

“WORKING PAPER 2”



Green Policy driven activities at Hiroshima University

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GREEN POLICY DRIVEN ACTIVITIES AT HIROSHIMA UNIVERSITY

Naotaka Hirami

RESUMEN

La Universidad de Hiroshima ha decidido enfocarse en cómo la organización de las sociedades humanas y los problemas generados por estas, impactan en el medio ambiente, así como la influencia que estas deben tener como factores en las llamadas “políticas verdes” con el objetivo de crear un desarrollo sostenible. Es a través de la educación, principalmente en las universidades, que se busca crear no solo consciencia, sino una base de investigación sobre la cual trabajar y crear redes de apoyo y trabajo hacia los sectores laborales y empresariales con énfasis en el cuidado del medio ambiente. Creando un modelo interseccional, puede comprenderse y aplicarse mejor las medidas necesarias para la protección del ambiente sin descuidar el desarrollo humano y económico, los cuales son igualmente importantes para el progreso de las sociedades. Las actividades presentadas por la Universidad y que buscan expandirse a México, son una gran oportunidad para crear dichas redes en el país y comprender la interrelación desarrollo-medio ambiente.

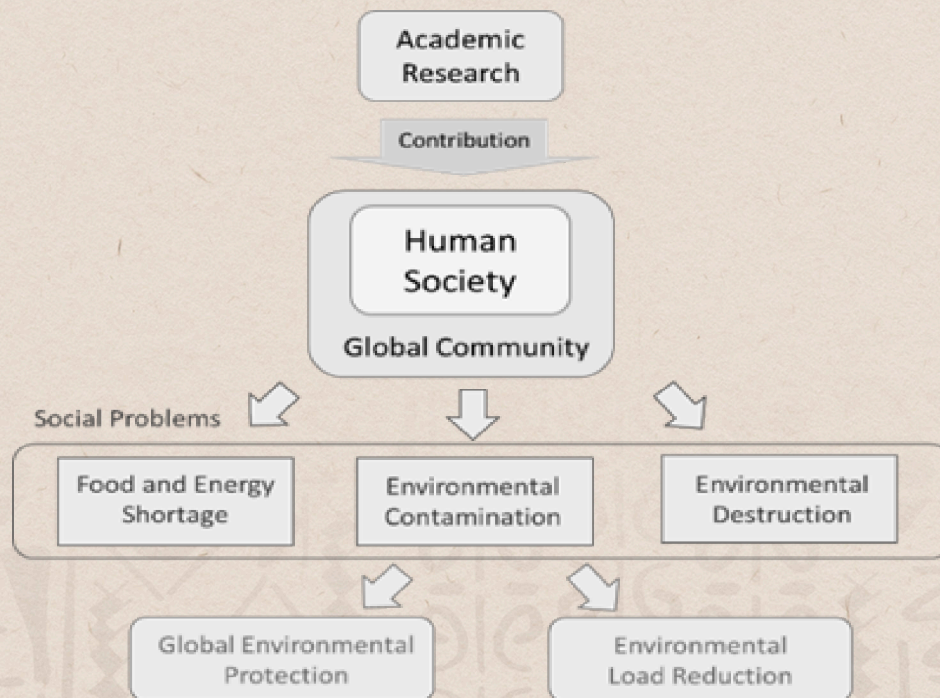
ABSTRACT

The University of Hiroshima has decided to focus on how the organization of human societies and the problems generated by these, have impacted the environment, as well as the influence that these should have as factors in the so-called "green policies" in order to create sustainable development. It is through education, mainly in universities, that we seek to create not only awareness but also a research base on which to work and create support and working networks towards the labor and business sectors with an emphasis on environmental care. By creating an intersectional model, the necessary measures for environmental protection can be better understood and applied without neglecting human and economic development, which are equally important for the progress of societies. The activities presented by the University, and that seek to expand to Mexico, are a great opportunity to create such networks in the country and understand the development-environment interrelationship.

INTRODUCTION

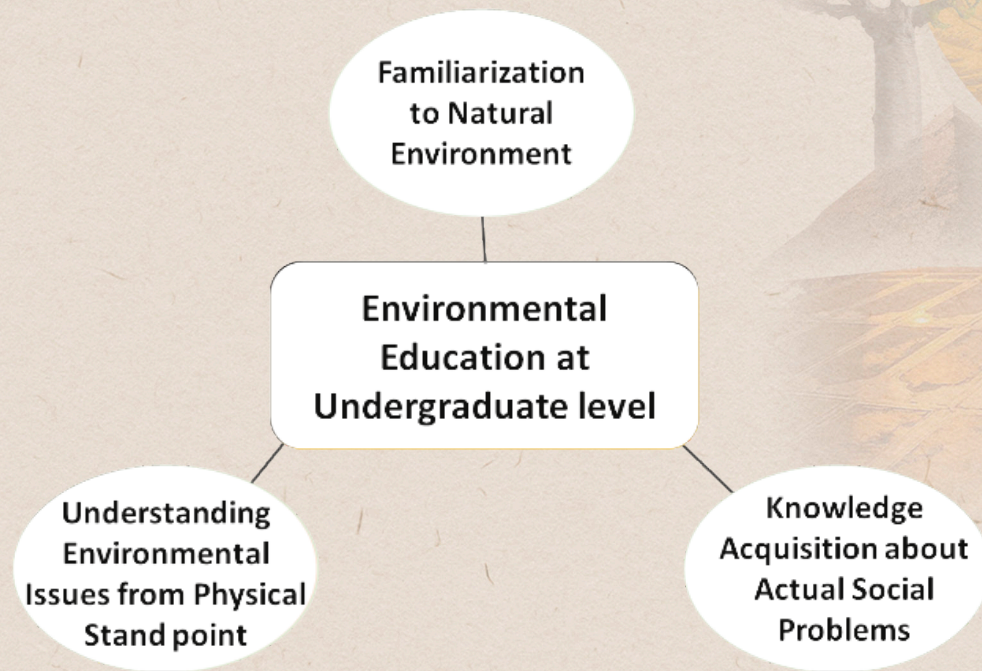
The mission of Hiroshima University comprises three factors: education, which is a succession of knowledge, research, which is a creation of knowledge and social contribution, an application of knowledge (Hiroshima University, 2017a). We intend to expand these three activities from regional community to global community. It is said, however, that academic research in conjunction with globalization has ironically caused social problems in general, such as food and energy shortage, environmental contamination, and environmental destruction. We believe that it is again the three factors –education, research and social contribution– that are essential to overcome the social problems in terms of global environmental protection and environmental load reduction (Environmental Report, 2017; Bornmann, 2013) (Green Policy, See Fig.1). The contents in the presentation include examples of classes offered by the university (education), research topics (research) and recent triple helix activities (social contribution) driven by the Green Policy.

Figure 1. Academic Research to Green Policy



Source: Own elaboration.

Figure 2. Environmental education (undergraduate level)



Source: Own elaboration.

ENVIRONMENTAL EDUCATION

Presented in this session are three examples of classes offered at the university. The first example is an environmental education at the undergraduate level. The following three aspects are introduced (See Fig.2):

1. Familiarization with the natural environment—being located in a place with abundant natural resources, Hiroshima University is known as an "Eco-campus" where students familiarize themselves with environmental issues such as biodiversity and water preservation.
2. Understanding environmental issues from a physical point of view—after studying the entropy concept, daily activities and environmental problems are being discussed from a anentropy viewpoint.
3. Understanding current social problems—a reality of famine and environmental destruction is shared by JICA staff with students to get to know the reality of the current social problems.

The second example is the Taoyaka program offered by the Graduate School for International Development and Cooperation (IDEC), which trains both researchers and professional specialists who can be engaged in various issues in developing countries. The Taoyaka program is offered as an independent on-site education program. Students visit and stay in disadvantaged regions such as mountainous regions and islands around Hiroshima, and also foreign countries such as India, Nepal and Bangladesh (Kumar *et al.*, 2017). They proactively learn local issues, unwind the issues' structure and challenge themselves for the resolution. The key point of the activity is to utilize the local environment and resources (Taoyaka Program Office, 2014). (See Fig.3).

Fig.3 Taoyaka program



Source: Hiroshima University (2017b).

The last example is Global 1st Penguin Club Conference (GIPEC) between Universidad Nacional Autónoma de México (UNAM) and Hiroshima University. This program started on November 14, 2017, and it continues on a semi-annual basis according to a partnership agreement concluded between UNAM and Hiroshima University. The program's objective is to promote entrepreneurship and foster international exposure, by sharing new ideas and perspectives for the enrichment of business plans. In the kick-off session, a local recycling company in Hiroshima joined and presented their business related to environmental protection. The participants were encouraged to propose new ideas for the use of recycled glass and continued the discussion offline. The program has now been extended to include three more universities in Latin American countries (Colombia, Peru and Bolivia) –Universidad Nacional de Colombia (UNAL), Universidad Nacional Mayor de San Marcos (UNMSM) and

Universidad Tecnológica Privada de Santa Cruz de la Sierra (UTEPSA)–. We continue to incorporate global issues such as energy, food and health into the discussion with active entrepreneurial pitch events (Global 1st Penguin Club—G1PEC, 2018) (See Fig.4).

Fig.4 Global entrepreneurial education network—G1PEC



Source: Global 1st Penguin Club (2018).

ENVIRONMENTAL RESEARCH ACTIVITIES

Two investigations led by Hiroshima University related researchers with a focus on the Latin American region are presented in this session. The first one is “Water quality management in the Dominican Republic” led by the Environmental research team of Hiroshima University.

There have been pollution issues at one of the major rivers, called Ozma River, in the country. It was evident that a considerable amount of garbage and waste had been dumped into the river, causing water pollution and no recovery of the nature was taking place (Sakuno *et al.*, 2014) (See Fig.5). To know where the pollution is severe, it is important to identify the cause of the problem; however, it was difficult to monitor water quality by minute measuring process in the region. Therefore, an advanced technology called “Satellite remote sensing technique” has been developed to detect the water pollution level of rivers and the sea in the Dominican Republic. With the developed technique, it became possible

to predict the density of Chlorophyll-a (Chl-a) and suspended sediments (SS), which are markers of the pollution distribution with the use of AVNIR-2 data, that is publicly available (Japan Aerospace Exploration Agency-JAXA, 1997) AVNIR-2 is a satellite launched by Japan Aerospace Exploration Agency-JAXA). Based on the data obtained from the prediction, it was identified where pollution level is high and the implication of the amount of rain and surface temperature of the sea (Sakuno *et al.*, 2014) (See Fig.6).

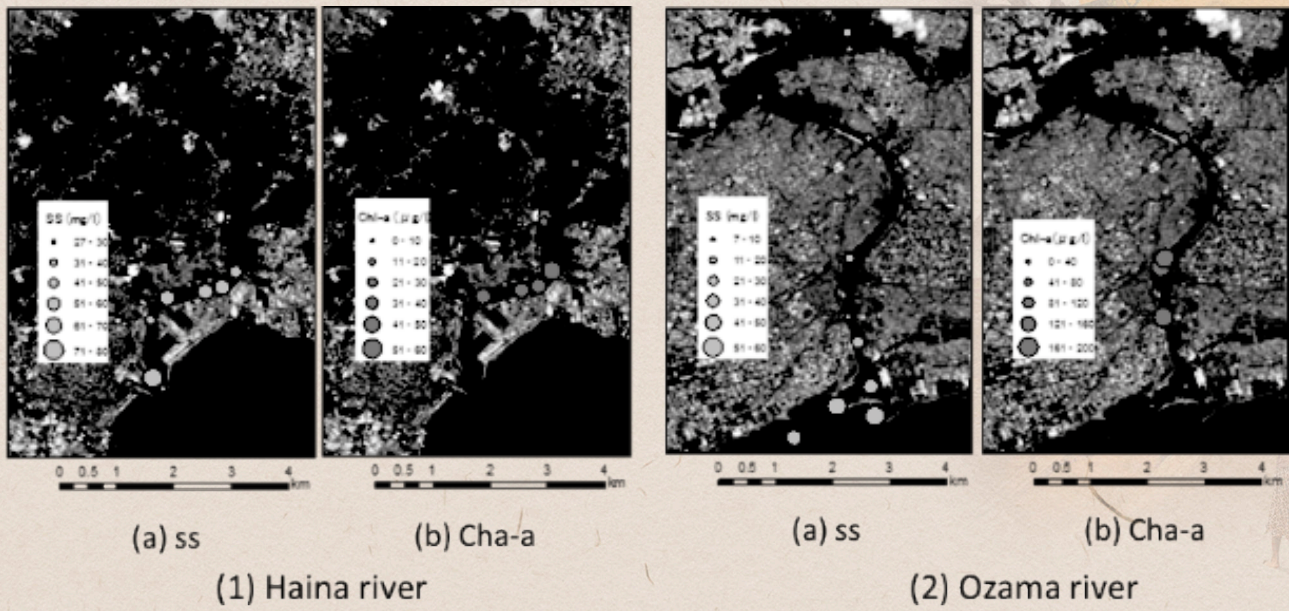
Another technique, which was found to be effective by this research group, is to detect the state of lead contamination in the sea with an application of coral skeleton (See Fig.7). With this technique, it was possible to monitor a history of lead contamination in the sea.

Figure 5. Pollution at Ozma River



Source: Provided through the courtesy of Dr. Wataru Nishijima, Professor of Environmental Research & Management Center and Dr. Satoshi Nakai, Professor of Graduate School of Advanced Science and Engineering, Hiroshima University.

Figure 6. The forecast of the density of Chl-a and SS in Haina river and Ozama river



Source: Provided through the courtesy of Dr. Wataru Nishijima, Professor of Environmental Research & Management Center and Dr. Satoshi Nakai, Professor of Graduate School of Advanced Science and Engineering, Hiroshima University (Nishijima, n.d.).

Figure 7. Coral skeleton analysis to detect lead level of the sea



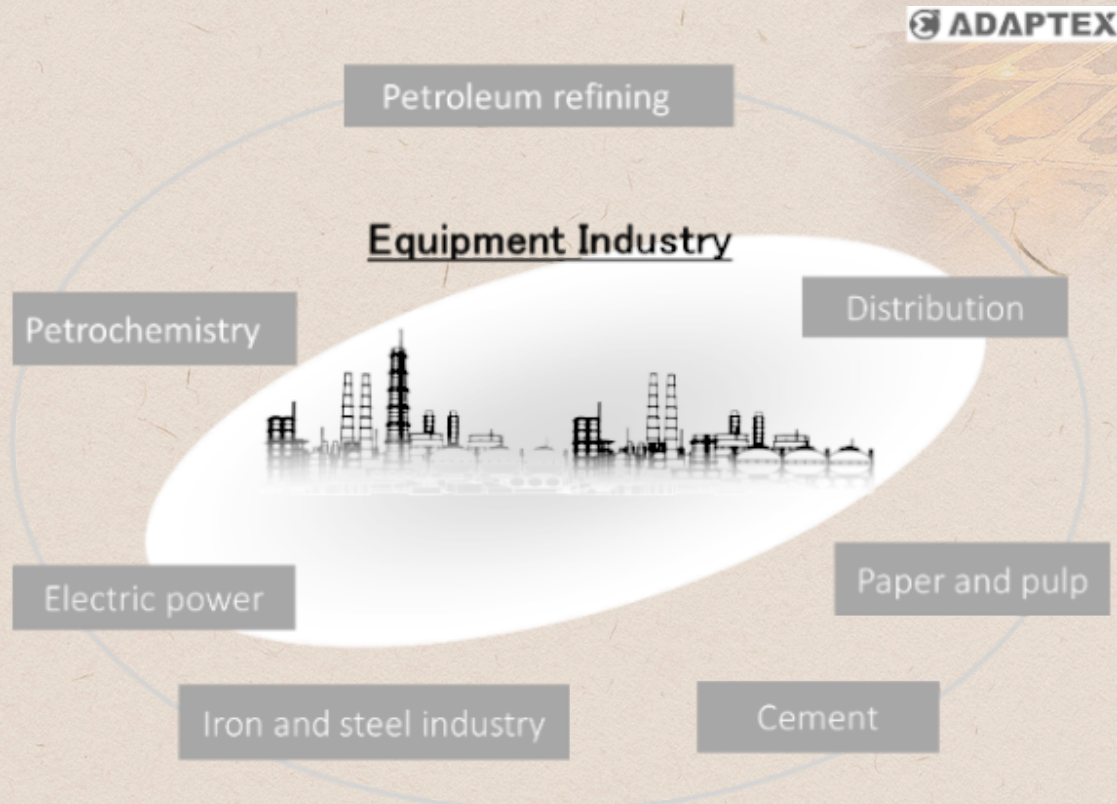
Coral skeleton

(b) coral

Source: Provided through the courtesy of Dr. Wataru Nishijima, Professor of Environmental Research & Management Center and Dr. Satoshi Nakai, Professor of Graduate School of Advanced Science and Engineering, Hiroshima University (Nishijima, n.d.).

One example shown by the environmental research team is past and present lead pollution level detection in Haina River (Kaul and Mukerjee, 1999) and near the coastal area (2011–2014). This identified the increase in lead pollution, which might be due to a battery plant situated near the Haina River and demolished by now.

Figure 8. ADAPTEX – Startup from Hiroshima



Source: Provided through the courtesy of ADAPTEX (n.d.)

The second example concerns the activity of a start-up company from Hiroshima University. The technology-oriented company called “ADAPTEX” started its operation in 2005 and has been working on advanced control, optimization and Big Data analysis technology that has been developed through Triple Helix activities with Hiroshima University (Adaptex, n.d). The main customers include equipment industries in a field such as cement, distribution, electric power, iron and steel, paper and pulp, petrochemistry and petroleum refining industry (See Fig.8). The start-up company helps the industry reduce the consumption of fuels and materials by increasing production efficiency. The company plans to work with PEMEX in Mexico from 2018 for the energy saving of production at the plant of the petroleum refining company with funding support by Japan International Cooperation Agency (JICA) (Comisión Nacional para el Uso Eficiente de la Energía, 2017).

ENVIRONMENTAL TRIPLE HELIX ACTIVITIES

Presented in this session are joint activities amongst academia, industry and government, which are called “Triple Helix” activities. In particular, the activities related to the Green Policy are introduced. Hiroshima University has started the Triple Helix seminars in 2016FY in Ho Chi Minh City, Vietnam with Vietnam National University Ho Chi Minh City, sharing the university research results for practical use to protect the environment (Center for Collaborative Research and Community Cooperation, 2019). Other presenters included managers and researchers of private companies with experience in environment protection. During the seminar, not only new research topics were shared but also the current environmental problems in the emerging country were discussed such as contamination in the sea and a chain of contamination. Incidentally, several dead fish were found along the seashore of Vietnam and participants discussed the issue and confirmed the importance of environmental protection (See Fig.9).

Figure 9. Green Policy driven seminar in Ho Chi Minh City, Vietnam



Source: Prepared by the author

Figure 10. Green Policy driver seminar in Yangon, Myanmar



Source: Prepared by the author

Topics covered in the seminar include:

1. “Novel energy-saving and low-cost waste water treatment technology”, Prof. Akiyoshi Ohashi, Graduate School of Engineering, Hiroshima University (Izarul *et al.*, 1997)
2. “Environmental water pollution issues in Ho Chi Minh City and Mekong delta-Problems and Solution”, Prof. Bui Xuan Thanh, Vietnam National University, Ho Chi Minh City
3. “Effective water management and biodiversity in wetland of MeKong delta-Case studies of Tram Chim National Park (Dong Thap Province) and Phu My Habitat/Species Management Area (Kien Giang province)”, Dr. Vu Ngoc Long, Fukken & Minami Consultant Co., Ltd
4. “Solution of environmental issues in Mekong Delta Region by companies in Hiroshima, Japan”, Dr. Akihiko Hougetsu, Coordinator of Hiroshima Environmental Business Promotion Council, President - Kobe International Technologies Corp
5. “Vietnam’s Mekong Delta: Challenges to integrated water resources management”, Prof. Pham Van Song, Thuy Loi University

Hiroshima University then covered the Green Policy related topics in Myanmar, another Asian country, in 2018 (Center for Collaborative Research and Community Cooperation, 2018) (See Fig.10). The topics covered were:

1. “Water Quality Improvement Programs of Inlay Lake, Myanmar: Stated Preference of the Floating Settlements”, Prof. Shinji Kaneko, Hiroshima University (Su Thet H *et al.*, 2017)
2. “Capacity Development in Basic Water Environment Management in Myanmar”, Dr. Tin Tin Thaw, MONREC
3. “Synergy Effects Derived from the Local Benefit and Carbon Stock in Tropics”, Prof. Toshinori Okuda, Hiroshima University (Toshinori, 2000)
4. “Environmental Assessment Practices in Myanmar”, U Soe Myint, Myanmar Engineering Society
5. “Improvement Technology for Enclosed Sea Deteriorated with Development Activities”, Dr. Yugo Mito, Fukken Co., Ltd.
6. “Practical Examples of Environmental Impact Assessment Procedures in Hiroshima, Japan”, Naoaki Okimoto, Fukken Co.,Ltd.
7. “Nitrogen Removal from Municipal Wastewater Using Aerobic and Anoxic Processes”, Daw Nway Nway Khaing, Yangon Technological University
8. “Sustainable Management of Final Waste Disposal Treatment Site”, Shingo Ishida, Fukken Co., Ltd.
9. “Integrated Environmental Values of Inya Lake and Related Parks”, Daw Thandar, Yangon Technological University

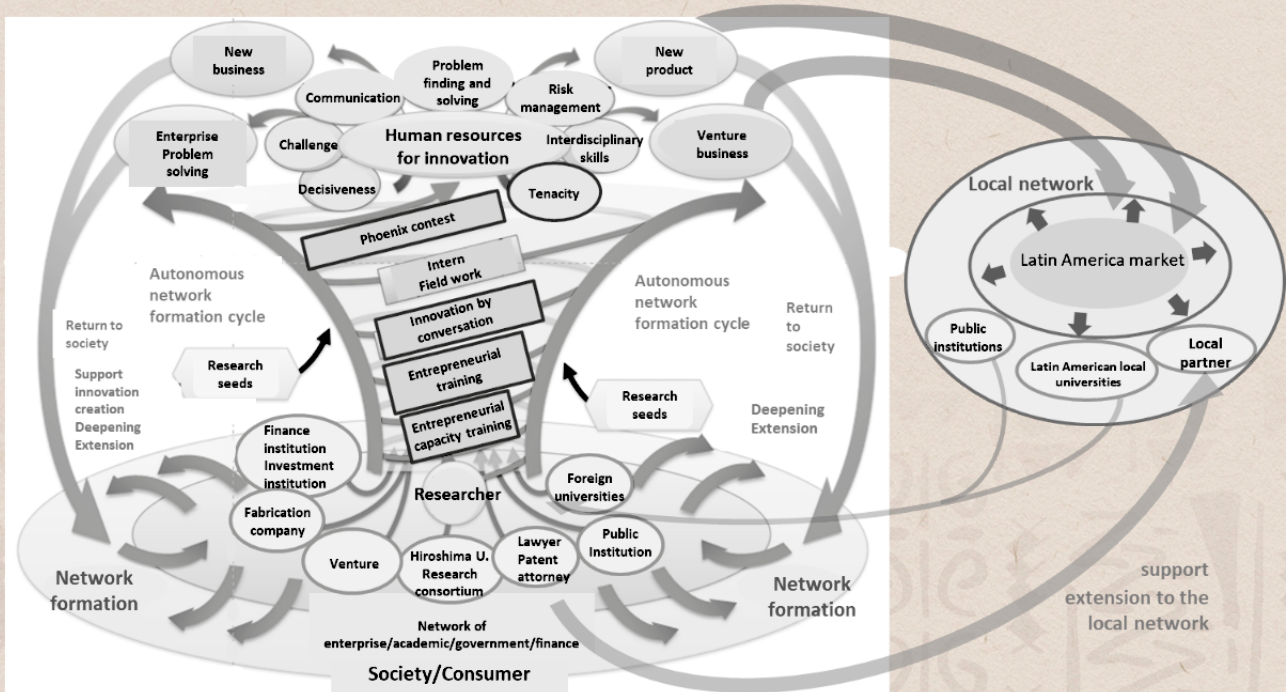
This type of seminar has also been conducted in Mexico with partner universities such as Instituto Politécnico Nacional (IPN) and Universidad de Guanajuato (Simposio celebrado en Guanajuato, Ciudad de México, 2017) and the activity is expanding through the country and university network (See Fig.11). The 2019 activities include a seminar at Chemical Department, UNAM titled “Seminario de Tecnología Alimentaria (Food Technology Seminar)”.¹⁸ Further events are being planned based on the innovation ecosystem expansion concept to include Latin American countries (President Ochi was interviewed by a Mexican TV station and talked about the international academic communication strategies of our university, 2018) (See Fig.12).

Figure 11. Flyers for seminars

(a) Source: IPN, 2017.

(b) Source: Universidad de Guanajuato, 2017.

Figure 12. Innovation eco-system expansion concept to include Latin American countries



Source: Prepared by the author based on the education policy at the Venture Business Laboratory (Hiroshima University, 2003).

In addition to the seminars, a special course on wastewater treatment techniques for company employees and government officers in Latin American countries was developed and initiated by Higashi Hiroshima City, where Hiroshima University is located (JICA, 2017). This course started with financial and management support from JICA in 1997, and since then, around 10 participants have been taking the course every year to date. Professors from Hiroshima University and company specialists support the classes, and the course is considered as a successful Triple Helix activity.

CONCLUSION

Several activities for energy saving and environmental protection have been presented according to the Green Policy of Hiroshima University. The activities in this presentation are just a fraction of the total activities. Our intention is to continue to strengthen the Green Policy-driven activities to achieve a goal of global environmental protection and environmental load reduction with education, research, and social contribution of the university.

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