, firstly from cabinet down to ministry, government bureau, department, and lastly research unit or academic institute, respectively.

The guideline can be revealed as the following:

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1) At national policy step, Ministry of Education, which is responsible directly to environmental management through the country, is the best leader. National commission of environmental education research promotion should be formed based on the minister's considering that this model should be applied. This national commission is consisted of certain related work units in order to support, develop, improve the model and present it to the cabinet for acceptation. Finally, details of work-plan, project, activity, budget, and responsible work-unit will be announced to related work-units.

2) Ministry, government, bureau and department are the following units, which conduct the policy by allocating environmental research budget and environmental education promotion budget to work-units.

3) Related work-units and academic institutes will continue the conducting upon the condition of achievement.

6.2 Recommendations

The recommendations of this study include the following:

6.2.1 Practical Recommendations

1) From the result of the study, it is clear that there are many things which should be considered for further environmental education research promotion, such as :

a) Learning process promotion
b) Public sources
c) Scientific learning methodology
d) Unity and direction of research policy
e) Quality and ethics of researcher and research output
f) Up-to-date and efficient research information technology

To respond Act of National Education 1999 which emphasizes on education reformation as well as learning development research, this model should be presented to the relevance for the considering of other supports.

2) Environmental study should be one of the objectives in every courses of fundamental education and should be empirically evaluated.

3) Administrators and teachers' attitudes about research performance should be improved.

4) The aspects of research promotion which should be seriously considered are research policy, researcher, research budget, and research organization.

5) Model structure and content should always be improved to the condition of environmental education research as well as time movement.

6) Research indicator should be more studied in order to systematically develop.

6.2.2 Recommendations for Research Output Application

Seeing by the researcher, the research output application is various. The recommendations can be as follows:

1) Recommendations for Executive

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(1) By the supporting of executives in Ministry of education, the findings should be a guideline to support unity of environmental education research policy. The specific units should be formed as well as the budget should be adequate. Regarding to all mentioned, research promotion should be succeeded.

(2) The model should be revealed in national conference in order to encourage related administrators' awareness about this research promotion.

(3) The model should be applied to other national research.

(4) The findings should be widely distributed.

2) Recommendations for Administrator and Environmental Education Research Promotion Unit

(1) The model should be presented to educational administrator conference in all levels, such as: department or office of Ministry of Education or Ministry of University Affairs, also includes agencies.

(2) The model should be integrated to employ in teacher and administrator training courses.

(3) I.S.O. (Insurance Standard Organization) of environmental education as well as education should be organized in academic institutes in order to increase the efficiency of research evaluation system of environmental education research.

(4) Network of environmental education research development should be performed. Moreover, research output within school, educational region, region, and country should be evaluated.

(5) The awareness of environment and natural resources preservation should be cooperated by public, eg., community environmental center.

(6) Research output and local environmental wisdom should be integrated in order to apply research output related to social and cultural context.

3) Recommendations for Educational Organization

1) General research and environmental education research should be developed, accepted, and considered to be essential by all relevance.

2) Research would be directly developed by school administrator who also be coordinator as well. On the other hand, connoisseurs may be formed to coordinate research instead depending on suitable occasion.

3) The person who instructs about environment and environmental education should be promoted to develop classroom research based on the education reformation guideline in Act of National Education 1999.

4) Research output report and improvement guideline of environment and environmental education should be formed continuously and empirically.

5) The findings of environment and environmental education research should be continuously reported to the relevance and public to criticize and apply.

6) The relationship between academic institute and public should be formed to conduct research which objects to sustainable development of environment in community.

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6.2.3 Further Research Recommendations

1) A Model of environmental education research promotion, especially in university, school, and educational region should be more studied with the same conceptual framework of this findings.

2) Domestic and oversea models should be compared.

3) The appropriate approaches of this model should be more studied.

4) The special major part of environmental education research promotion model such as research policy, researcher and research budget should be got more studies.

5) Environmental education research network should be more studied to find suitable form.

6) The priority of environmental education research promotion should be got more.

7) Factor analysis should be available to should be analyzed in order to investigate model form and content.

8) PAR (Participatory Action Research) should be applied to develop the environmental education research promotion model.

9) Qualitative environmental education research should be promoted in various fields such as:

a. Researcher/expert on environment or environmental education
b. Development of environmental educator.
c. Research development of environmental education in class - room
d. Development of environmental awareness
e. Development of environmental education conceptual framework
f. Grouping in environmental education research
g. Development of environmental education knowledge and process

10) The former environmental education research promotion models and the present one should be compared.

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APPENDIX

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APPENDIX A.
Research Instruments

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Questionnaire for Model Evaluation
of Tri-research Member of Environmental Education

Personal Information

Full-Name .....

Position.....

Academic Position ☐ Lecturer ☐ Assistant Professor
☐ Associate Professor ☐ Professor

Responsible Organization.....
.....

Province.....

Direction : The model of environmental education research promotion is consisted of principle/concept, guideline/measure strategy/means and indicator. Though it has been synthesized through documentary, expert in-depth interview and expert evaluation your opinion as the much experient researcher is needed to confirm the model efficiency. However the model must be improved to get more completeness following your recommendations

Please put a number 1-5 in ( ) at the end of statement for each item

Number 5 = Very high agreement
Number 4 = High agreement
Number 3 = Moderate agreement
Number 2 = Low agreement
Number 1 = Very low agreement

If you have some more recommendations, you can write them in the space of others at the last item of each part.

Definition of Terms

1. The word ***"research"*** in the questionnaire is defined as "***environmental education research".***
2. A research is a scientific of truth searching to form regulations or theories for incident referencing, explaining, forecasting and controlling. Moreover, the research can be applied of life development.
3. Environmental Education is an educational process treating people to understand the relationship of man and environment, to get desirable and creative awareness, values and responsibility leading to sustainable skill and solution both in present and future.

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1. Research Policy

Principle/Concept

The research policy on environmental education is the major element of various supporting research system because it is the first issue to others and all conduction are always started from policy, so environmental education research policy should be as the following:

1. The environmental education research policy should be participatively specified by all levels of research process such as policy makers, supporters, researchers and research output applicators.. ( )
2. The policy should be empirical appearance ( )
3. The policy should make various performances. ( )
4. There should be clarified policy for research direction. ( )
5. Performance duration should be specified in the policy. ( )
6. It should be life long education policy. ( )
7. The policy should be based on sustainable development principle. ( )
8. The research should be considered to be as a major instrument for creative thinking development. ( )
9. Dynamics based policy ( )
10. Emphasize on research administration followed the policy. ( )
11. The research output applicator based policy
12. Others.....

Guideline/Measure	Strategy/Means	Indicator
1. Participation promotion among research supporters, researchers, and research output users both in government and private organizations for environmental education research policy making. ( )	1.Making connection among research supporters, researchers and research output users for setting up the research policy. ( ) 2.Promoting local and national research policy at the same time. ( ) 3.Promoting the research condition and guideline study for research policy making ( ) 4.Appointed the research policy coordinating committee in all levels.. ( ) 5. Others.....	1.Proportion of research policy makers among research supporters, researchers and research output users. ( ) 2.Participatory regularity and continuity of research policy making ( ) 3.Reserch policy concession of the related persons. ( ) 4.Number and quality research condition and guideline study for research policy making. ( ) 5.Policy research output used for research policy making. ( )

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1. Research Policy (Cont.)

Guideline/Measure	Strategy/Means	Indicator
		6. Number of meeting, seminar, training, operating, observation, and public relation for research policymaking. ( ) 7.Efficiency of research policy coordinating committee at all levels. ( ) 8. Others.....
2. Promoting the environmental education research policy making based rush and necessary problems with directing to national potential. ( )	1. Determining the research policy accordance with the national research guideline and policy. ( ) 2. Emphasizing to proactive research policy. ( ) 3. Promoting the conference or seminar on research policy determination and adaptation. ( ) 4 Others.....	1. Research performance according to the research policy. ( ) 2. Research budget allocation being accordance with the research policy. ( ) 3. Research findings being available for problem solution. ( ) 4. Flexible research administration in the frame of research policy. ( ) 5. Number of conference or seminar for policy clarification and adaptation. ( ) 6. Others.....
3.Promoting proacting and developing on group formation to be as a center for environmental education research policy determination. ( )	1. Educational and Environmental research organizations being the core leader for central unit formation. ( ) 2. Environmental education research policy being forced to be partial policy related. ( )	1. Foreing operation condition. ( ) 2. Empirical unity of environmental research in related policy ( ) 3. Strong intention of politician. ( ) 4 Others.....

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1. Research Policy (Cont.)

Guideline/Measure	Strategy/Means	Indicator
	3. Educational and political mechanism forcing to form a central unit for environmental education research policy determination. ( ) 4. Others.....	
4. Support, accelerate the communication to pass the policy to the operation. ( )	1. Promoting the participatory conference or seminar for research performance and policy units.. ( ) 2. Constructing the motivation for performance unit. ( ) 3. Others.....	1. Research policy operation of performance unit. ( ) 2. Empirical motivation for performance unit. ( ) 3. Others.....
5. Promoting and proacting on research policy transformation to performance. ( )	1. Promoting the commission or staff for research policy evaluation ( ) 2. Forming a group studying the research evaluation process.. ( ) 3 Performance unit can get partial or authentic evaluation ( ) 4. Others.....	1. .Effective commission or staff ( ) 2. Effective evaluation. ( ) 3. The evaluation results can be available for research policy determination. ( ) 4. Accepted evaluation results. ( ) 5. Others.....
6. Others.....		

For more recommendations.....
.....
.....

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2. Researcher

Principles

1. Researcher should be considered to be an occupation in society. ( )
2. Appropriate should be considered to be an occupation in society. ( )
3. All related aspects should be supported to researchers.( )
4. The environmental education researchers are the indicator for national environmental education development. ( )
5. Researchers should be continuously and adequately developed. ( )
6. Professional ethic necessary for researchers. ( )
7. Researchers are the major factor effecting to research resources or any other factors. ( )
8. Resources or any other factors. ( )
9. Others.....

Guideline/Measure	Strategy/Means	Indicator
1. Promoting to produce the environmental education research. ( )	1. Promoting the career path of environmental education researchers ( ) 2. Forming the research institute for environmental education researchers. ( ) 3. Forming the association of environmental education researcher. ( ) 4. Promoting to balance the researchers in educational organizations. ( ) 5. Others.....	1. Number of freelance and profession researchers. ( ) 2. Balancing research organization of Environmental education ( ) 3. Forming the association of environmental education researcher. ( ) 4. Number of researchers working as major career. ( ) 5. Number of researchers on basic knowledge. ( ) 6. Research continuing ( ) 7. Number of researcher in educational organization. ( ) 8. More employment rate of students who finish an environmental education programme. ( ) 9. Others.....

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2. Researcher (Cont.)

Guideline/Measure	Strategy/Means	Indicator
2. Promoting continuously to produce and develop the research motivation for environmental education researchers. ( )	1. Constructing the research motivation and atmosphere as income, welfare etc. ( ) 2 Developing the research finance. ( ) 3. Others.....	1. Income for researcher.. ( ) 2. Social welfare for researcher.. ( ) 3. Certificate or prize for researcher. ( ) 4. Convenient finance for research. ( ) 5 Others.....
3. Promoting both quality and quantity of environmental education researcher. ( )	1. Promoting the formation of organization certifying the research standard. ( ) 2. Promoting an environmental education programme in university. ( ) 3. Developing quality of researcher production in university. ( ) 4. Promoting the researchers joining a mega project. ( ) 5. Budget allocation for researcher quality and quantity development.( ) 6. Studying the future trend and vision for researcher production and development. ( ) 7. Designing the approaches treating administrators and environmental instructors getting more interest in research. ( ) 8. Promoting the action research in environmental education class. ( ) 9. Others.....	1. Number of researcher promoted the highest position as research administrator. ( ) 2. Number of research special experts. ( ) 3. Frequency of training for researcher. ( ) 4. Number of new researcher. ( ) 5. Balance of researcher in the country. ( ) 6. Evaluation of researcher quality. ( ) 7. Number of environmental education graduates.( ) 8. Short and long term plan for research development. ( ) 9. Research continuing. ( ) 10. Number of environmental education programme available in university. ( ) 11. Number of environmental education administers and teachers. ( ) 12. Number of action research in environmental education class. ( )

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2. Researcher (Cont.)

Guideline/Measure	Strategy/Means	Indicator
		13. Others.....
4. Promoting both domestic and international network of environmental education researcher. ( )	1. Promoting the researcher network in domestic and international levels. ( ) 2. Pushing the researchers to join an environmental education project. ( ) 3. Promoting the researcher operation among government private and university. ( ) 4. Others.....	1. Operative levels of researchers both in domestic and international areas. ( ) 2. Number of network researcher team. ( ) 3. Number of high skilled researchers. ( ) 4. Proportion of team research and disciplinary research. ( ) 5. Approaches for network connection. ( ) 6. Others.....
5. Developing an environmental education system supporting to scientific thought process. ( )	1. Pushing the scientific process of thought in environmental education activities. ( ) 2. Others.....	1. Number of environmental education activities based scientific process of thought. ( ) 2. Number of educational organization providing the field trip course of environmental education( ) 3. Number of educational organization using the research findings to be partial course environmental education. ( ) 4. Others.....
6. Others.....		

For more recommendations.....
.....
.....

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3. Research Budget

Principle/Concept

1. Research budget should be enough and adequate. ( )
2. The environmental education research budget should be specially allocated. ( )
3. The research budget for environmental education should be made priority based its significance both in present and future for sustainable development. ( )
4. There should be various forms of research supporting source. ( )
5. The research budget can be the indicator for environmental education development in country
6. The research budget can be the indicator for environmental education development in country. ( )
7. The budget for research output application should made through educational organizations, environmental education for research development. ( )
8. Educational organization should coordinate to both private and international organizations for research budget support. ( )
9. The government should coordinate to both private and international organizations for research budget support. ( )
10. The research budget is a major factor effecting to other research factors. ( )
11. Others.....

Guideline/Measure	Strategy/Means	Indicator
1.Supporting specially the budget for environment education research. ( )	1. Forming a central unit for environmental education research. ( ) 2. Studying the relation of environmental education budget application and research. ( ) 3. Others.....	1 Appearing a central unit for environmental education research. ( ) 2 Appearing the budget system of environmental education research and development with indicators. ( ) 3 Others.....
2. Supporting to have various forms of budget source for research system. ( )	1. Forming or developing the budget source for research support. ( ) 2. Development the efficiency of budget source for research support. ( ) 3. Promoting the discovery oversea research budget sources. ( )	1. Number of adequate research budget source. ( ) 2. Number of research project applying for budget support. ( ) 3. Operation of international research budget sources. ( ) 4. Researchers knowing in research budget sources. ( )

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3. Research Budget (Cont.)

Guideline/Measure	Strategy/Means	Indicator
	4. Doing public relation of research budget sources. ( ) 5. Others.....	5. Balance of research budget sources. ( ) 6. Other.....
3. Supporting the adequate and covers budget for environmental educational research ( )	1. Specifying the goal of research budget. 2. Studying the balance of research investment. 3. Studying the future trend of research budget allocation. 4. Increase of research budget in graduate study level. 5. Promoting the research scholarship for junior researchers. ( ) 6. Promoting the research budget support in classes, schools and schools. 7. Others.....	1. Amount of research budget nearly as the goal specified. ( ) 2. Research findings being available for research budget allocation. ( ) 3. Empirical plan of research investment. ( ) 4. Number of graduate students getting research scholarship. ( ) 5. Number of junior researchers getting research subsidy in environmental education. ( ) 6. Number of environmental education projects getting research getting research scholarship. ( ) 7. Others.....
4. Developing the management and regulation to be convenient for environmental education research budget support. ( )	1. Improving and developing the regulation and problem on research budget support. ( ) 2. Improving actively the research financial measure. ( ) 3. Research budget of block grant being	1. Being actively independent to get research support. 2. Flexible regulation for research support. 3. Specifying the standard rate for researchers. 4. Others.....

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3. Research Budget (Cont.)

Guideline/Measure	Strategy/Means	Indicator
	available for researchers and research organizations. ( ) 4. Others.....	
5.Supporting the environmental education research investment participation among domestic and international organizations. ( )	1. Supporting a set of research project for holistic solution. ( ) 2. There is a central unit committee-working group for research coordination. ( ) 4. Doing the public relation for research investment. ( ) 5. Others.....	1. Levels of cooperation among organizations. ( ) 2. Levels of effective coordination. ( ) 3. Effective public relation. ( ) 4. Amount of international subsidy. ( ) 5. Others.....
6. Promoting the administration of budget allocation on environmental education research. ( )	1. Promoting a research project development based achieved task. ( ) 2. Promoting long term budget allocation (over 2 years) for a large research project. ( ) 3. Promoting the budget allocation for research administration which was separated from the research performance. ( ) 4. Promoting an urgent research for urgent problem solution. ( ) 5. Constructing a connection among the research subsidy sources. ( ) 6. Others.....	1. Quality of research works and researchers. ( ) 2. Research usage. ( ) 3. Confidence to operate research. ( ) 4. Efficiency of research administration or research conduction. ( ) 5 . Sufficient budget allocation for research administration. ( ) 6. Consistency of research supported scholarship direction and scholarship resources. ( ) 7. Others.....
7. Others.....		

For more recommendations.....
.....
.....

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4. Research Organization

Principle/Concept

1. The research organizations are as a center for collecting developing and transferring research knowledge to application. ( )

2. There should be a specialized organization with independent performance ( ) for developing, coordinating and connecting in the research process ( )and distributing the research output and modern technology ( )

3. There should be some organization promoting all levels of environmental education performance. ( )

4. The direction of environmental education development should be the same among all organizations related. ( )

5. Action unit of environmental education should be also a research unit. ( )

6. Others.....

Guideline/Measure	Strategy/Means	Indicator
1. Promoting to have a specialized organization with independent performance for developing, coordinating and connecting the research process and distributing the research output and modern. ( )	1. Promoting the power storming among researchers, administrators and research output users for forming the specialized unit of environmental education. ( ) 2. Studying the appropriate form of specialized unit. ( ) 3. Getting some recommendations from national research supporter. ( ) 4. Doing the public hearing. ( ) 5. Getting the cabinet approval. ( ) 6. Others.....	1. Operational levels of power unity. ( ) 2. An appropriate form of specialized organization. ( ) 3. Acceptation of nation research supporter. ( ) 4. Passing the public hearing from all related. ( ) 5. Cabinet approved. ( ) 6. Others.....
2. Promoting to have the regional unit of environmental education research for connecting to the central unit determining the policy and public relation. ( )	1. Creating the mechanism for power storming among researchers, administrators and research output users.( ) 2. Studying the appropriate form of regional research organization. ( )	1. Operational levels of power unity. ( ) 2. An appropriate form of regional research organizations. ( ) 3. Operational levels of regional research organization and national research supporter. ( )

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4. Research Organization (Cont.)

Guideline/Measure	Strategy/Means	Indicator
	3. Request some supports from the national research organization. ( ) 4. Others……..	4. Decentralization of research administration. ( ) 5. Others……
3. Developing all organizations related environmental education working efficiently. ( )	1. Studying the strategy for potential reform of related research organizations. ( ) 2. Promoting the operative reform policy of research organization. ( ) 3. Promoting to be the government policy for effective research in any organizations. ( ) 4. Promoting the educational organizations to be local wisdom sources of environmental education. ( ) 5. Developing the research organizations to be academic centers of environmental education. ( ) 6. Forming the network and mechanism to connect all research organization direction and performance. ( ) 7. Others……	1. Empirical and practical strategy. ( ) 2. Operation and direction of research organization performance. ( ) 3. Convenient and active performance of research organizations. ( ) 4. Effective presentation for environmental conservation. ( ) 5. Number of participants in environmental conservation. ( ) 6. Development of excellent organization in environmental education. ( ) 7. Others……
4. Promoting the learning sources of environmental education in a community. ( )	1. Promoting the environmental learning center in a community. ( ) 2. Promoting the mobile unit of environmental learning center. ( ) 3. Promoting the integrated sources of environmental learning in a community. ( ) 4. Others……..	1. Participatory levels for center formation. ( ) 2. Levels of environmental problem in a community. ( ) 3. Number of environmental learning source in a community. ( ) 4. Others……

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5. Research Information, Material and Equipment

Principle/Concept

1. There should be researched information sources both in central and regional area. ( )
2. The research information should be connected as a network. ( )
3. The research information should be undated all time. ( )
4. The research information should be conveniently available. ( )
5. The research facility should be adequate. ( )
6. The research facility should be conveniently available. ( )
7. The research facility should be appropriate to research condition. ( )
8. Others.....

Guideline/Measure	Strategy/Means	Indicator
1. Promoting the central unit of environmental education research. ( )	1. Promoting the national research office to be a central unit of research information. ( ) 2. All research organizations sending research information to the central unit. ( ) 3. Others.....	1. Number of research reports sending to the central unit. ( ) 2. Number of research information applicator. ( ) 3. Operation levels of research organization sending the research information to the central units. ( ) 4. Others.....
2. Promoting the efficiency and inodernization of environmental education research information technology. ( )	1. Promoting the study related needs of research information application. ( ) 2. Promoting the research data base performance for effective service of customer needs. ( ) 3. Promoting the effective system of network connecting in research information service. ( ) 4. Promoting the effective service of research information. ( ) 5. Others.....	1. Number of research information applicators. ( ) 2. Operative levels of research information applicators. ( ) 3. Service quality of research information application. ( ) 4. Satisfaction levels of research information application( ) 5. Others.....

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5. Research Information ,Material and Equipment (Cont.)

Guideline/Measure	Strategy/Means	Indicator
3. Promoting the development of environmental education research facilities. ( ) 4. Others.....	1. Promoting the research organizations borrowing some research facilities. ( ) 2. Checking the quality of research facilities all times. ( ) 3. Promoting to budget increase for research facilities based actual incident. ( ) 4. Promoting the import tax reduction for research facilities in private sectors. ( ) 5. Promoting the research facility invention. ( ) 6. Others.....	1. Participatory levels of the research organization borrowing some research facilities each other. ( ) 2. Satisfaction levels of research borrowing the research facilities. ( ) 3. Levels of research facility readiness and quality. ( ) 4. Amount of budget for research facilities. ( ) 5. Export rates of research facilities in private sectors. ( ) 6. Increase rates of invention . ( ) 7. Number of invented property right. ( ) 8. Others.....

For more recommendations.....
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.....

6. Research Performance

Principle/Concept

1. Environmental education research performance needs completeness of related parts as researcher, and internal and external supporters. ( )

2. The appropriate condition for research performance may effect to quality and effective research. ( )

3. Major investigator and researchers are major factors to achieve goal of environmental education research. ( )

4. Most aspects of environmental education research should be provided by the research output applicator. ( )

5. Environmental science should be researched to be based information for environmental education research. ( )

6. Others.....

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6. Research Performance

Guideline/Measure	Strategy/Means	Indicator
1. Promoting the connection of environmental education researchers and applicators. ( )	1. Promoting to have the specialized organization for connection of environmental education researchers and applicators. ( ) 2. Others……..	1. Operational levels of central unit of environmental education research connection. ( ) 2. Operational levels of researchers and research output applicators. ( ) 3. Innovative approaches for research development. ( ) 4. Others……..
2. Promoting an environmental education research atmosphere. ( )	1. Promoting the environmental education research training to researchers and organizations. ( ) 2. Promoting the research team of senior and junior researchers. ( ) 3. Developing the relation of researchers and research administrators. ( ) 4. Improving the research regulation in government sector. ( ) 5. Promoting the continuing and integrated research. ( ) 6. Promoting the sample package of environmental education research. ( ) 7. Others……..	1. More experiences for researchers. 2. More interest in research training for researchers. 3. Quality of researchers and rescarch output 4. Good relation of administrators and researchers. 5. Research independence for the government officials. 6. Satisfaction to research work 7. Research's progression. 8. Number of junior researchers. 9. Number of achieved goal research. 10. Others……..
3. Promoting the operation of governmental and private sectors for environmental education research.	1. Inviting the private organizations participatively doing research. ( ) 2. Promoting the investment sharing to private sectors. ( )	1. Perspective view of private operational levels. ( ) 2. Private sharing in research investment. ( ) 3. Convenient

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6. Research Performance (Cont.)

Guideline/Measure	Strategy/Means	Indicator
3. Others.....	3. Promoting the exchange of researchers, experts and materials to private sectors. ( ) 4. Others.....	performance in private research sharing. ( ) 4. Number/ proportion of sharing research of government and private sectors. ( ) 5. Number/proportion of researchers/experts and material exchange on government and private sectors. ( ) 6. Others.....

For more recommendations.....
.....
.....

7. Research Output

Principle/Concept

1. The research output should be quality and available. ( )
2. Various approaches should available for research output inspection. ( )
3. The research output is presently caring to be more available than in the past. ( )
4. The excellent research output should be selected annually and continuously. ( )
5. Transpirated approaches are necessary for research output evaluation. ( )
6. The research output must be protected by the government. ( )
7. Others.....

Guideline/Measure	Strategy/Means	Indicator
1. Promoting the appropriate from development of environmental education research output. ( )	1. Promoting to have future researches for persist solution and future prevention of environmental problems. ( ) 2. Promoting the research output responding to urgent issues. ( ) 3. Promoting the interdisciplinary research	1. Numbers of future research. ( ) 2. Number of research output application for problem prevention and solution( ) 3. Effects of research output application for problem prevention and solution. ( ) 4. Number of research series. ( )

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7. Research Output (Cont.)

Guideline/Measure	Strategy/Means	Indicator
	for integrated solution and prevention of environmental problems. ( ) 4. Promoting an adaptive research. ( ) 5. Others.....	5. Others.....
2. Promoting the quality of environmental education research output in various approaches. ( )	1. Promoting to have the continuing study of research condition. ( ) 2. Promoting the research output synthesis for research policy determination. ( ) 3. Promoting the research cost-benefit. ( ) 4. .Promoting to market project evaluation by experts. ( ) 5. Promoting the research motivation for quality research. ( ) 6. Supporting to provide an academic conference for research output distribution and research work synthesis in local, national and research work synthesis in local, national and international levels. ( ) 7. Others.....	1. Research findings can be available for policy and plan determination or research improvement. ( ) 2. Number of certified research. ( ) 3. Number of research report published in domestic and international journals. ( ) 4. Number f research reference. ( ) 5. Research output application. ( ) 6. Others.....
3. Developing the research output presentation. ( ) 4. Others.....	1. Promoting the simple presentation of research output for special target group. ( ) 2. Others.....	1. Understanding levels of research output applicator in research output. ( ) 2. Research output application of target group. ( ) 3. Others.....

For more recommendations.....
.....
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8. Research Output Distribution

Principle/Concept

1. The research output should be distributed be distributed in various approaches. ( )
2. The research output should be distributed both in local and national levels. ( )
3. There should be a responsible unit for research output distribution. ( )
4. The research output distribution should focus on learning improvement for both formal students and general public. ( )
5. Others.....

Guideline/Measure	Strategy/Means	Indicator
1. Promoting network for environmental education research public relation. ( )	1. Promoting the operation of local and national research organization doing data collection and public relation to the target group. ( ) 2. The center unity of national research responding to public relation. ( ) 3. Promoting the local education organizations responding to public relation in communities. ( ) 4. Promoting the environmental education curriculum development based research output application. ( ) 5. Others.....	1. Operational level of research organization network. ( ) 2. Ability levels to stimulate the target group interest in research output application. ( ) 3. Variety and covery of research information in the central unit of national research. ( ) 4. Numbers of public relation activities participatively joined in the research organization network. ( ) 5. Environmental education curriculum development based the research output. ( ) 6. Others.....
2. Promoting public relation quality of environmental education research. ( )	1. Promoting various forms of distribution. ( ) 2. Promoting the selection of quality and available research output for public distribution. ( ) 3. Promoting modern media for public distribution. ( )	1. Number of seminar participants and journal publishing. ( ) 2. Public response on various forms of distribution. ( ) 3. Active distribution. ( ) 4. Attitude change in public. ( ) 5. Others.....

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8. Research Output Distribution (Cont.)

Guideline/Measure	Strategy/Means	Indicator
3. Others.....	4. Promoting the budget for public distribution. ( ) 5. Promoting the public distribution for special target group with simple language. ( ) 6. Others.....	

For more recommendations.....
.....
.....

9. Research Output Application

Principle/Concept

1. Research output application is the ultimate goal of research and it will be rather more interesting from the public. ( )
2. Research output application should be widely distributed. ( )
3. The research output applicators and researchers should be always discussed. ( )
4. The research problem should be specified by research output applicators. ( )
5. New culture related research output application for social problem solution and prevention should be more created. ( )
6. Lack of research output application promotion is the major problem for research output application in society. ( )
7. Research output application should be available for instructional curriculum both formal and non-formal education system. ( )
8. Others.....

Guideline/Measure	Strategy/Means	Indicator
1. Promoting participation on environmental education research output application. ( )	1. Promoting the specialized organization of environmental education research responding the research output application. ( )	1. Operational levels of organization for research output application. ( ) 2. Effective mechanism of research output application promotion. ( )

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9. Research Output Application (Cont.)

Guideline/Measure	Strategy/Means	Indicator
	2. Constructing the promoted mechanism of research output application based governmental and private participation. ( ) 3. Commission for research output application being formed by the operation of policy maker, research supporter and researcher. ( ) 4. Promoting the meeting of researchers and research output applicators. ( ) 5. Others.....	3. Operational levels of commission forming for research output application. ( ) 4. Results of research output application in various levels. ( ) 5. Meeting frequency of researchers and research output applicators. ( ) 6. Others.....
2. Promoting the researches seeking effective approaches for environmental education research output application. ( )	1. 1. Promoting the specialized organization of environmental education research creating the approaches for checking research output needs and research output application. ( ) 2. Promoting a set or project research performance. ( ) 3. Promoting an environmental education researchers researching on the research output needs ( )	1. To know needs and guidelines of research output application. ( ) 2. More performance of environmental education research in set or project. ( ) 3. Number of specialized researchers performing the researches based user's needs. ( ) 4. Compels research output with empirical application. ( ) 5. Most research problems based research output application need. ( )

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9. Research Output Application (Cont.)

Guideline/Measure	Strategy/Means	Indicator
3. Others.....	4. Promoting the complete system of research performance as; - Budget allocating from the research starting to the research output application. ( ) - Motivating the research output application for the research responsible organization. ( ) - Allocating an adequate budget for research output distribution. ( ) 5. Promoting the research output applicators specifying participatively the research problem. ( ) 6. Promoting the significance of research process in all levels of educational system. ( ) 7. Promoting the efficiency improvement of intellectual property protection from the government. ( ) 8. Others.....	6. Environmental education based scientific thinking process and innovative culture for research output application in environmental problem prevention and solution. ( ) 7. Efficiency of intellectual property protection from the government. ( ) 8. Others.....

For more recommendations.....
.....
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10. Research Evaluation

Principle/Concept

1. Research evaluation is a mechanism promoting the research-achieving goal. ( )
2. Research evaluation can make all parts learning both effective and failure research. ( )
3. The macro evaluation of research should be made annually. ( )
4. The research supporters should monitor annually all supported research. ( )
5. The research organization should follow annually their research output. ( )
6. The research evaluation should be creative to develop quality and efficiency of research. ( )
7. The research evaluation should develop an administrative system and make condition supporting to produce the quality and efficient research. ( )
8. The evaluation results should be available to improve the policy. ( )
9. There should be research impact evaluation presenting the benefit of research investment. ( )
10. Other.....

Guideline/Measure	Strategy/Means	Indicator
1. Promoting the specialized organization of environmental organization of environmental education getting effective performance. ( )	1. Designing an accredited system of research evaluation based research expert and peer review. ( ) 2. Promoting the research evaluation system based commission. ( ) 3. Promoting the research evaluation in phase with expertized persons. ( ) 4. Others.....	1. Acceptation of evaluation system from all related. ( ) 2. Quality performances of research experts peer reviewers and commission. ( ) 3. Others.....
2. Promoting the evaluating results of environmental education research being available for budget allocation. ( )	1. Recommending the integrated a approaches of budget allocation based the research evaluation results and research policy. ( ) 2. Others.....	1. Research budget allocation being accordance with research evaluation. ( ) 2. Others.....

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10. Research Evaluation (Cont.)

Guideline/Measure	Strategy/Means	Indicator
3. Promoting the standard criteria of environmental education research among all related organizations( )	1. Promoting all research organizations having the same form of research evaluation. ( ) 2. Promoting the positive atmosphere of creative evaluation. ( ) 3. Allocating an adequate budget for research evaluation. ( ) 4. Others.....	1. Having accredited forms of research evaluation. ( ) 2. Participation levels of research evaluation. ( ) 3. Adequate budget for research evaluation. ( ) 4. Others.....
4. Developing the specialized organization for environmental education research evaluation( ) 5. Others.....	1. Promoting the development and formation of research quality and standard organization based educational zones. ( ) 2. Forming an accredited board of research evaluation. ( ) 3. Constructing a systemic network of research evaluation. ( ) 4. Others.....	1. Number of research quality and standard evaluation organization. ( ) 2. Number of organization network for research. ( ) 3. Quality and standard evaluation. ( ) 4. Others.....

For more recommendations.....
.....
.....

Recommendations for application of environmental education research promotion model.....
.....
.....

Thank you for answering the questionnaire

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FORM OF MODEL EFFICIENCY EVALUATION

Direction: The model of environmental education research promotion is consisted of ten parts, five aspects and three groups of informant. The ten parts are research policy, researcher, research budget, research organization, research information/ material and equipment, research performance, research output, research output distribution, research output application and research evaluation. Each part covers five aspects: principle/ concept, purpose, measure/ guideline, strategy/ means and indicator. The three groups of informant are research supporter, researcher and research output applicator.

The model was firstly implemented by studying the environmental education research status in-depth interview, expert evaluation and evaluating by 452 of tri-research member before evaluating the model efficiency through nine items.

Please mark ✓ in the space being the most acceptable item of your consideration and giving more recommendation, if necessary.

There are 5 scales in the form of model efficiency:

Scale 5 is defined to be the very high agreement.
Scale 4 is defined to be the high agreement.
Scale 3 is defined to be the moderate agreement.
Scale 2 is defined to be the low agreement.
Scale 1 is defined to be the very low agreement.

Evaluator's Personal Information

Full-name.....
Position.....
Organization name.....
Office Address.....
Telephone No.....Fax. No.....

Note: The term *"research"* in the model refers to *"environmental education research"*

Definition of Terms

1. **Research** is defined as the study for reliable facts in order to form the regulations, theories for the appearance reference, and the findings could predict and control some phenomenon, and also apply for further study to develop quality of life with the focus on study for facts as the process or activity based on the regulations and specific purpose.

2. Environmental education is defined as every system of educational process purposely to develop the public knowledge on the mankind and environment relationship, and for desirable realization, moral, responsibility, and participation to solve and prevent both present and future environmental problems.

3. Environmental education purpose is for the public- minded, environment understanding including the responsibility, realization, attitude, morality in order to support and participation on preventing and improving the environment and for skillful problem-solving, evaluating the environment measure and participation on finding strategies for environmental problem-solving.

Evaluating Items	Score Scale					Improvement Guideline
	5	4	3	2	1	
1. Appropriation model structure or factors.						
2. Completion of model contents.						
3. Empirical contents of model.						
4. Contents consistency in each factor of model.						
5. Consistency of model and environmental education goal.						
6. Consistency of model and national environmental education research status.						
7. Possibility of model application supporting the national environmental education research.						
8. Possibility of model application supporting an environmental education research in community and any levels of educational organization.						
9. Model benefit for perspective view of environmental education research.						

For more recommendations.....
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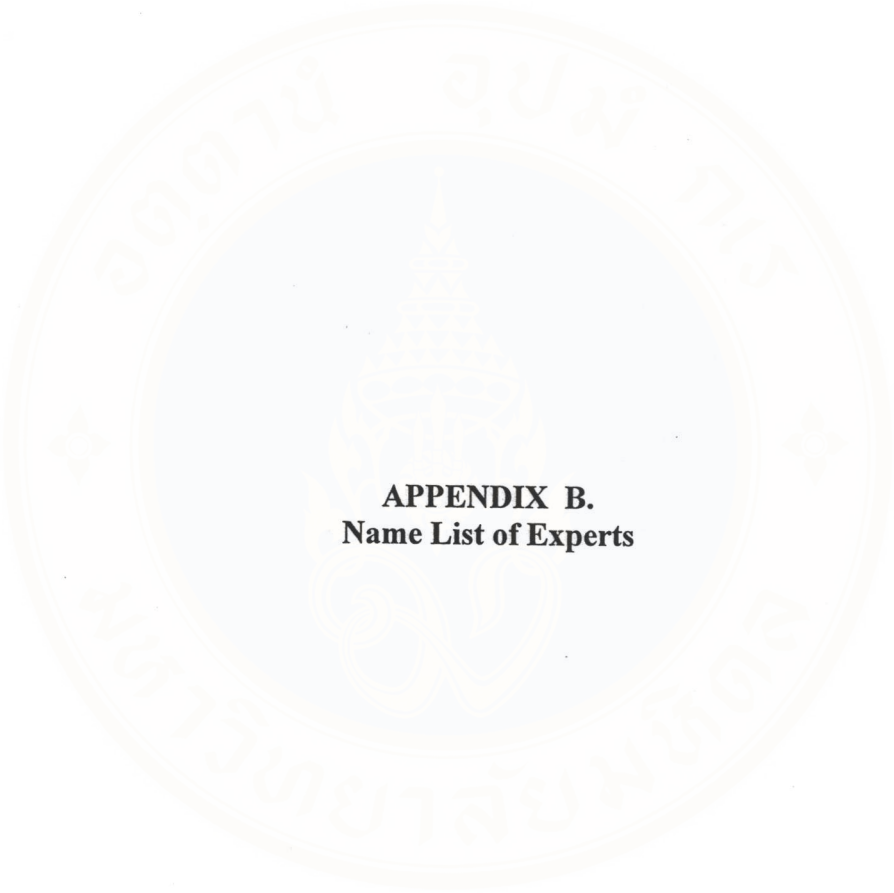

APPENDIX B.
Name List of Experts

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NAME LIST OF EXPERTS

There are 2 sets of expert; the first one contains 14 experts getting in-depth interview for model construction and evaluating the draft model, and the second one contains 23 experts for model efficiency evaluation.

The First set of Experts

Research Supporter Group

1.	Prof. Kasem Chankaew, Ph.D.	President of College of Environment, Kasetsart University
2.	Prof . Choompol Sawasdiyakorn,Ph.D.	Chairman, Committee on Sociology Branch National Research Council of Thailand.
3.	Prof. Ahnond Bunyaratvej, Ph.D.	Advisor on the Sixth National Research Policy and Guidelines (2002-2006) Making Project.
4.	Mr.Chalermsak Wanichsombat	Secretary-general, Office of Environmental Policy and Planning Ministry of Science, Technology and Environment
5.	Dr.Sopon Tanamai	College of Environment, Kasetsart University
6.	Dr.Wichian Ketsingha	Senior Advisor on Educational System Office of National Education Commission
7.	Mr.Booncherd Sobhon	Senior Advisor for Social Science Research, The Office of the National Research Council of Thailand.

Researcher Group

8.	Dr. Pairat Thidpad	Head of the Governmental Efficiency Support Centre, Ministry of Education
9.	Asist.Prof. Wilailak Ratanapeantamma, Ed.D.	Faculty of Graduate Studies, Krirk University.
10.	Mrs. Patoommas Pooltip	Policy and Plan Analyst 7, The Office of the National Research Council of Thailand.
11.	Dr. Panya Theerawittyalert	Training Officer, The Office of the National Research Council of Thailand

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Research Output Application Group

12.	Assist. Prof. Prapha Norapanlop	Former Director of Environmental Education Centre, Pranakorn Rajchabhat Institute
13.	Assist. Prof. Siriwat Soontharothok	Director of the Environmental Education Centre, Pranakorn Rajchabhat Institute
14.	Mrs.Supannee Meethet	Academic Supervisor 9, The Office of National Primary Education Commission, Ministry of Education

The Second Set of Experts

Research Supporter Group

1.	Prof. Kasem Chankaew, Ph.D.	President of College of Environment, Kasetsart University
2.	Prof . Choompol Sawasdiyakorn,Ph.D.	Chairman, Committee on Sociology Branch National Research Council of Thailand.
3.	Prof. Ahnond Bunyaratvej, Ph.D.	Advisor on the Sixth National Research Policy and Guidelines (2002-2006) Making Project.
4.	Mr.Chalermsak Wanichsombat	Secretary-general, Office of Environmental Policy and Planning, Ministry of Science, Technology and Environment
5.	Dr.Sopon Tanamai	College of Environment, Kasetsart University
6.	Dr.Wichian Ketsingha	Senior Advisor on Educational System Office of National Education Commission
7.	Mr.Booncherd Sobhon	Senior Advisor for Social Science Research The Office of the National Research Council of Thailand.
8.	Assoc. Prof.Wasant Pongsapich, Ph.D.	Director of Environmental Research Institute, Chulalongkorn University
9.	Mr. Thamrong Chootap	Educational Research Division Director Department of Curriculum and Instruction Development Ministry of Education

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Researcher Group

10.	Dr. Wee Rawang	College of Management, Mahidol University
11.	Asist.Prof. Wilailak Ratanapeantamma, Ed.D.	Faculty of Graduate Studies, Krirk University.
12.	Dr. Pairat Thidpad	Head of the Governmental Efficiency Support Centre, Ministry of Education
13.	Dr. Panya Theerawittyalert	Training Officer, The Office of the National Research Council of Thailand
14.	Mr. Somchai Sadubsroi	Supervisor 7, Supervisory Unit, Department of General Education , Ministry of Education
15.	Assist. Prof. Pasinee Piampongsant	Faculty of Education, Chulalongkorn University ,
16	Mr. Atphol Anantworasakoon	Center of Environmental Education Research, Faculty of Education, Chulalongkorn University

Research Output Application Group

17.	Assist. Prof. Prapha Norapanlop	Former Director of Environmental Education Centre, Pranakorn Rajchabhat Institute
18.	Assist. Prof. Siriwat Soontharothok	Director of the Environmental Education Centre, Pranakorn Rajchabhat Institute
19.	Mr.Bunchoom Piadang	Department of Vocational Education, Ministry of Education
20.	Mrs.Supannee Meethet	Academic Supervisor 9, The Office of National Primary Education, Commission, Ministry of Education
21.	Assoc. Prof. Somphong Chitradup, Ph.D.	Faculty of Education, Chulalongkorn University
22.	Prof. Kriengsakkdi Chareonwongsak, Ph.D.	Director, Institute of Education Studies for Development
23	Dr. Chaiyot Boonyakit	Vice- President Thai Environment Development Institute

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BIOGRAPHY

NAME	Jintanapa Sobhon (Jintana Visitwon)
DATE OF BIRTH	June 15, 1956
PLACE OF BIRTH	Nakorn-nayok Province, Thailand
INSTITUTIONS ATTENDED	Chulalongkorn University,1975-1679 Bachelor Degree of Education Chulalongkorn University,1997-2002 Master Degree of Education Kasetsart University,1995-1999 Master Degree of Environmental Science Mahidol University,1997-2002 Ed.D.in Environmental Education
POSITION & OFFICE	The Office of The National Research Council Position : Head of Scientific Research Plan and Policy Group, Research Policy and Planning Division

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