PERSPECTIVE OF AGRI-ENVIRONMENTAL SERVICE INCENTIVES IN INDONESIA, DEVELOPING COUNTRIES AND OECD MEMBERS

Perspektif Insentif Pembayaran Jasa Lingkungan Pertanian di Indonesia, Beberapa Negara Berkembang, dan Anggota OECD

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ABSTRAK

Peran sektor pertanian di Indonesia memiliki multi fungsi terkait dengan lingkungan, ketahanan pangan, sosial ekonomi, dan budaya. Strategi utama dalam menjaga multi fungsi pertanian adalah: (a) meningkatkan kesadaran terhadap pertanian dan masyarakat pedesaan; (b) mendukung kebijakan harga pertanian; (c) meningkatkan apresiasi terhadap multi fungsi pertanian; (d) meningkatkan upaya konservasi tanah; dan (e) menentukan langkah penataan lahan sesuai dengan program revitalisasi pertanian. Kendati lahan pertanian memberikan jasa pelayanan lingkungan kepada masyarakat, namun petani tidak memperoleh insentif yang memadai dalam hal jaminan berusahatani, subsidi input, pengawasan kualitas pasokan pertanian, dan dukungan akses pasar. Oleh karena itu, gagasan insentif jasa lingkungan pertanian patut diimplementasikan. Akan tetapi, untuk kelancaran implementasi insentif jasa lingkungan pertanian tersebut perlu dilakukan terlebih dahulu analisis pemangku kepentingan diiringi dengan proyek percontohan. Dengan kata lain, beberapa langkah strategis seperti sosialisasi dan uji coba kegiatan perlu disiapkan. Modifikasi pembayaran jasa lingkungan dapat direkomendasikan dalam implementasi insentif jasa lingkungan pertanian di Indonesia.

Kata kunci : *jasa lingkungan, insentif, pertanian*

ABSTRACT

Indonesian agriculture has been admitted for its multifunctionality which encompasses environmental, food security, socioeconomic, and cultural roles. The main strategies to maintain the multifunctionality of agriculture are as follows: (a) improving the awareness on the agriculture and rural community; (b) providing the favorable price policy of agriculture; (c) enhancing the appreciation on the multifunctionality of agriculture; (d) improving soil conservation efforts; and (e) delineating the prime agriculture land in accordance with revitalization of agriculture, fisheries, and forestry program. Agricultural land provides environmental services to community; however, farmers deserve incentives such as secure tenure, subsidized inputs, quality control of agricultural supplies, and better market access. Hence, the notion of agri-environmental service incentives is essentially implemented. However, for better implementation, it should be initiated employing stakeholder's analysis through a pilot project activity. In other words, there is a need that a road map strategy is implemented, including its socialization and implementation. Modified mechanism model of payment for environmental services is recommended in implementing agri-environmental service incentives in Indonesia.

Key words : *environmental service, incentives, agriculture*

INTRODUCTION

Indonesian agriculture has been admitted for its important functions in food provision for hundreds of millions of people nationwide, and materials supply for food as well as non-food industries. Besides its direct functions, agriculture also has indirect non-commodity roles which are called multifunctionality of agriculture. The multifunctionality encompasses environmental, food security, socioeconomic, and cultural roles. Most of the roles may not be realized by people except those deeply involved in conservation such as researchers, scientists, and agricultural observers.

Discussion on the roles of agriculture, therefore, is important to provide people with information on it. It is hoped that such know-

ledge can be a stimulant to people to give concrete appreciation to the sector. It may be in terms of facilitation to foster the sector for sustainable development and better performance. This is to address the poor performance of the sector such as great fluctuation prices, limited market access, and poor handling processing. Apart from that, farmers as the actors in providing food are left in poverty condition for decades. In fact, they are the poorest compared with the people involved in other economic sectors in the country.

Furthermore, farmland which is the most important factor for food production encounters major problem, namely conversion of the land into non plant-based utilization. Without extensive provision of new farmland, the course may threaten the country's food production. Therefore, the study of multifunctionality of agriculture may give new knowledge to the people, for which they need to maintain the existence of agricultural land.

This paper aims to review the perspective of agri-environmental services incentive in Indonesia. Initially, it is discussed recent performance of agriculture and environment followed by environmental roles of agriculture (agri-environmental service). The discussion will be continued towards policy and institutional measures to enhance environmentally sustainable farming practices. Experiences of some Asian countries and OECD (Organization for Economic Cooperation and Development) member countries including European countries, United States, Australia, New Zealand, Japan, Korea, Mexico, and Turkey will be discussed as lessons learned for the implementation of agri-environmental service incentives. Finally, the discussion is directed to formulate policy recommendation towards the notion of agri-environmental service incentives implementation.

AGRI-ENVIRONMENTAL SERVICE INCENTIVES CONCEPT

Agriculture plays the role that can be define as the function that it has or is expected to have in society (Sakuyama, 2007). Agriculture not only produces goods (food and fibers) but also provides various kinds of services that are so-called multifunctionality as illustrated in Figure 1. Hence, multifunctionality comprises : (a) the existence of multiple commodity and non-commodity outputs that are jointly produced by agriculture; and (b) the fact that some of the non-commodity outputs exhibit the characteristics of externalities or public goods, with the result that markets for these goods do not exist or function poorly (OECD, 2000).

It is considerably important that numerous externalities, both positive and negative, are associated with agriculture. According to Casini *et al.* (2004), positive externalities are consumed by their beneficiaries without paying a price. Public intervention by setting up a regulation or a subsidy thus becomes essential to correct the failure of the market to coordinate the offer of positive externality. By contrast, for negative externalities, an overproduction is probable because the private producers is interested in maximizing their private profit whereas a lower level of production would be necessary to respect the socially acceptable level of negative externality. Here, the public intervention takes the form of a regulation or a tax. In terms of environmental and socio-economic concerns, some examples of positive and negative externalities are presented in Table 1.

Based on the aforementioned general background, environmental service incentives (ESIs) program is strategically implemented. Sakuyama (2006) mentioned that environmental services generated from agriculture are a fraction of diverse ecosystem services, which are the benefits that people obtain from ecosystems. It refers to positive environmental externalities and public goods generated through agricultural production process. Meanwhile, negative externalities remain to be used to describe environmental disservices.

Due to different circumstances, designed and implemented ESIs program in developed and developing countries are diverse (Sakuyama, 2006). *Firstly*, ESIs have emerged in developing countries from the need for forest conservation, whereas those in OECD countries are originated from the domain of agricultural policy. *Secondly*, ESIs in developing countries are largely the remuneration for maintaining environmental benefits from natural ecosystems, but in OECD countries, those are often employed also as a tool to

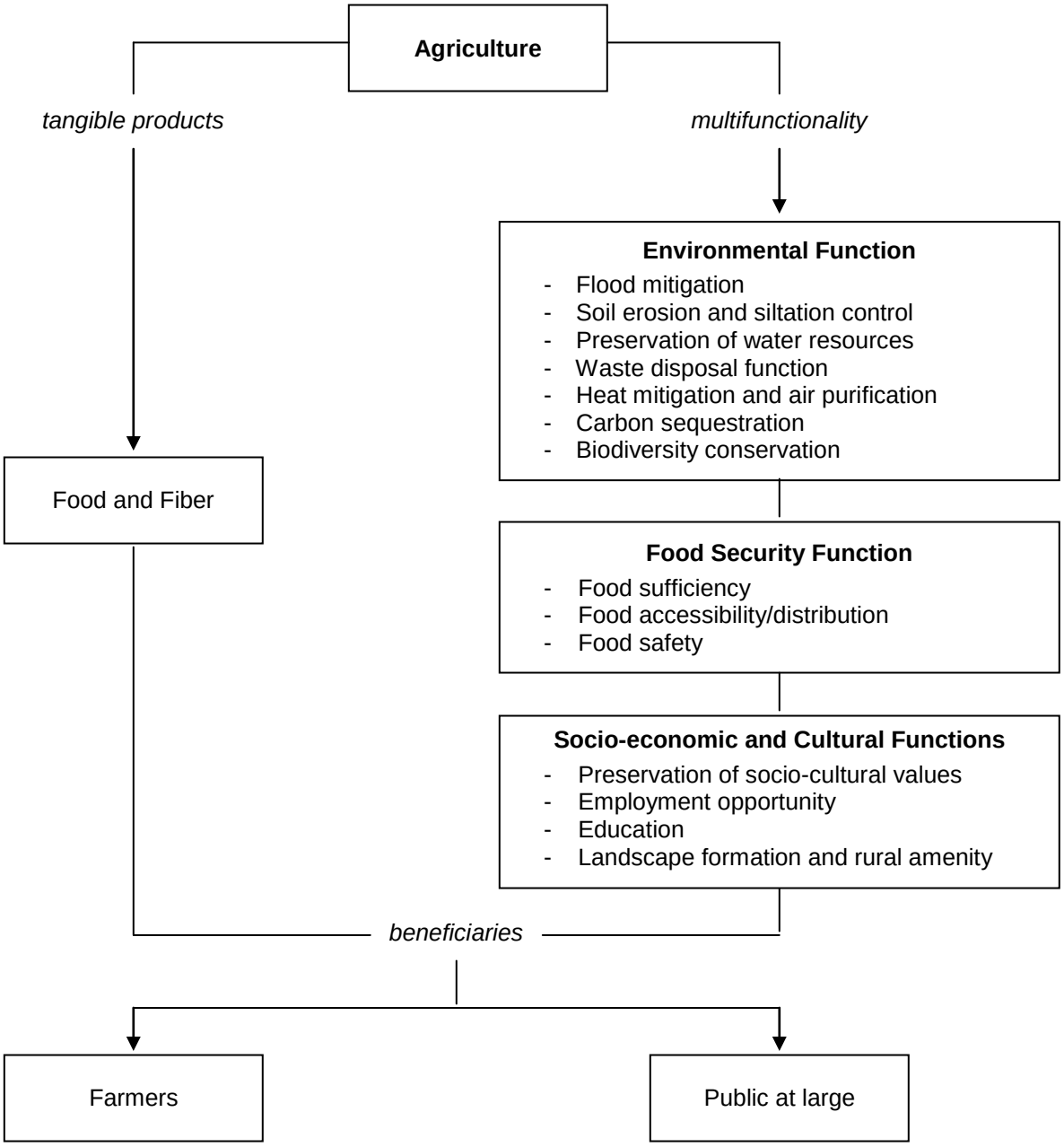

Figure 1. Agricultural Multifunctionality (adapted from ISRI, 2005)

reduce environmental damages originated from agriculture. *Thirdly*, developing countries put emphasis on compensation mechanisms between providers and beneficiaries of an environmental service through negotiations and agreements, while OECD countries pursue the approach by heavy relying on incentive payments funded by governments.

Above all, in the case of Indonesia, ESIs program should be implemented through pilot project activity employing stakeholder analysis. The program is subsequently designed to be replicated in other areas based on its specific localities.

Table 1. Examples of Positive and Negative Environmental and Socio-economic Externalities

Item	Externality	
	Positive	Negative
Environment	Open space Soil conservation Watershed protection Groundwater recharge Biodiversity Wildlife habitat	Odor Soil erosion Nutrient/pesticide run-off Biodiversity loss Decrease of Habitat quality Habitat defragmentation Emissions (green house gases)
Socio-economic	Rural income Employment Assure availability of food supply High food quality Scenic vistas of the landscape Traditional country life Cultural Heritage	Food contamination Land use conflicts

Source : adapted from Bohman *et al.*, 1999

RECENT PERFORMANCE OF AGRICULTURE AND ENVIRONMENT IN INDONESIA

As stated earlier, despite Indonesian agriculture has vital position, it did not make the sector receive more attention for better performance; otherwise pressure towards the sector is amounting. One of the problems burdening is agricultural land conversion into non-agricultural uses. Directorate General of Land and Water Management, Indonesian Ministry of Agriculture (Ditjen *PLA*, 2005) confirmed that about 187,720 hectares of wetland has been converted into non-agricultural purposes annually. Moreover, Directorate General of Land Use of Indonesian Agency for Land Management in Winoto (2005) alarmed that if local government spatial land use plan were not immediately revised; about 3.01 hectares (42.4%) of wetland of the total irrigated land (7.3 hectares) would be converted into non-agricultural purposes.

Major land use conversion occurred from forest into agricultural lands, and from various agricultural systems into housing, urban, and industrial development areas (Wahyunto *et al.*, 2001). High conversion rate of agricultural lands has undermined multi-functionality of agriculture that benefit to environment and people. The accelerating rate of conversion of agricultural lands is mainly caused by very low incentives to work in agriculture compared with industrial and service sectors (Agus and Irawan, 2006).

Sumaryanto *et al.* (2001) identified that some negative socioeconomic impacts of agricultural land conversion have happened, namely degradation of national food security and decrease of agricultural income and increase of local community poverty. According to empirical data, agricultural land conversion has missed a chance of producing paddy, ranging from 4.5 to 12.5 tons annually, depending on agricultural land quality converted. This made the income of agriculture also declined and poverty among local community escalated. Agricultural land conversion has made the farmers lost their opportunity to secure income of Rp 2.3 millions, while agricultural laborer 900 thousands every season.

Basically, there are several causes potentially degrading agri-environmental services, which aggravate land conversion (Agus and Irawan, 2006, Adimihardja, 2006, Bappenas and PSE-KP, 2006). They are :

a. Negligence of community towards the agri-environmental function since they mostly appreciate only the direct function of the land to produce agricultural products such as rice, secondary crops, and horticultural crops.
b. Rural community under poor economic condition requires immediate income generation while their understanding of the

roles of agriculture is merely in short-term basis, therefore, it creates the notion of land conversion as a natural process and they perceived that is not loss of multi-functionality.

c. Demand of non-agricultural sectors for ready-to-use lands, of which biophysics and accessibility requirement of the land can be fulfilled by existing irrigated agricultural land.

d. Decentralization (autonomy) that is regarded as an opportunity by the local government to boost local economy by prioritizing the most profitable economic development, in some cases, sacrifices agriculture lands.

e. Ineffective regulation measures to control the conversion of land due to inconsistency in planning, constraints in implementation, and lack of coordination,

According to Adimihardja (2006), the quantity and quality of the multifunctionality of agriculture can be deteriorated by the process of land degradation such as flood, landslide, and soil erosion. The driving factors of multifunctionality of agriculture degradation cannot be handled solely by the land users, but it needs a political will with appropriate strategies which is in line with regulation. Moreover, Manikmas *et al.* (2003) added that the failure to look at agriculture as a multifunctionality role system and concentration only on its marketable surplus has lead policy makers to trust that agriculture could be substituted by other sectors which are known as positive and negative externalities. Thus, it is important to formulate the policy framework that can maximize the positive externalities as well as minimizing the negative ones for agricultural sustainability and environmental quality.

Adimihardja (2006) identified that the main strategies to maintain the multi-functionality of agriculture are as follows : (a) improving the awareness on the agriculture and rural community; (b) providing a favorable price policy of agriculture; (c) enhancing the appreciation on the multifunctionality of agriculture; (d) improving soil conservation efforts; and (e) promoting the program of revitalization of agriculture, fisheries, and forestry. The latter was launched by the President of Indonesia on June 2005 through among others delineating the prime agriculture land.

ENVIRONMENTAL ROLES OF AGRICULTURE (AGRI-ENVIRONMENTAL SERVICES) IN INDONESIA

Through a series of research, some environmental functions of agriculture have been identified by some researchers. In paddy field, environmental functions consist of at least six aspects, namely soil erosion prevention, soil water conservation, organic waste disposal, rural amenity preservation, and heat mitigation (Agus and Irawan, 2006). The functions and its description of each functions cited from ISRI (2005) is shown in Table 2.

As has been stated earlier, the indirect functions of agriculture are not well recognized by farmers. A study carried out by Irawan *et al.* (2004) indicated that either farmers in the watersheds of Citarum in West Java or Kaligarang in Central Java perceived that the

Table 2. Agri-environmental Function of Wetland (Paddy Field)

Item	Description
Flood mitigation	Having retention capacity which is comparable to that of tree-based agricultural systems, although lower than that of forest
Water resources conservation	Moving water downward gradually as percolation water
Soil erosion prevention	Depositing the soil and nutrient transported from upstream areas
Organic waste disposal	Increasing soil organic matter and plant nutrient, and reducing waste accumulation problems
Rural amenity preservation	Attracting for recreation and relaxation
Heat mitigation	Mitigating heat as well as cool down the air through photosynthesis and evapotranspiration processes

Source : ISRI, 2005

functions of agriculture (direct and indirect meaning) were merely producing agricultural products, supplying soil water, mitigating flood, and providing employment. From farmers' perspective, the functions of agriculture may be only something giving real benefit to them. Environmental services as the public goods are deemed as not real benefit for farmers, although it may have high value.

The research on the multifunctionality of agriculture had also succeeded in making valuation over the environmental functions, which are beneficial to provide more information to support the effort of maintaining agriculture and preventing land conversion. Using the replacement cost method (RCM), the value of multifunctionality of 156,000 hectares paddy field in the Citarum Watershed was calculated and the result is shown in Table 3. The valuation showed that besides producing paddy, the paddy fields in the area also produces environmental services some US$ 92.7 millions annually, or equal to 51 percent of rice value produced in the area (ISRI, 2005, Agus and Irawan, 2006).

Table 3. Environmental Value of 156,000 hectares Paddy Field in the Citarum Watershed, Indonesia, 2005

Multifunctionality	Value (US$/year)	Percentage [1)]
Flood mitigation	18,104,983	9.98
Conservation of water resources	51,232,550	28.25
Soil erosion prevention	27,243	0.02
Organic waste disposal	812,537	0.45
Rural amenity preservation	18,232,647	10.05
Heat mitigation	4,262,933	2.35
Total	92,672,893	51.10

Remark : [1)] marketable rice grain product is US$ 181,342,667/year
Source : ISRI, 2005

Table 3 reveals that there are only three environmental roles having large value, namely conservation of water resources, rural amenity preservation, and flood mitigation. Such condition suggests that priority of socialization should be emphasized only to the significant value roles. Yet, the value of roles may be different by time and place.

POLICY AND INSTITUTIONAL MEASURES TO ENHANCE ENVIRONMENTALLY SUSTAINABLE FARMING PRACTICES IN INDONESIA

Preventing agricultural land conversion is deemed difficult as it keep happening up to now. Actually, some regulations to avoid the trend have been made such as Presidential Decree No.53/1989 on Industrial Areas, Presidential Decree No.33/1990 on Land Use for Industrial Area Development, Circular Letter of Agrarian State Minister/Head of National Land Use Agency No.410-2261/1994 on Prevention of Technical Irrigation Field Use for Non-Agriculture Utilization. Unfortunately, such regulations do not work because of poor control of the implementation. It can be witnessed that the investors converting agricultural land were found themselves easy, and no punishment was applied.

Another effort to prevent agricultural land conversion is through encouraging agricultural landholders to keep their lands from conversion. ESIs (Environmental Service Incentives) are one of the concepts that are trying to avoid agricultural land from conversion into non-agricultural uses. ESIs are simply defined as a mechanism in which the costs of providing services are directly or indirectly remunerated by the third party through financial transfer. The third party includes taxpayers, beneficiaries, and consumers (Sakuyama, 2006). Thus, it is necessary to formulate

special policy and integrated approach among stakeholders.

The steps of implementing special policy and integrated management are discussed in the following. As the initial step, it is needed to enforce the regulation of land conversion management. For that reason, the integrated policy approach includes regulation, acquisition and management, and incentive and charge should be formulated (Pearce and Turner, 1990). Moreover, it is carried out through implementing law and economic instruments, zoning area, and initiative of community. Law instrument covers regulation, while economic instrument includes incentive, disincentive, and compensation for landowners who keep and convert, and being converted of their lands. Zoning consists of restricted, limited, and authorized conversions. Meanwhile, initiative of community related to participatory collective action. The summary of those approaches can be seen in Table 4.

The ESIs can be implemented through organizing two component groups, namely : (a) stakeholder participation (government organizations/GOs, community, non-government organizations/NGOs, and private sectors) based on interest, influence, and needs; and (b) stakeholders' forum as an intermediary institution (Figure 2). It is anchored on incentive for farmers in which it can be directly formed in cash or indirectly in terms of developed infrastructure and input/output price subsidy for assuring the environmentally

Table 4. Integrated Policy Approach in Controlling Wetland Conversion

Approach	Description
Regulation	Implementing zoning land conversion and transparency mechanism for land use permit through stakeholders' participation.
Acquisition and management	Improving land transaction regulation systems and land tenure patterns
Incentive and charge	Providing subsidy for farmers who are able to improve the quality of their land, implementing progressive taxes, and developing supported infrastructures to agricultural practices.

Source : Pearce and Turner, 1990

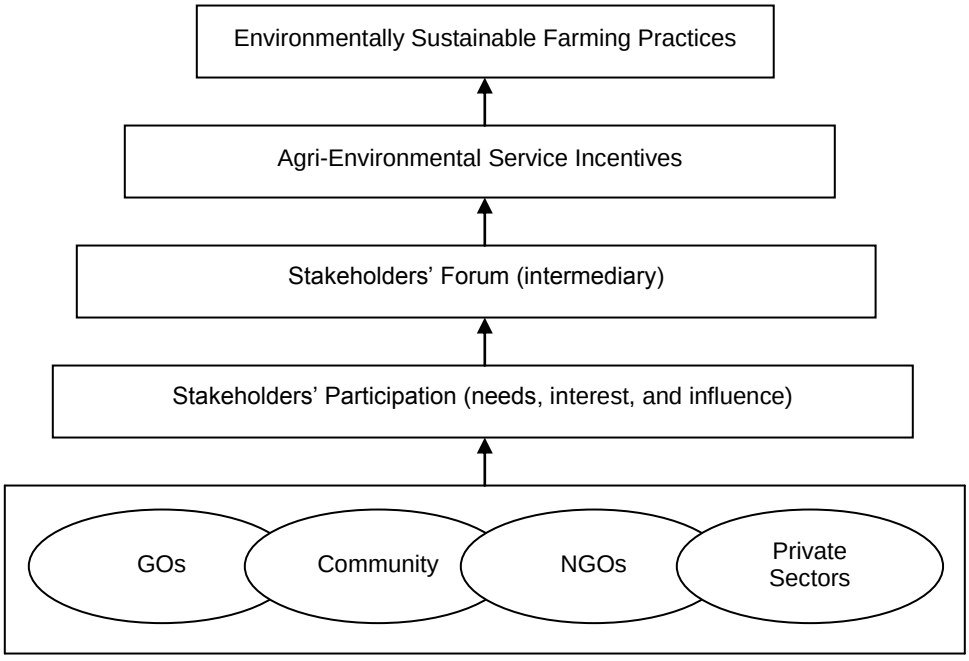

Figure 2. Environmental Service Incentives Mechanism towards Environmentally Sustainable Farming Practices

sustainable farming practices. As Sakuyama (2006) stated, the payment can be derived from taxpayers, beneficiaries, and consumers.

The mechanism of ESIs can be implemented through modifying the model of Payment for Environmental Services (PES). This model has been tested in the Cidanau Watershed of Banten Province.

The principle of the PES concept is that the community in downstream pays the farmers community in upstream area for conservation effort they have done (van de Sand, 2004). The kind of conservation effort is trees growing on their own lands, while the payment amount would be determined by two sides, the upstream community farmers (the sellers) and downstream community (the buyers). This concept should be then socialized to many institutions including Local Parliament, Gubernatorial Office, and some companies especially those using much water, for getting support from most parties.

The relationship between sellers and buyers was facilitated by established stakeholders' institution, namely Communication Forum of the Cidanau Watershed (CFCW). This institution has tasks in managing fund from PES, arranging PES mechanism, and establishing an independently, transparently, credibly, and accountably environmental services organizer institutions.

To some extent, the program showed successful results, which can be identified from some activities and achievement carried out by farmers such as more trees planted, more conservation technology applied, and more income taken. Conclusively, PES program could encourage farmers in upstream area to carry out conservation efforts as well as environmentally friendly farming activities. The farming system technology could be adopted by the farmers as it is not only giving the farmers better farming and income, but also strengthening the roles of their agriculture.

ENVIRONMENTAL SERVICE INCENTIVES IN DEVELOPING COUNTRIES AND OECD MEMBERS

Besides Indonesia, some developing countries have been trying to make further study on the agri-environmental service, in order to capture more advantages. There is a need to uncover what the countries have been carried out and how they look at the problems encountered. In order to make deeper assessment, from which this country can learn, it is necessary to make comparison with those carried out by OECD members. In the following is the performance of selected Asian countries (India, Pakistan, Philippines, Taiwan, and Thailand) and OECD countries related to agri-environmental services.

Developing Countries

India

Narayanrao and Kumbhare (2007) argued that environmental issues related to agriculture and the entire growth process should be viewed in the context of growth desires especially of the farm sector. In the frame of developing agriculture, policies concerning the effort might give an externality. Currently, for example, besides making some progress on agricultural product, some policy distortions on fertilizer and power subsidies are also causing environmental degradation through excessive use of these inputs. This shows that agriculture has not been seen from the perspective of agri-environmental services. Otherwise, there is a favorable environment needed before the sector is put as an environmental-friendly.

In order to make conducive environment, some policy programs are carried out; for example, the Western Ghat Development Program, National Watershed Development Program in Rainfed Areas, Command Area Development Program, and National Horticulture Mission are being implemented in the state for stopping environmental degradation and lead to sustainable and eco-friendly agri-environment. The programs include state sector schemes like supply of quality seeds and planting material, agriculture mechanization, plant protection, organic farming, floriculture, development of irrigation structure and support prices to major crops and others converge with the above programs to provide economic sustenance and socioeconomic development of the state.

The impact evaluation studies of the above programs have been shown to have a

favorable impact in the maintenance of agro-ecosystem and the environment. It can be avoided that the above-mentioned effort is spoiled by the pressure of urbanization, tourism, and mining industry. This fact is a challenge to the effort of implementing agri-environmental service incentives.

Pakistan

Pakistan is facing some key issues with respect to agri-environmental services. At least there are three points pertaining the issues, namely : (1) Quality of drinking water in urban and rural area which is substandard which costs between US$ 460 million to US$1.25 billion per year and air pollution corresponding to between US$ 250 to US$ 369 million per year; (2) Degradation of wet land ecology; and (3) Marine environment, including fish, mangroves and others, which is continuously being degraded due to release of waste which accounts for 58,000 m^3 per day (Ashiq and Abdullah, 2007).

As the forest-poor country (0.01 hectare /capita), Pakistan is facing an annual loss of 2.9 percent of natural forest. Destroying rangelands to an alarming extent, indiscrimate use of agro-chemicals, and inappropriate irrigation techniques are causing a loss of agricultural productivity and degrading ground water. Natural resources are being used to the limit of exploitation. Relevant monitoring and regulatory agencies or departments are under capacity and deficient in trained human resources. Apart from them, Pakistan is also facing the problem of water logging and salinity.

In order to address all above issues, the government has adopted a comprehensive medium term action plan to deal with the constraints on the agriculture sector, which includes strengthening extension services, development of high yielding and pest resistant varieties, balanced use of fertilizer and micro-nutrients, integrated pest management, plant protection, crop maximization as well as efficient water management. In terms of strengthening capacity building, several actions meet the challenges of conforming to WTO-SPS (World Trade Organization-Sanitary and Phytosanitary) measures.

In addition Pakistan has accomplished the following mitigating efforts with respect to agri-environmental services, the Convention on Biological Diversity (1992), the UN Convention on combating diversification (1997), implementation of maintaining biodiversity and rural community development by joint action of IUCNC Pakistan, Wildlife Enquiry Committee (WEC) in 1969, World Wild Life Fund Pakistan, WWF International (1970), Ramser Convention for Wet Land (1976), Convention of International Trade in Endangered Species of flora and fauna (1976), Mangla Watershed (1961).

Philippines

The concept of multifunctionality of agriculture was introduced in the Philippines in April 2001 through the project “Multi-functionality of Paddy Farming and its effects on ASEAN countries”. The project laid the foundation for the recognition of the multi-functionality concept so that existing and future policies aligned to it can be reviewed and formulated, respectively (Ampil *et al*., 2007).

The six-year study in four agro-ecosystems representing the diversity of agriculture in the country, particularly in the highland ecosystem of the Ifugao Rice Terraces, upland agro-ecosystems devoted to paddy rice adopting rain water harvesting, small island agro-ecosystem, and high-end agriculture, revealed that the valuation of the multifunctionality of agriculture varies depending on its multiple roles relative to the environment, economy and society and culture. The non-tradable benefits or multi-functionality is substantial compared to the conventionally traded agricultural goods.

While the different approaches and methods to value the multifunctionality of agriculture showed considerable differences, they provide the bases for recognition and appreciation of the contribution to long-term policy making for further development of sustainable agriculture and rural areas. Prescribing the methods of analytical tools for the valuation of various environmental services and the multifunctionality of agriculture in general, is thus necessary. However, the full appreciation of the concept is still to be seen at the grassroots level in which the institutional efforts in the Philippines should be directed. There are also some gaps that need to be addressed, particularly in terms of national

land and water use. Efforts on enhancing the environmental and natural resources accounting system also need to be encouraged.

A key issue and challenge faced by the Philippines is the development and operationalization of a harmonized and comprehensive approach to balancing objectives relating to food vs. environment, and development vs. protection of the environment. The valuation of agri-environmental services is another key issue. The conventional valuation of tangible agricultural goods and services provides only a limited measure of the contribution of agriculture to development. Program and project monitoring, evaluation and investment should integrate the valuation of the true worth of agricultural programs and projects to guide decision-making. Neglecting the agri-environmental concerns leads to misuse, abuse and non-use of agricultural resources favoring land use reclassification and land conversion, shifting the agricultural uses into urban and related uses.

Multifunctionality of agriculture, aside from being a useful tool to express the value of supporting sustainable agriculture practices and their attendant multifunctionalities, is emerging as a new potential tool in creating Sustainable Agriculture and Sustainable Land Management (SLM) the common platform that will integrate the Multi-Environmental Agreements, such as the UN convention on desertification and land degradation (UNCCD), climate change (UNFCC), and biodiversity conventions (UNCBD). The implementation of sustainable agricultural land use and practices will result in land use stability. A highly stabilized land use and ecosystems will ensure that natural resource is in harmony with the conservation and restoration of habitat of biodiversity. On other hand, the management and use of farm biomass as compost fertilizers will enhance carbon sequestration and reduce carbon dioxide and methane emission, important forms of greenhouse gases that caused global climate change (Conception, 2007).

Taiwan (Republic of China)

In Taiwan, agriculture still have important role in the structure of economy. However, it not only produces the frame of supporting environmentally friendly agriculture, Taiwan has carried out measurement of agri-environmental services, as such sector also produces externality, which costs development at large. There are three methods employed in the measurement, namely the replacement cost method (RCM), contingent valuation method (CVM) and the travel cost method (TCM) are adopted to quantify the agri-environmental services and values were compared to production values.

The results showed that the agri-environmental services had a value ranged of US$ 3,469 million to US$ 5,211 million, depending on the inclusion of multifunctional attributes. The ratio of the value of external services to the value of rice production was estimated about 32.7 percent to 49.3 percent. Specifically, it was US$ 389 million for flood prevention, US$ 501 million for maintaining water resources, US$ 432 million for reducing soil erosion, US$ 1,742 million for reducing land subsidence, US$ 3.1 million for water quality purification, US$ 961 million for cooling air, US$ 196 million for refreshing air, and US$ 987 million for providing recreation. Agricultural policies that take into account the agri-environmental services to ensure sustainable development of agriculture were also discussed (Hung and Hwa, 2007).

Due to economic growth and an increase in national income, people in Taiwan have a higher demand for recreation and higher expectations for a beautiful living environment. Several policies and social means have been implemented for this purpose, including the promotion of eco-tourism, subsidies for community forestry, and policies of lowland reforestation and greening the countryside.

Thailand

Thai Government has put in place many agricultural policies to develop the potential and increase the quality of productions and the standard of living of farmers. The essential principles are to increase its international competitiveness by increasing efficiency and reducing production costs, opening new international markets of agriculture, developing the farm processing industry, and raising the prices of farm commodities (Kusonwiriyawong and Klubnuam, 2007).

The royal philosophy of the "Sufficiency Economy" was used as a guideline for determining policy, planning and formulating the implementation plan in Thailand covering the period 2002 to 2011. The Sufficiency Economy Concept can be applied to all communities, either individual or family or even company. The focus on agricultural systems, three concepts consisting of : (a) grow what we eat and eat what we grow; (b) community enterprises; and (c) networking for diversity and security.

The Royal New Theory was introduced to properly use land and water resources. Technically, the new theory divides a plot of land into several parts for different agricultural activities. It is suggested to divide farming land into four groups including the depth pond, rice crop, other crop plantings and finally the residual area, in the ratio of 30 : 30 : 30 : 10, respectively.

Organic agriculture is also a major policy for national agricultural policy. Thai governments have recently become interested in organic farming and wanted to expand the market. Organic products can be accredited by the Government, private organizations and foreign certification bodies. Almost all certified organic products are exported. Jasmine rice is the main organic export, followed by vegetables, fruits, corn, and herbs and spices.

Themes identified for the agricultural system will lead people in communities to reinforce foundations for social and community development, incorporating good management systems at all levels. Thai national cultural identity and realization of the economic potential will result in Thailand becoming a regional economic center, particularly in primary agriculture.

OECD Members

There is increasing concern in OECD countries about the effects of agriculture on the environment and trying to better understand the environmental impacts of different agricultural policy measures. More recently, there is heightened concern over the effect of external environmental events – in particular climate change – on agriculture (Legg, 2007). Markets for many of the harmful or beneficial environmental goods and services from agriculture either poorly function or are non-existent. In many cases society's demand for the environmental performance of agriculture is not always clear – and not easy to quantify in a comparable way within or across countries.

Agriculture is a sector in which policy plays a significant role in most OECD countries. Agricultural policies provide monetary transfers that impact on the environment because they influence output and input use decisions by farmers, where production takes place and under which conditions. Environmental policies and regulations requiring farmers to adopt certain practices, or deliver particular environmental outcomes, in turn affect production.

The OECD has been working for nearly 15 years on describing and quantifying the environmental performance of agriculture, classifying agri-environmental policy measures in place in OECD countries, and more recently in analyzing the quantitative relationships between policies and the environment. The purpose is to help inform policy makers on the design and implementation of effective policy measures (those that achieve desired objectives), which are also efficient (giving best value for money with least distortion to production and trade).

Agriculture, although only accounting for two percent of GDP and six percent of employment on average in the OECD area, uses around 40 percent of available land and water, with significant effects on soil and water quality, ecosystems and landscapes. Overall, since the mid-1980s there has been some reduction in the pressure on the environment in agriculture across OECD countries, according to work on agri-environmental indicators in the OECD. But progress has been mixed across countries and a number of severe local and regional problems remain, while future global pressures, including climate change, on land and water resources will be significant.

OECD agricultural policies in 2005, as measured by the Producer Support Estimate (PSE) generated an annual average of US$ 280 billion of farm support (two-thirds of which was paid by consumers for domestic commodity prices kept higher than on world markets, the remainder from budgetary payments),

accounting for 29 percent of farm receipts. About 72 percent of support was provided by measures closely linked to production. These latter measures raise land values and provide incentives to adopt environmentally harmful practices such as more intensive use of chemicals and expansion of production to environmentally sensitive land, aggravating environmental pressure.

But some may contribute to maintaining farming systems associated with providing ecosystem services such as biodiversity or flood control, although because such support is not targeted at these services they are not at all cost-effective and their effects must be weighed against environmental damage caused. Production quotas, land set-aside and cross-compliance – whereby farmers adopt certain environmental practices to reduce environmental harm in order to receive production payments – limit the environmental impacts of production-linked support, but can lock-in existing harmful environmental impacts and would generally not be required with lower production-linked support.

All OECD countries have regulations in place that limit some of the harmful environmental effects of agriculture. Some countries impose taxes on farm chemicals to limit their use. Many countries provide payments to farmers to reduce pollution (such as the installation of facilities to deal with animal waste), encourage ecosystem service provision (through field, meadow and wetland management), or support production practices deemed favorable to the environment (such as organic systems or biomass production). Although increasing, on average only about five percent of the PSE is spent directly on agri environmental payments (or about 15% of budgetary support). However, general services to agriculture, such as research and development programs, advisory and training services increasingly focus on improving agriculture's environmental performance. Policies that generate benefits associated with the provision of environmental services must be weighed against other policies that contribute to increase environmental damage.

There is scope for the application of more clearly defined property rights to indicate where farmers should be held liable at their own cost for environmental damage, and where they could be remunerated for providing environmental services that go beyond usual "good farming practices" and for which markets are absent or poorly developed. There is also scope for a more comprehensive application of the polluter-pays-principle in agriculture, and to create markets and quasi-markets to reward farmers for the provision of environmental services.

Evidence suggests that trade liberalization has resulted in some shift in production from higher to lower-cost and lower input using farm systems. Production intensity in countries with historically high levels of fertilizer and pesticide application has fallen, lowering environmental stress in these areas. At the same time, in other countries, raising the historically low levels of agro-chemicals has increased environmental pressure in these areas. There is little evidence that the abandonment of farming, which can generate both positive and negative environmental impacts, has been due to trade liberalization, or that environmental regulations significantly affect trade competitiveness. But environmental gains from trade liberalization will be greater when accompanied by measures directly targeted to those environmental effects that are not accounted for by markets. In the case of additional negative effects, they need to be corrected at source, for example by taxing or regulating production practices rather than using trade barriers.

A key policy message is that despite some environmental improvements, where agri-environmental measures co-exist with production-linked support policies any improvements are more costly than would be the case in the absence of such support. Agri-environmental policies are intended to promote improved environmental performance through addressing externalities that hinder favorable agri-environmental outcomes. There is a role for regulatory frameworks, information dissemination, taxes and payments, and market-based approaches such as auction systems. Greater efforts are needed to monitor and enforce actions to take account of agriculture's environmental costs and benefits in production decisions.

Given the site and context specificity of agri-environmental conditions across OECD

countries there is no general “one-size-fits-all” formula for dealing with environmental concerns and achieving an optimal policy mix. However, the lack of coherence between agricultural production linked support, agri-environmental measures and environmental regulations in many countries gives conflicting signals to farmers. Understanding the characteristics of effective policy design to identify policies that can achieve better environmental outcomes at lower cost requires more analysis of the linkages between policies, production decisions, and environmental outcomes. This is underway through the use of modeling techniques in the OECD. Sharing experiences across OECD countries of what has or has not worked – and at what cost – is an essential element of the work which helps to understand the most cost-effective approaches.

LESSONS LEARNED

The aforementioned discussion of agri-environmental in developing countries and OECD members can be compared through five factors. The factors consist of awareness, policies and guidelines, ESI being applied and implemented, capacity building and institutional development, and physical and social infrastructure support (Table 5).

The comparison shows that developing countries with lower quality of human resources are late comers with lower awareness of the people. While developing countries are still not aware of making assessment on the agri-environmental services, OECD has gone far by making some discussion on the issues, although they found themselves still confused. Such poor condition is aggravated by government commitment on it. Absence of supporting government policy shows that the government is still not in the capacity of making solution to the issues.

Likewise, the effort of implementing the concept of environmentally friendly agriculture is still limited to the mitigation of negative environmental effects, not to the promotion of the positive multi-functionality. Meanwhile, some of ESI being applied and

Table 5. Systematic Comparisons between OECD and Developing Countries towards Agri-Environmental Services

Indicator	OECD	Developing Countries
Awareness	Greater awareness in OECD countries in general yet there is still a confusion in terms of conceptual understanding; focused more on quality	Lower awareness in developing countries; emerging concerns; focused more on quality
Policy and guidelines	General understanding (1998 OECD Ministerial Meeting) that policies should not be protectionist in nature, nor impede market and trade liberalization	Not explicit in existing agricultural policies of member countries
ESI being applied and implemented	More on the promotion of the positive multifunctionality	More on the mitigation of negative environmental effects
	Customary rules, land care groups, taxes and charges, regulation, direct payment, conservation trusts, market price premium, labelling standards and certification, community supported agriculture, research development and extension, cross compliance	Customary rules, eco-tourism, conservation trusts, entrance fees, market price premiums, labelling standards and certification, community supported agriculture
Capacity building and institutional development	Sufficient	Insufficient knowledge dissemination
	Knowledge dissemination already include environmental concerns	More focused on production technology
Physical and social infrastructure support	Sufficient and advanced (but not necessarily environmentally friendly)	Insufficient

Source : APO, 2007

implemented are more or less the same, especially on the commodity-related treatment and community encouragement commitment. Finally, the problem of capturing advantages from agri-environmental services also comes from the absence of physical and social infrastructure.

CONCLUSION AND POLICY IMPLICATIONS

Environmental roles are among the multifunctionality of agriculture which has considerable value. However, they are not well recognized by farmers since their concern only on direct roles or giving them real benefits. Due to insufficient knowledge and appreciation of Indonesian community towards this multifunctionality, the multifunctionality of agriculture is being degraded and affects agricultural land conversion significantly. There are some possible strategies to maintain the multifunctionality of agriculture including land conversion, namely : (a) improving the awareness on the agriculture and rural community; (b) providing the favorable price policy of agriculture; (c) enhancing the appreciation on the multifunctionality of agriculture; (d) improving soil conservation efforts; and (e) delineating the prime agriculture land in accordance with revitalization of agriculture, fisheries, and forestry program. Specifically in terms of environmental function, the notion of ESIs is strategically implemented.

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Experience of other developing countries and OECD on agri-environmental services can be a lesson learned for Indonesia. Some of which are that there is a need that people's awareness should get more attention, government giving support; the promotion of the positive multifunctionality is also carried out, physical and social infrastructure are developed.

ESIs are essentially implemented and should be initiated employing stakeholder analysis through a pilot project activity. In other words, it is needed that a roads map strategy to be implemented, including socialization and implementation test of ESIs. Modified mechanism model of payment for environmental services (PES) can be recommended in implementing ESIs in Indonesia.

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