

@Attention@

The purpose of this report is to share the Japanese PES information with TEEB. It has been revised from April 2010 version. Most cases in the report are included in TEEBcase web site (<http://www.eea.europa.eu/teeb>). **For recent information, Please see the TEEB web site.**

Good Practices of Payments for Ecosystem Services in Japan

Kiichiro HAYASHI

Hiroshi NISHIMIYA

* Professor, Nagoya University, EcoTopia Science Institute, Nagoya, Japan

** Principal Researcher, Institute for Global Environmental Strategies, Hayama, Japan

April 2010, **revised at April 2011**

Print version, Electric version

1. Introduction

Japan is a country which experiences a number of natural disasters including earthquakes, typhoons and floods. One could even say that as a result of these natural disasters, the Japanese share both emotions of fear and respect for Mother Nature and strive to live in harmony with her. The respect and a sense of nurturing for the environment which the Japanese possess can be illustrated with the example of payments for ecosystem services (PES) and/or PES like approaches (here in after, PES). The history of these PES stretch back many years from even as early as 1901 when the Government of Tokyo implemented a scheme to hold and manage forests in upstream basins to help keep water purified and to prevent soil out flow, etc (Metropolitan government of Tokyo, 2006, p6). Over the years and even today, there have been a vast number of PES schemes which have been implemented by both the public and private sectors.

Based on basic textbooks on Environmental Economics, payment schemes for biodiversity and/or ecosystem services can be divided into three categories:

- The first category can be illustrated by the scenario where negotiations take place between cost shoulders and beneficiaries. Examples of this include many cases in which private companies engage in the conservation of watershed forests, etc.
- The second category is governmental intervention through the utilization of taxes, extra charges and the creation of funds. Examples include but are not limited to forest management tax systems, etc.
- And finally, the third category describes the scenario of trading schemes of the rights of ecosystem services. Examples of such schemes are actually few except for CO₂ trading which is currently being piloted.

In this paper, good practices of PES in Japan are extensively collected and summarized in parallel with the above mentioned categories (with particular attention paid to the first two).

2. PES cases in Japan

2.1. Direct Negotiations

Regarding direct negotiations, one good example of payment for ecosystem service for groundwater recharge has been implemented in Kumamoto prefecture in the Kyushu area (see below). Kumamoto prefecture depends on groundwater for 80 percent of its drinking water (Kumamoto Prefecture et al, 2008, p4). The middle basin of Shirakawa river is known to have recharge capacities of 5 times or more than that of other areas, one-third, or 210 million m³ of which the rice paddies in the area account for (Kumamoto City, 2009, p21; Kumamoto Prefecture et al., 2008, p5). However, the amount of groundwater recharged is forecasted to decrease by 37 million m³ annually (6.2 percent) from 2007 to 2024 as a result of reduced rice production and urbanization (Kumamoto City, 2009, p8 and 10).

In 2003, Sony Semiconductor Kyushu started a groundwater recharge project in which it returns the

groundwater that is consumed in its semiconductor plant¹. This is an example of direct negotiation among a company, farmers and others. The PES can be summarized as follows²: The company usually uses groundwater extracted from the ground under the factory. The company has concluded an agreement including local farmers requesting that they flood agricultural fields in between crop cultivation periods in summer. The flooded water infiltrates into the ground as recovering groundwater recharge function. Payments are made from the company to agricultural farmers via local intermediate organizers. The payment is 11,000JYen/1000m² in 30days period of flooding and for 60days, it is 16,500JYen/1000m². The payment rate was decided by taking into consideration basic preparation cost, flooding management cost, etc³.

This is one of the well known examples of payment for agricultural ecosystem service. Kumamoto City and other local firms joined the activity in the innovative scheme the following year⁴. The company has successfully assumed the costs of recharging the groundwater it has pumped annually for each successive year excluding 2005, when Kumamoto was hit by a severe drought⁵ (Sony⁶; SKC, 2009, p18). The company also purchases rice grown with reduced pesticides by a partner farmer at 430 JYen/kg⁷ to accommodate one meal for all employees, in an attempt to encourage employees to offset water consumption by purchasing rice grown in the Shirakawa middle basin area (1kg of rice production returns 20-30m³ of water to the ground)⁸.

Also there are several other direct negotiation examples in which several companies make monetary and/or non-monetary contributions to conserve forest ecosystem services in upstream basins on a voluntary basis.

2.2. Governmental Intervention

2.2.1. Forest Environmental Tax

Japan is a mountainous country and almost 67⁹ percent of the land is covered by forest. But about 41% of forest area is artificial forest¹⁰. The forestry sector was one of the most active industries supporting Japanese industrialization and urbanization after the World War II and before the high economic growth period from 1950s to 1960s. Now, the situation is totally changed. Cheaper foreign timber imports, an aging population and a declining domestic forestry industry¹¹ might lead to expanding unmanaged forest area in Japan. So the some of Japanese forest is unmanaged and ecosystem services provided by forest are degrading in forest area¹². The issue of forest in Japan is not decreasing forest area but degrading artificial forest ecosystem services due to insufficient management. So Japan is faced with the unique issue of unmanaged forests leading to biodiversity degradation. Many over-planted artificial forests are in desperate need of tree thinning and transformation into natural mixed forests comprising both coniferous and broadleaf trees in order to maintain

¹ The information was obtained in interview at Kumamoto TEC in Feb. 2010 and Sony web site: http://www.sony.co.jp/Products/SC-HP/cx_pal/vol59/pdf/sideview.pdf, last accessed in March 2010, (in Japanese)

² The information of this project was obtained in interview at Kumamoto TEC in Feb. 2010 and Sony web site: http://www.sony.co.jp/Products/SC-HP/cx_pal/vol59/pdf/sideview.pdf, last accessed in March 2010, (in Japanese), <http://www.sony-sckyushu.co.jp/new/index0119.html>, last accessed in Oct. 2010, (in Japanese) and Sato(2010).

³ Data obtained in interview at Kumamoto TEC in Feb. 2010

⁴ Interview at Kumamoto City and Seiji Tominaga of Shirakawa Middle Basin Water Soil Sato Net Association, available at : http://www.japanriver.or.jp/taisyo/oubo_jyusyou/jyusyou_katudou/no6/no6_pdf/midori.pdf, in Oct. 2010, (in Japanese)

⁵ Sony web site :<http://www.sony-sckyushu.co.jp/new/index0119.html>, last accessed in Oct. 2010, (in Japanese).

⁶ Sony web site: http://www.sony.co.jp/SonyInfo/csr/eco/site/community/report07_1.html, last accessed in Oct. 2010, (in Japanese)

⁷ Data obtained in interview at Kumamoto TEC on February, 2010

⁸ Sony web site: http://www.sony.co.jp/Products/SC-HP/cx_pal/vol59/pdf/sideview.pdf, last accessed in March 2010, (in Japanese) and Kumamoto City web site: http://www.kumamoto-waterlife.jp/list_html/pub/detail.asp?c_id=25&id=9&mst=0&type, last accessed in Oct. 2010, (in Japanese)

⁹ Forestry Agency of Japan, Government of Japan, web site: <http://www.rinya.maff.go.jp/j/keikaku/genkyou/index.html>, last accessed in Oct. 2010 (in Japanese)

¹⁰ Forestry Agency of Japan, Government of Japan, web site: <http://www.rinya.maff.go.jp/j/keikaku/genkyou/index.html>, last accessed in Oct. 2010 (in Japanese)

¹¹ The historical background of forestry sector in Japan is summarized in the Forestry White Paper 2009, <http://www.rinya.maff.go.jp/j/kikaku/hakusyo/21hakusho/zenbun.html>, last accessed on Oct. 2010, p8-9, p4-45, etc. (in Japanese) and in the National Biodiversity Strategy of Japan 2010: <http://www.env.go.jp/en/focus/100430.html>, (summary in English)

¹² The issue is summarized as the second crisis of Japan in the National Biodiversity Strategy of Japan 2010, <http://www.env.go.jp/en/focus/100430.html>, last accessed in Oct. 2010, (summary in English)

HAYASHI K. and NISHIMIYA H.(2010) *Good Practices of Payments for Ecosystem Services in Japan*, EcoTopia Science Institute Hayashi laboratory Policy brief, 2010 No.1, Nagoya, Japan, revised in Oct. 2010.

their public functions.

Regarding the second type of governmental intervention, since 2003, 30 prefectures have introduced forest environmental taxes as of April 2010. These are taxes that require payments from the partly beneficiaries of forest ecosystem services. Most of prefectures have increased the tax rates of their prefectural inhabitant tax on individuals (per capita overassessment tax ranging around between 500 to 1000 JYen) and corporate entities (per income overassessment tax). One part of the revenue is usually earmarked in a fund for direct payments to forest owners for forest management work to protect critical watershed areas. According to the revision of Local Tax Act in 2000, this local initiative is also in line with the aim of local autonomy and decentralization of power from the national government to local governments. Under the concept that local matters should be decided locally by methods suitable for actual local conditions, each prefecture has tailored the tax to its unique needs.

One good example in forest management charge is being implemented in Toyota city in Aichi prefecture which is adjacent to the COP10 host city of Nagoya. Seventy-eight percent of tap water in Toyota city comes from the Yahagi River¹³. Since 1994, an additional tap water conservation fee of 1 JYen per 1m³ of water use has been introduced as PES and this revenue has been inputted into the Toyota city tap water conservation fund¹⁴. It is around 0.3 to 1.2 percent¹⁵ of the total water usage fee excluding the base rate depending on the water usage volume. Since 2000, the fund has started to spend money for water source conservation purposes, such as, tree thinning and forest measuring¹⁶. According to Toyota City¹⁷, in 2006, the fund was used for the thinning of 110 ha and the measuring of 83ha. Also the target of the fund is privately-owned artificial forest so that the prohibition of clear-cutting of their forest is first required before accepting the fund.

Similar tap water additional fees for conservation purpose are introduced in other local governments, such as Fukuoka city. Fukuoka City is the only major city in Japan without a single major river located within the city (Fukuoka City Waterworks, 2009,p5). Fukuoka City reserved 1 JYen per ton of water consumed in the city in a water source conservation fund from 1997 through 2006, by extracting 0.5 JYen from the water charge budget and allocating the remaining 0.5 JYen from the general budget¹⁸. Its approach differs from that of Toyota City in that it considers the costs for watershed protection included in the water charge instead of imposing an extra fee. Fukuoka City spends 100 million JYen annually (for local exchange programs, forest management in water sources areas, contribution to a watershed fund comprising neighbouring municipalities) (Fukuoka City¹⁹)

The other PES by governmental intervention in Japan is forest management tax systems which are introduced by many prefectures. Kochi prefecture²⁰, in the south-west of Japan, is the first prefecture to introduce a forest management local tax for protecting forest ecosystem service. Tax rates are mostly the range of 500 to 1000 JYen per person depending on prefectures. Taking a look at each prefecture's information, budget generated from the forest management tax is tend to be usually used for tree thinning, transforming unmanaged forests into natural mixed forests (broadleaf and coniferous trees), etc. One other example is listed and explained in the table 1. In this way, a lot of forest environmental taxes are implemented in Japan as

¹³ Toyota City, Yahagigawa to Toyotashi "Mizu to midori no Sangyou toshi" toyota, (Yahagi river and Toyota City "Industrial City with Water and Green" Toyota City, p2, (in Japanese)

¹⁴ The information is provided by Toyota City web site: http://www.city.toyota.aichi.jp/division/ca00/ca01/1199128_7198.html, last accessed in Oct. 2010, (in Japanese).

¹⁵ Water fee is from 85.05JYen/m³ to 326.55JYen/m³ depending on the amount of usage. Toyota City web site, http://www.city.toyota.aichi.jp/division/ca00/ca02/1199182_7200.html, last accessed in Oct, 2010, (in Japanese)

¹⁶ Toyota City, Yahagigawa to Toyotashi "Mizu to midori no Sangyou toshi" toyota, (Yahagi river and Toyota City "Industrial City with Water and Green" Toyota City, p2, (in Japanese)

¹⁷ The information is provided in Toyota City web site: <http://www.city.toyota.aichi.jp/>, last accessed in Oct. 2010, (in Japanese)

¹⁸ Fukuoka City Waterworks web site: <http://www.city.fukuoka.lg.jp/mizu/ryuiki/0037.html>, last accessed in Oct. 2010, (in Japanese)

¹⁹ Information based on interview with Fukuoka City Waterworks in February, 2010, personal communication with the City and web site of Fukuoka City Waterworks: <http://www.city.fukuoka.lg.jp/mizu/ryuiki/0037.html>, last accessed in Oct. 2010, (in Japanese) and for more detail information, see Kajisaka(2008).

²⁰ Kochi prefecture, forest management tax web site: http://www.pref.kochi.lg.jp/~seisaku/kinobun2/hp_1/sinrinkankyouzei.htm, last accessed in Oct. 2010, (in Japanese)

HAYASHI K. and NISHIMIYA H.(2010) *Good Practices of Payments for Ecosystem Services in Japan*, EcoTopia Science Institute Hayashi laboratory Policy brief, 2010 No.1, Nagoya, Japan, revised in Oct. 2010.

PES.

Table 1. Example of Forest Environmental Taxes in Japan

	Kanagawa Prefecture
Background ²¹	Kanagawa prefecture is located adjacent to Tokyo, and has a population of 9 million people in 2010. Kanagawa prefecture has introduced a forest environmental tax since 2007 for watershed forest protection and other purposes. One interesting point of Kanagawa example is that they employed participatory system engaging citizens in forums for discussions on cost distribution and tax implementation before the tax development. Kanagawa Prefecture also engages its citizens in forums for discussions on tax implementation.
Tax rate ^{22,23}	Aiming for all prefectural residents to protect forests and gain awareness of their importance via a broad low-rate tax, it is designed slightly different from that of other prefectures and imposes a per income overassessment tax of 0.025 percent of income upon individuals - instead of on corporate entities – in addition to an additional 300 JYen per capita. Tax rates have been determined according to the estimated total tax income (3.8 billion JYen annually) required to implement the projects listed under its Five-Year Action Plan.
Use of revenue	Kanagawa tax is unique in that it seeks not only to preserve the social functions of unmanaged forests, but clearly to secure a stable supply of water through its tax. It takes a comprehensive approach covering several types of conserving and restoring water sources including groundwater and river and water catchment forests by conducting 12 programs under its Five-Year Action Plan. (Kanagawa Prefecture, 2008, p2-3.) ²⁴

However, there are several issues to be tackled in general for the proper implementation of forest environmental taxes in Japan. One is that most of the forest tax rates implemented by prefectures are low compared to Willingness To Pay(WTP) ²⁵. Also, because tax rates are unfortunately set at a relatively low level, little revenue for improving resource management is generated. Also, the tax is levied usually on all prefectural citizens and thus is not directly relevant to the range of ecosystem service beneficiaries. Another issue is that while the budget is mainly used for forest management purposes but in some cases it is used for non-forest management purposes.

2.2.2 Payments to Agricultural Ecosystem Services

Japan introduces many PES-like systems at the local level. Most of these are forest management tax, but some are related to payments to agriculture ecosystem services.

One example which is not mentioned above is payment to biodiversity friendly rice production. Biodiversity friendly way of rice production needs more cost than the standard rice production(see below cases). Usually a local government pays back one part of that cost to promote biodiversity friendly rice production. And biodiversity friendly rice usually sells at a premium rate.

One example comes from the north part of Japan in Kabukuri-numa and surrounding paddy fields in Miyagi prefecture. Kabukuri-numa and surrounding paddy fields covering 423ha was registered as a wetland protected under the Ramsar Convention in 2005²⁶.

²¹ Kanagawa Prefecture(2008), p1, and web site: <http://www.pref.kanagawa.jp/osirase/05/0517/suigenkankyo/index.html>, and <http://www.pref.kanagawa.jp/kenzei/kaikaku/syuukai.htm>, last accessed in Oct. 2010, (in Japanese)

²² Kanagawa Prefecture(2010), p14 and also there are some discussions in Takai(2007)

²³ The examination of tax development is summarized in Kanagawa Prefecture Local Tax Study Group Daily Life Environmental Tax Special Group(2003), etc.

²⁴ Kanagawa prefecture web site, <http://www.pref.kanagawa.jp/kenzei/kaikaku/rinzi/zaigenan.htm>, last accessed in Oct. 2010, (in Japanese)

²⁵ Confirmed by Prof. Kentaro YOSHIDA of Nagasaki University.

²⁶ The information is obtained at the site visit in Nov. 2009 by communication with Osaki City, Mr. Masayuki KURECHI and Mr. Shigeki IWABUCHI.

HAYASHI K. and NISHIMIYA H.(2010) *Good Practices of Payments for Ecosystem Services in Japan*, EcoTopia Science Institute Hayashi laboratory Policy brief, 2010 No.1, Nagoya, Japan, revised in Oct. 2010.

Modern rice production methods of keeping rice paddies dry during wintertime in pursuit of higher productivity and efficiency have seriously impacted many species which depend on wetland habitats, however, in this project, winter-flooded rice paddies are introduced²⁷.

This project has been supported as follows²⁸: a grant for local development (8,000 JYen/1000m²), a grant to accommodate costs for third-party certificate of organic farming (5,000JYen/1000m²), a grant for the action plan for improvements in farmland, water and environmental conservation (4,400JYen/1000m²) and a grant for wintertime flooding and non-tilling farming (6,000JYen/1000m²). Then after introduction of the new scheme, rice production dropped from 540kg/1000m² to less than 420kg/1000m², mainly because it involves planting smaller bunches of seedlings in order to grow disease-resistant crops.

On the other hand, slimy fecal layer developed by sludge worms as a result of putting rice bran and crushed soya into the fields inhibited weed growth(MAFF, 2007,p112, 151).

The rice grown in winter-flooded paddy fields are sold at a premium price of 23,000-24,000 JYen, compared to a price range of around 14,000JYen for conventionally grown rice²⁹. Rice products including Japanese rice wine are also sold as luxuries. By flooding paddy fields in wintertime, the wetlands of Kabukuri-numa have been successfully restored as “agricultural wetlands” and the number of geese using the wetlands as roosting sites has tripled since 1999³⁰.

Table2 also showed two other examples from other part of Japan. Agriculture field is one other area of PES implementation in Japan.

One big reason for the importance of agriculture fields in Japan is that Japanese government promoted, what we call, Satoyama initiative³¹. Satoyama is landscape fostered in a long history of interrelationships between nature and humans through human activities, such as agriculture, forestry, fishery and animal husbandry. The Satoyama areas are just as important as protected areas in biological terms but ecosystem changes in the Satoyama are occurring due to insufficient human activity³². The rural landscape of Satoyama areas had been sustainably maintained by the traditional activities in it, including gathering fuel wood and leaves for fertilizer, which have been replaced by fossil fuels and chemical fertilizers. The Satoyama Initiative, launched in March 2009 focuses on these traditional production landscapes, or human-influenced natural environments, which are in urgent need of conservation. It seeks to consolidate wisdom on a maintaining a sustainable supply of ecosystem services and harmonious co-existence between nature and human society, to integrate experimental and traditional knowledge of the regional environment and techniques to use and manage natural resources with modern science³³.



Picture 1. Geese in Kabukuri-numa
Photo by Kiichiro HAYASHI

²⁷ The information is obtained at the site visit in Nov. 2009 by communication with Osaki City, Mr. Masayuki KURECHI and Mr. Shigeki IWABUCHI.

²⁸ The information of this paragraph is provided by Osaki City in TEEB-D2 workshop in Nagoya Japan in May 2010 and personal communication with Osaki City.

²⁹ The information is obtained through personal communications with Osaki City.

³⁰ The information is obtained through personal communication with Osaki City and <http://www5.familie.ne.jp/~kabukuri/02kabukuri.html>, (original source by Miyagi Prefecture Tobu Public Works Office).

³¹ UN university web site, <http://satoyama-initiative.org/en/>, last accessed in Oct. 2010, (in Japanese)

³² The issue is summarized as the second crisis of Japan in the National Biodiversity Strategy of Japan 2010, <http://www.env.go.jp/en/focus/100430.html>, last accessed in Oct. 2010, (summary in English)

³³ UN university web site, <http://satoyama-initiative.org/en/>, last accessed in Oct. 2010 and Ministry of the Environment Japan. HAYASHI K. and NISHIMIYA H.(2010) *Good Practices of Payments for Ecosystem Services in Japan, EcoTopia Science Institute Hayashi laboratory Policy brief, 2010 No.1, Nagoya, Japan, revised in Oct. 2010.*

Table 2. Payments to Agriculture Ecosystem Services

Title	Contents
<p>Restoring Rice Paddies Habitats to Reintroduce the Oriental White Stork in Toyooka City</p>	<p>Toyooka City, located along the Japan Sea coastline, was the last area inhabited by wild Oriental white storks, classified as Endangered on the IUCN Red List, before they became extinct in Japan in 1971. The main reasons for their extinction lay in the degradation of their habitat provoked by the modernization of rice farming which involved rice paddies holding water for a shorter period of time than traditional methods (from several days prior to planting through several succeeding weeks, after which they are drained), concrete irrigation and drainage systems and the use of pesticides and chemical fertilizers. Because the oriental white stork is carnivorous and sits at the top of the ecosystem pyramid, restoring its foraging habitat was the key to its reintroduction³⁴.</p> <p>Based on Toyooka City (2007), the history of the reintroduction of Oriental white stork could be summarized as follows: after 25 years of breeding in captivity by introducing several white storks from abroad, the first baby was born in 1989 and a pilot release program was launched in 2005.</p> <p>According to Hyogo prefecture Tajima Region Toyooka Agriculture Extension Centre (2008) and Toyooka City (2007), the agriculture method for conservation of Oriental white stork is summarized as follows: Since 2003, in order to improve the habitat quality of the paddy field, rice farmers have been encouraged to reduce either 75% reduced or 100% pesticides, to flood their paddies deeper, to retain the water in the paddies for a longer period of time compared with conventional methods, and to keep a diary of living creatures (which would serve as indices of biodiversity) found in their paddies as obligatory requirements.</p> <p>According to Toyooka City³⁵, from 2003 through 2007, when the prefecture shared half of the costs with Toyooka City, participating farmers were paid 40,000 JYen per 1,000m² of rice paddies to compensate for increased labor and reduced income (Expert Committee on Sustainable Land Management³⁶ and Toyooka City³⁷). And they are currently granted 7,000 JYen per 1,000m² by Toyooka City (Inter-Ministerial Committee on the National Biodiversity Strategy of Japan³⁸ and Toyooka City³⁹). As a result of such habitat restoration, the wild population of oriental white storks has now increased to 44⁴⁰.</p> <p>Onuma and Yamamoto(2009) presented study results as follows: The reintroduction of the oriental white stork has raised municipal income by 1.4 percent, which amounts to about 8 billion JYen. They also report that, although this agricultural method for the conservation of the Oriental white stork reduces rice production by 25% compared to conventional methods, the product can be sold under the local brand, “Konotori no Mai (meaning “flying Oriental White Stork”) which sells for a premium price – 23 % higher than rice grown by conventional methods for reduced pesticide use, and 54 % more, for organic farming – therefore promising increased revenue.</p> <p>A part of the municipal income rise by 8 billion JYen stated above is contributed by eco-tourism related to Oriental White Stork. The economic impact of reintroducing the oriental white stork in terms of tourism is estimated to be approximately 1 billion JYen annually (Onuma and Yamamoto,2009). Visitors to Toyooka include school children, students from China, farmers and researchers from Korea and Russia(Toyooka City, 2007, etc.). The growing number of visitors to the</p>

³⁴ The historical background surrounding Oriental White Stork is summarized based on Toyooka City (2007) and personal communication with Toyooka City, etc.

³⁵ The information is provided from Toyooka City at TEEB-D2 workshop in Tokyo in Feb. 2010.

³⁶ Expert Committee on Sustainable Land Management, Planning Division, National Land Council, Ministry of Land, Infrastructure and Transport (2006) Reference for the Eight Meeting of the Expert Committee on Sustainable Land Management, www.mlit.go.jp/singikai/kokudoshin/keikaku/jizoku/8/jizoku_shiryou.html, last accessed in Oct. 2010, p7, (in Japanese).

³⁷ The information is provided from Toyooka City at TEEB-D2 workshop in Tokyo in Feb. 2010.

³⁸ Inter-Ministerial Committee on the National Biodiversity Strategy of Japan (2008) Local Case Examples, material distributed at the Sixth meeting of the Inter-Ministerial Committee on the National Biodiversity Strategy of Japan, (in Japanese)

³⁹ The information is provided from Toyooka City at TEEB-D2 workshop in Tokyo in Feb. 2010.

⁴⁰ The information is provided from Toyooka City by e-mail communication in July 2010.

⁴¹ The information is provided by personal communication with Toyooka City in July 2010

HAYASHI K. and NISHIMIYA H.(2010) *Good Practices of Payments for Ecosystem Services in Japan*, EcoTopia Science Institute Hayashi laboratory Policy brief, 2010 No.1, Nagoya, Japan, revised in Oct. 2010.

	municipal museum beyond 2004, which peaks in 2006, implies that more people are coming to see the oriental white stork ⁴¹ .
Reintroducing the Crested Ibis in Sado in Japan	<p>The crested ibis became extinct in Japan due largely to pesticide use, which intoxicated some creatures that they fed on, and land consolidation programs that destroyed wildlife habitats⁴². Nevertheless, because the rice grown in Sado City had always been traditionally sold for a premium price, there was no incentive for farmers to shift to environmentally-friendly methods. However, when the typhoon in 2004 destroyed all crops, the “Sado Koshihikari rice” was removed from the market and 5,000 tons of rice remained unsold annually for three consecutive years⁴³</p> <p>All Sado farmers have reduced pesticide use by 30 percent and aim to reduce another 20 % by 2012⁴⁴. 2600ha (42.3%) of planted acreage grow rice using half the amount of pesticides used in conventional methods.⁴⁵</p> <p>A scheme was developed to certify a brand label for rice grown employing alternative agricultural methods including winter flooding that restore the habitat for crested ibis and other waterfowl⁴⁶. Certified rice is sold at almost twice the price of the average market price: 2,980 JYen for 5 kg of rice grown using half the amount of pesticide conventionally used and 4,000JYen for the same amount of organically grown rice⁴⁷. Farmers were entitled to a government grant of 27 thousand JYen⁴⁸ per 1,000 m² to compensate for lost profits and to promote no-tilling farming. 50 % pesticide-cut certified rice has doubled its planted acreage from 420 ha in 2007 to 860ha in 2009(MLIT⁴⁹ added information by Sado City⁵⁰)</p>

2.3. Others

The following two examples are not directly related to PES but are effective policy measures to conserve green spaces in a city. Both examples come from Nagoya City which hosted the COP10 meeting of CBD. Embracing a population of approximately 2.2 million people⁵¹, Nagoya is the third largest economic area in Japan after Tokyo and Osaka. It has lost 1,643ha of green covered area during the fifteen years between 1992 and 2005⁵² and is faced with the continued danger of losing its remaining Satoyama landscape.

Nagoya City seeks to formulate an innovative tradable development rights scheme (correctly speaking, it is not a development right) based on the Act on Special Measures concerning Urban Reconstruction, implemented in 2002⁵³. Nagoya City is designing a scheme to partly offset a high-rise building construction with conducting activities including biodiversity conservation/environmental impact offsite mitigation activities, by permitting developers to exceed legal limits if they agree to conserve Satoyama areas risking development depend on

⁴² The information was obtained via personal communication with Sado city government.

⁴³ The data of this paragraph was confirmed in personal communications via email with Sado City in August, 2010 and the detailed information is also included in Saito, Shinichiro (2009) “Living with Crested Ibis!! Making an Island of Biological Diversity” material prepared for the Sixth Breakfast Meeting of the Business Leaders’ Inter-Forum for Environment 21 B-LIFE 21) on December 15, 2009, available at <http://www.zeroemission.co.jp/B-LIFE/MORNING/index09.html>, last accessed in Oct.2010, (in Japanese).

⁴⁴ Data confirmed in personal communications via e-mail with Sado City in August, 2010 and in Saito, Shinichiro (2009) above.

⁴⁵ Data confirmed in personal communications via e-mail with Sado City in August, 2010 and in Saito, Shinichiro (2009) above.

⁴⁶ The explanation of this paragraph was summarized in Living with Toki Promotion Committee and Sado city government: Guiding Principles for Harmonious Coexistence with Biodiversity.

⁴⁷ The information was confirmed by Sado city government by personal communication.

⁴⁸ The information was provided by Sado city government by personal communication.

⁴⁹ MLIT (Ministry of Land, Infrastructure and Transport) (2009) ” Reference 3: The Background for Research and Pioneering Cases” material distributed at the First Meeting of the Conference on Establishing an Ecological Network in the Southern Kanto Area, December 3, 2009, p21 (in Japanese)

⁵⁰ Data confirmed in personal communications with Sado City in August, 2010.

⁵¹ Nagoya City web site, <http://www.city.nagoya.jp/>, last accessed on Oct. 2010, (in Japanese)

⁵² Green area information is provided by Nagoya city, for example the following web site, <http://www.city.nagoya.jp/shisei/category/53-3-3-6-0-0-0-0-0-0-0.html>, last accessed in Oct. 2010, (in Japanese)

⁵³ The information of this scheme in this paragraph is provided from Nagoya City web site:

<http://www.city.nagoya.jp/shisei/category/53-10-9-26-0-0-0-0-0-0-0.html>, last accessed in Oct. 2010, (in Japanese)

HAYASHI K. and NISHIMIYA H.(2010) *Good Practices of Payments for Ecosystem Services in Japan, EcoTopia Science Institute Hayashi laboratory Policy brief, 2010 No.1, Nagoya, Japan, revised in Oct. 2010.*

cases. This is implemented from Sept. 2010.

The other example is low interest loans for greening in Nagoya City. Faced with an urgent need to stop the ongoing depletion of privately owned green areas, which cover approximately two-thirds of the city⁵⁴, Nagoya City implemented the Greening Zone Program from October 31, 2008⁵⁵. This program obligates the greening of a minimal area on new construction or building enlargement sites of a certain size. For example, on a 300m² site with building-to-land ratio restricted to 50 %, the equivalent of 20 % of the site area must be covered with green⁵⁶. Nagoya Bank, and other local private banks, launched a new housing loan scheme to lower the interest rate for customers who submit a NICE GREEN certification label, issued by the city to prove the level of greening⁵⁷.

3. Conclusion

In Japan, nature and agricultural management are important for harmonization with nature and thus domestic local PESs have developed uniquely. Because the abundance area and segmentalized watershed basin zones, many separated local systems exist in Japan. Also, one characteristic of Japanese PES is that the PES is usually deals with conserving secondary forest and agricultural land and is not focused on natural protection land. They have proven that PES can be used for the conservation of artificial nature, like, Satoyama.

Regarding forest management taxes, many local schemes have been implemented in Japan. Most of the tax rates are low compared to WTP⁵⁸. It is important to set the tax at a level that approaches the marginal value of the ecosystem service used and which provides a level of revenue of forest management. Another issue regarding forest environmental tax in Japan is that each PES system implemented by each local government, etc. is operated separately and is not interrelated. Then they should be more bundled with some related payment schemes. Lastly, a lot of PESs implemented in Japan are focused on local and regional ecosystem services. There is no good example addressing on global ecosystem services except CO₂ sequestration.

Acknowledgement

The authors give thanks to Ms Hiroko NAKAMURA who supported the collection of documents and drafting the report.

Reference Sources

- Fukuoka City Waterworks (2009) Fukuoka City Long-term Vision for Waterworks, (in Japanese)
- Government of Japan (2010) Forestry White Paper 2009, available at: <http://www.rinya.maff.go.jp/f/kikaku/hakusyo/21hakusho/zenbun.html>, (in Japanese)
- Government of Japan (2010) The National Biodiversity Strategy of Japan 2010, available at: <http://www.env.go.jp/en/focus/100430.html>, (English summary).
- Hyogo prefecture Tajima Region Toyooka Agriculture Extension Center (2008) "Kounotori hagukumu nouhou koshihikari henn" (Agriculture method for conservation of Oriental White Stork –Koshihikari), brochure of Toyooka Agriculture Extension Center, (in Japanese)
- Kajisaka, Yasuhiko (2008) "Managing Water Source Forests and Liaison with Water Source Areas: Fukuoka City Fund for Water Source Recharge Project" in Kurachi, Koichi eds. Can Forest Environmental Taxes Save our Forests? : abstracts from the Twentieth National Conference on Conserving Japan's Forests and Nature, Seto City, Japan: The Tokyo University Forests, p26-44, (in Japanese)

⁵⁴ Description of Greening Zone Program at Nagoya City website: <http://www.city.nagoya.jp/ryokuseidoboku/page/0000008169.html>, last accessed in Oct. 2010, (in Japanese)

⁵⁵ The information obtained from Nagoya City in the TEEB-D2 Workshop in Nagoya in 20 May 2010 in Nagoya Japan.

⁵⁶ The detailed information of this system is presented in the following Nagoya city web site: <http://www.city.nagoya.jp/ryokuseidoboku/page/0000008169.html>, last accessed in Oct. 2010, (in Japanese)

⁵⁷ The detailed of this system is presented in the Nagoya city web site, last accessed in Oct 2010, <http://www.city.nagoya.jp/ryokuseidoboku/page/0000008208.html>, last accessed in Oct. 2010, (in Japanese).

⁵⁸ Confirmed by Prof. Kentaro YOSHIDA of Nagasaki University.
HAYASHI K. and NISHIMIYA H. (2010) *Good Practices of Payments for Ecosystem Services in Japan*, EcoTopia Science Institute Hayashi laboratory Policy brief, 2010 No.1, Nagoya, Japan, revised in Oct. 2010.

- Kanagawa Prefecture (2008) In Pursuit of Conservation and Restoration of Kanagawa's Water Source Environment, available at: <http://www.pref.kanagawa.jp/osirase/05/0517/suigenkankyo/data/pdf/english.pdf>.
- Kanagawa Prefecture (2010) Plan for Watershed Environmental Conservation and Restoration and Summary of Tax system. Brochure, available at: <http://www.pref.kanagawa.jp/osirase/05/0517/suigenkankyo/data/pdf/h22pamphlet.pdf>, (in Japanese)
- Kanagawa Prefecture Local Tax Study Group Daily Life Environmental Tax Special Group(2003) Report on Examination of Daily Life Environmental Tax, available at: <http://www.pref.kanagawa.jp/kenzei/kaikaku/mokuji031021.htm>, (in Japanese)
- Kumamoto City (2009)Kumamoto City Groundwater Conservation Plan: Establishment, Enhancement and Partnership, (in Japanese)
- Kumamoto Prefecture, Kumamoto City, Kikuchi City, Udo City, Koshi City, Jonan Town, Tomiai Town, Ueki Town, Ozu Town, Kikuyo Town, Nishihara Village, Mifune Town, Kashima Town, Mashiki Town, Kosa Town (2008) Comprehensive Plan for Groundwater Conservation and Management, (in Japanese)
- MAFF(Ministry of Agriculture, Forestry and Fisheries) (2007) Guidebook for Agricultural Production Infrastructure, Technologies for the Promotion of Environment-Friendly Agriculture, p.154-159, (in Japanese)
- Metropolitan Government of Tokyo, Water Works(2006)"Tokyo no suido"(Water of Tokyo), Metropolitan Government of Tokyo, available at: http://www.waterworks.metro.tokyo.jp/water/pp/suido/suido_h18.pdf, p6 etc. (in Japanese)
- Onuma, A and M.Yamamoto(2009),"Hyogoken Toyookashi ni okeru kounotori yaseifutsuki wo meguru keizai bunseki – kounotori hagukumu nouhou no keizaitekihaikei to kounotori yaseifutsuki ga motarasu chiikikeizai heno kouka“(Economic Analysis of Reintroduction of Oriental White Stork in Toyooka, Hyogo). Mita Journal of Economics, Vol102, No.2,(in Japanese)
- Sado City, Living with Toki Promotion Committee and Sado City, Guiding Principles for Harmonious Coexistence with Biodiversity, provided by Sado City.
- Sato, Tomio(of Sony Semiconductor Kyushu Corporation) (2010) Returning Consumed Groundwater through Rice Paddies: The First Japanese Corporate Project to Recharge Water, Global Net, Tokyo: The Global Environmental Forum, (in Japanese).
- SKC(Sony Semiconductor Kyushu Corporation) (2009) Environment Report 2009, (in Japanese)
- Takai, Tadashi (2007) The Current Status and Issues of Local Environment Taxes: A Study of Kanagawa Prefecture's Water Source Tax in Seeking an Ample Tax Source and Local Corporate Taxation (Report of the Working Group on Kanagawa Prefecture's Local Tax System), Chapter 4,p37-54, (in Japanese)
- Toyooka City (2007) "Kounotori to tomoni ikiru Toyooka no chousen"(Living with Oriental White Stork, Chareng of Toyooka", Toyokoka City, (in Japanese)
- Toyota City, Yahagigawa to Toyotashi "Mizu to midori no Sangyou toshi"toyota,(Yahagi river and Toyota City "Industrial City with Water and Green" Toyota City, available at: http://www.mlit.go.jp/tochimizushigen/mizsei/m_evaluation/sirvo5_5.pdf, (in Japanese)

Note

The purpose of this report is to share the Japanese PES information with TEEB provided by Hayashi lab. of ESI of Nagoya univ. and Mr. Nishimiya of IGES. This is not official policy paper by the organizations. So this is for limited distribution and is not for wider distribution. This report has made amendments from April 2010 version, especially for, references and adding new information.

Then most cases in this report are included in TEEBcase web site (<http://www.eea.europa.eu/teeb>). **For recent information, Please see the link.**

The views expressed in this report are those of authors and may NOT be an official position of the organizations involved.

Apology and errata

Regarding the old version of this document distributed in 2010, the authors would like to express sincere apologies for Professor Onuma and Yamamoto(2009) by incorrect quotations from their paper in this document. Also the authors would like to apologize for the readers by utilizing misleadingly-title of an official document of EcoTopia Science Institute. The authors have already made the revised version in April 2011 which included several other minor revisions. If you have a copy of the old version, please dispose it and read this version.