MULTIFUNCTIONALITY OF THE IFUGAO RICE TERRACES IN THE PHILIPPINES

Multifungsi Sawah Berteras di Ifugao, Filipina

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Abstract

The Ifugao Rice Terraces was the Pilot Site of the ASEAN-Japan Multifunctionality of Paddy Farming and Its Impacts in ASEAN Countries. The Rice Terraces was declared by UNESCO as a World Heritage Site in 1996. Five categories of multifunctionality were studied: (1) Economic function – this is the classical historical function of agriculture in economic growth such as food supply and income generation for the individual farmers. The rice terraces also provide the people living in the rural area with stable job opportunities contributing to the healthy growth of rural communities. As per our study, agriculture remains the major source of employment in the area during the last 15 years. The aggregate value of products where farmers are direct recipients was estimated to have a monetary value of $5.04 million (at 28,284 MT palay output); (2) Environmental function – the rice terraces provide a variety of environmental functions such as flood prevention, water retention, soil conservation, and biodiversity. The environmental services provided, when converted to monetary values, will come to at least $8.51 million; (3) Food security function – the rice terraces provide the domestic food supply with excess for export to neighboring areas enabling the community to import its other requirements. The Self-Sufficiency Ratio analysis suggests that the rice terraces can support the total rice requirements of the communities. The surplus provided by the 6 municipalities is more than enough to cover the deficit of 3 other municipalities; (4) Social functions – the rice terraces maintains rural viability through creation of employment opportunities and income. This permits the farming population to stay on the land and participate in the economic and social life of rural communities. The study, however, indicates declining capacity of agriculture to absorb labor over the last decade; and (5) Cultural function – the rice terraces create beautiful landscapes and traditional cultural heritage. Tourism provides the rural community with additional income and thereby contributes to the enhancement of the rural lives. In addition, the continuous paddy farming ensured the preservation and transmission of their rich cultural heritage. The study on the multifunctionality of the Ifugao Rice Terraces showed that these rice terraces were able to
contribute through these more than 2,000 years, to the maintenance of viable rural community.

Abstrak

INTRODUCTION

The Philippines is basically an agricultural country. Of its total land area of 30 million hectares, approximately 34% or 10.2 million hectares are classified as agricultural lands. However, under the Republic Act 8431, the Agriculture and Fishery Modernization Law, about 14.1 million hectares are identified as suitable lands for crops, livestock, and fishery development and are referred as the Strategic Zones for Agriculture and Fishery Development. Some 1 million hectares of currently used for various agricultural activities are classified as marginal agricultural lands. The remaining lands are classified as lands that are best left to forestry and agriforestry uses to improve the watershed’s role on environmental health, good quality water supply and biodiversity.

The agricultural sector remains the country’s biggest resource users and the pillar of the Philippine economy and food security. In the last 15 years, agriculture posted a share of at least 20% of the Gross Domestic Product, generates about 60% of the total export earnings from raw and procured agricultural products. Despite the predominance of small farms and persistent problems of under-development, agriculture is a key factor for rural development. Approximately 70% of the national population is directly dependent on various forms livelihood in agriculture and about 41% of the country’s total labor forces are employed in different agricultural development activities.

Because of the importance of rice in the country’s food systems, paddy farming remains a very important agricultural activity and has always been on the top of the country’s agenda for development and investment. About 2.7 million hectares or 30 percent of the country’s total arable land is devoted to mainly to rice production. Paddy rice farming has the highest share in country’s investment on water development infrastructures. About 79 percent of the country’s available water is used for various agricultural activities, with paddy rice farming as the sector’s major water user. Rice contributes an average of 15.5 percent of the country’s gross value-added (GVA) in agriculture, 13 percent to the consumer price index, 3.5 percent to the gross domestic product (GDP), and 3.3 percent to the gross national product (GNP). As the country’s staple food, rice accounts for 35 percent of the average calorie intake of the population (now about 80 million). However, its share can increase to as much as 60-65 percent in the diet of the lowest income quartile group. The average annual rice consumption level in the country is approximately 103 kilograms per capita. As a way to illustrate the primordial value of rice as basic social and economic commodity, rice sufficiency under growing rice-eating population, has become synonymous with food security. Labor absorption by the rice industry is highest among the agriculture
sub-sectors, involving 11.5 million farmers and family members. Approximately, three-fourths of the farm household income is derived from rice farming and related activities.

The *multifunctionality* concept was first articulated in the 1992 Earth Summit in Rio de Janeiro in the context of discussions of contribution of agriculture to environmentally sustainable environment. The idea is that agriculture, in addition to producing food and other raw materials, produces a range of other non-commodity outputs such as environmental and rural amenities, food security, and rural viability.

Multifunctionality is a non-tangible attribute of paddy farming and agriculture that are not reflected as income and is not a factor that influences farmer’s initiative to increase investments on yield-improving technologies. Because, multifunctionality mostly refers to positive and negative off-site benefits of farming activities, the farmers have very little, if any, appreciation on the valuation of multifunctionality into monetary terms.

Traditionally, agriculture is related to the use of lands to produce food, fiber, meat and meat products. This limited understanding of the actual roles and potential contributions of agricultural lands, especially paddy farming, which has created an artificial but highly stable economic landscape. The paddy farms represent artificial wetlands that are primarily intended to satisfy basic food and human economic needs. Their ability to retain water for longer periods enables paddy rice lands to perform extra functions on groundwater enrichment, reduction of excessive run-off and river flooding. Biodiversity is an important aspect of paddy farming, where paddy fields are hosts to varied plants and animal life.

Recent economic events in the Philippines, and elsewhere, have brought about serious concerns about the focal role of paddy farms in the over-all food security concerns of the growing population. The expansion of food security to global dimension and the increasing role of global food trading and exchange have created conditions that even World Heritage Site like the Ifugao Rice Terraces are being tapped to support the food security programs of the country. These emerging changes in the traditional use of the Ifugao Rice Terraces encouraged the shifting of traditional farming to modern farming, which brought about the degradation of the Ifugao Rice Terraces and subsequently pose a serious threat to the international commitment of the country in preserving the Ifugao Rice Terraces. Moreover, the rapid population has set the rapid expansion urban areas, which induced massive conversion of agricultural lands for housing and for other basic urban needs. These created serious concerns of food security where productive lands, for reason of their better accessibility and closeness to urban
and other economic facilities, are lost to urbanization and other forms of land use conversion.

The multifunctionality of agriculture is a concept that agricultural activities not only produce food and fiber but also create both tangible and intangible values. These values, however, are not tradable and cannot be reflected in the prices of food. Among the functions commonly associated with agricultural activities are the following: environmental, social, food security, economic and cultural functions.

The multifunctionality of paddy farming and agriculture, in general, refers to the externalities or non-tradable or non-tangible public goods. Externalities are either positive or negative off-site impacts or spillovers of development and farming activities resulting from the production and consumption of goods and services. The multifunctionality is an expression of welfare and losses that are not expressed in monetary values but just the same are causative factors in associated economic and social cost of development. They affect people’s welfare, directly and indirectly, but are not themselves the object of market transactions since there is no monetary compensation for gains or losses in public and human welfare. OECD (1994) further clarified that as externalities are produced incidentally or externally to the market they do not appear in the revenue and cost account of the producer on industry, although for the individuals affected or for society as a whole they represent real costs and benefits.

**Figure 1.** The concept of multifunctionality of agriculture (Matsumoto, 2002)
Concepcion (2003) has developed an expanded concept of multifunctionality valuation processes for sustainable agricultural development. Figure 2 provides the expanded framework for multifunctionality evaluation where space and time were added to the existing social and environmental dimension for a sustained agricultural development.

It is from this context of multifunctionality that we will take a look at the Ifugao Rice Terraces. It was in 1996 that UNESCO declared the Ifugao Rice Terraces as a World Heritage, and praised the Ifugao’s exceptional achievements, mainly in the form of non-tangible services and multifunctionality, as priceless.

The Project Site

One of the most famous paddy farming sites in the Philippines is the Ifugao Rice Terraces located in the northern province of Ifugao (120° 40’ longitude; 16° 35’ latitude) with an elevation ranging from 500 to 900 meters above sea level. It has a total terraced area of 17,138 ha distributed over nine of the eleven municipalities. Ifugao province has a population of 161,623 (NSO Census of Population, 2002).

For centuries, terraced farming remains to be the major economic activity of the Ifugao people. But aside from their productive capability, these terraced mountain rice fields are also breathtakingly beautiful and are often referred to as the “8th wonder of the world”. In 1996, the UNESCO declared the Ifugao Rice Terraces as a World Heritage with the following brief description:

“For 2,000 years, the high rice fields of the Ifugao have followed the contours of the mountain. The fruit of knowledge passed on from one generation to the next, of sacred traditions and a delicate social balance, they helped form a landscape of great beauty that expresses conquered and conserved harmony between humankind and the environment.”
Project Objectives

The ASEAN-Japan project phase 1 studies for the multifunctionality of agriculture was conducted for the period of three years from April 2001 to November 2003, with a well defined overall objectives basically to introduce the concept and appreciation of values of multifunctionality in supporting and sustaining the long term and varied contributions of agriculture to the sustained growth of ASEAN countries, to wit:

1. To establish a common understanding on the importance of multifunctionality through analytical works in ASEAN member countries. To create appreciation on the contribution of multifunctionality to the ASEAN countries long term policy making for further development of sustainable agriculture and rural areas.
The participation of the Philippines in the phase 1 of the ASEAN country study on Multifunctionality of Agriculture is focused on the estimation of the multiple benefits derived from the support needed to sustain the cultural and economic values traditional paddy farming in the Ifugao Rice Terraces.

**Study Objectives**

The application of the concept of multifunctionality of paddy farming in the Ifugao Rice Terraces in the Philippines has set two basic study objectives:

1. To evaluate the multiple benefits from both tangible and non-tangible benefits derived from the protection and conservation of the paddy fields and 2000-year traditional practices in the Ifugao Rice Terraces;
2. To establish benchmark information on the levels of attainable productivity improvement obtainable in the application of new production technologies in the Rice terraces.

**MATERIALS AND METHODS**

**Data Collection and Methods**

Various relevant primary and secondary data and information were collected, organized and analyzed for the estimation of multi-functionalities of the Ifugao Rice Terraces (Table 1). The socio-economic studies were contracted out to the technical staff of the Benguet State University. The data from that study were used to analyze the food security and economic functions as well as the part of the cultural functions. Automatic rain gauges and sediment traps were installed in the selected locations and actual measurement of dike height in various slopes were done to analyze the various environmental functions.

**Valuation Methods**

The various valuation methods used in the study followed the recommendation from the papers of Yabe (2003) and Matsumoto (2002). Table 2 showed the methods used for each type of multifunctionality.
Figure 3. Location of the Ifugao Rice Terraces
Table 1. Data collected and methods of collections for various multi-functionalities of the Ifugao Rice Terraces

<table>
<thead>
<tr>
<th>Functions</th>
<th>Data Collected and Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food security function</td>
<td>Commissioned study: Rice supply and demand, per capita consumption, urban-rural rice sufficiency ratio</td>
</tr>
<tr>
<td>Economic function</td>
<td>Commissioned study: Irrigated areas, cropping index, aggregated production per municipality, farm income, share of agricultural employment Farm techno-demonstration trials</td>
</tr>
<tr>
<td>Cultural function</td>
<td>Field Data related to tourism, Actual field interview with local and foreign tourists: Cost of travel, cost and frequency of visit, willingness to contribute to the protection and conservation of Ifugao Rice Terraces</td>
</tr>
<tr>
<td>Environmental functions</td>
<td></td>
</tr>
<tr>
<td>- Soil Conservation</td>
<td>Installed automatic rain gauge in selected rice terrace areas</td>
</tr>
<tr>
<td>- Flood prevention</td>
<td>Installed sediment trap in terraced and unterraced fields</td>
</tr>
<tr>
<td>- Water conservation</td>
<td>Actual measurement of height and width of dikes is terraced plots in various slopes</td>
</tr>
</tbody>
</table>

RESULTS OF THE STUDY

Environmental Functions

Soil Conservation

The Ifugao province receives an average annual rainfall of 3238 mm. August is the rainiest month. During high intensity rainfall, the rice terraces reduce the velocity of runoff water thus minimizing soil erosion. The rice paddies also trap sediments containing soil nutrients needed for plant growth.

The soil conservation function of the rice terraces was evaluated by computing the rate of erosion between terraced and unterraced areas. For this purpose, a set of sediment trap with corresponding runoff recorder was established in each area. An automatic rain gauge was also installed to monitor rainfall characteristics.
Table 2. Valuation Methods for various Multi-functionalities of the Ifugao Rice Terraces

<table>
<thead>
<tr>
<th>Multifunctionality Analyzed</th>
<th>Methods of Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Economic Function</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Tangible Function</strong></td>
<td></td>
</tr>
<tr>
<td>- Pure Economic Function</td>
<td>Rice Production and gross revenue</td>
</tr>
<tr>
<td><strong>Non-tangible Functions (Multi-functionalities of Paddy Farming):</strong></td>
<td></td>
</tr>
<tr>
<td>1. Non-tangible economic function</td>
<td>Analysis of the share of agriculture on:</td>
</tr>
<tr>
<td></td>
<td>- aggregate food production</td>
</tr>
<tr>
<td></td>
<td>- share of Rice Terraces from provincial production</td>
</tr>
<tr>
<td></td>
<td>- income analysis (cost and return)</td>
</tr>
<tr>
<td></td>
<td>- share of agricultural employment</td>
</tr>
<tr>
<td>2. Environmental functions (soil conservation, flood prevention, and water conservation)</td>
<td>Replacement Cost Method (RCM)</td>
</tr>
<tr>
<td>3. Social functions (rural employment and rural sheltering)</td>
<td>Rural Employment and Population Analysis</td>
</tr>
<tr>
<td>4. Food security function</td>
<td>Rice Sufficiency Ratio</td>
</tr>
<tr>
<td>5. Cultural function (rural amenities, rice wine production for rituals)</td>
<td>Contingent Cost Valuation Method (Travel Cost Method and Willingness To Pay methods)</td>
</tr>
</tbody>
</table>

The rate of erosion was estimated using the Estimation of Onsite Erosion (ESONER) formula:

\[
\text{Amount of soil loss} = K\times R\times C\times S
\]

where

- \(K\) is soil erodibility index (Weshmeir nomograph)
- \(R\) is rainfall erosivity
- \(C\) is cropping coefficient volume
- \(S\) is slope coefficient volume

The estimated volume of soil erosion in terraced and unterraced areas is shown in Table 3. Terraced areas had very low erosion rate of 0.068 t ha\(^{-1}\) yr\(^{-1}\) compared with unterraced areas (24.71 t ha\(^{-1}\) yr\(^{-1}\)). This indicates that the about 24.642 t ha\(^{-1}\) yr\(^{-1}\) of soil have been conserved due to the presence of field bunds in the rice terraces. Using the ESONER formula, the total volume of 422,315 t yr\(^{-1}\) of soil were retained and conserved by the entire Ifugao Rice Terraces (17,138 ha).
Table 3. Comparative estimated of soil loss between terraced and unterraced areas

<table>
<thead>
<tr>
<th>Site</th>
<th>Estimated soil loss (t ha(^{-1}) yr(^{-1}))</th>
<th>Estimated amount of soil conserved by the terraces (t yr(^{-1}))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terraced</td>
<td>0.068</td>
<td>422,315</td>
</tr>
<tr>
<td>Unterraced</td>
<td>24.71</td>
<td>–</td>
</tr>
</tbody>
</table>

The equivalent monetary value of the soil conserved by the rice terraces was evaluated using the following equation:

\[
\text{Value of Soil Conserved} = (\text{Estimated volume of soil erosion in unterraced area} - \text{estimated volume of soil erosion in terraced area}) \times \text{cost of terrace construction}
\]

The average cost of terrace construction per cubic meter (PhP 75) was computed based on the following assumptions:

- Rate of labor = PhP 150/day
- Working capacity = 2 m\(^3\)/day

Thus, based from the foregoing valuation the equivalent amount of soil conserved by the rice terraces amounted to 316.7 million pesos per year.

\[
\text{Value of Conserved Soils} = (4,234,799 m^3 - 11,653 m^3) \times 75 \\
= \text{PhP316,735,950}
\]

The amount of soil nutrients lost due to soil erosion was also analyzed and computed based on the current price of single element fertilizers. The aggregated equivalent of nutrients in the conserved soils was about 394.3 t ha\(^{-1}\) yr\(^{-1}\) with a corresponding monetary value of 7.63 million pesos.

**Water Conservation**

Paddy fields in the Ifugao Rice Terraces retain water obtained from rainfall and irrigation. Water stored in the paddy fields is lost in the forms of direct runoff, evapo-transpiration and percolation. Part of the percolated water reaches the river through underground flow or base flow and eventually reaches the dam. The rest of percolated water recharges the ground water. Percolating waters from the paddy field are either added to the ground water or flows to the river are considered in this study as that water conserved by the paddy fields of the Ifugao Rice Terraces.
Table 4 provides the estimates of the annual water balance for the Ifugao Rice Terraces. The rainfall data considered was the mean annual rainfall for Lagawe and Banaue stations. Based from this evaluation, about 900 mm/yr were recycled back to the river/dam, while 300 mm/yr found its way to recharge the groundwater.

**Table 4.** Approximation of the annual water balance for the Ifugao Rice Terraces

<table>
<thead>
<tr>
<th>Item</th>
<th>Rate (mm/day)</th>
<th>Duration (day/yr)</th>
<th>Amount (mm/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irrigation</td>
<td>8.33</td>
<td>120 (2) = 240</td>
<td>1,999</td>
</tr>
<tr>
<td>Rainfall (mean annual for Lagawe and Banaue station)</td>
<td></td>
<td></td>
<td>2,535</td>
</tr>
<tr>
<td>Total Input:</td>
<td></td>
<td></td>
<td>4,535</td>
</tr>
<tr>
<td><strong>Output:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percolation</td>
<td>4.0</td>
<td>300</td>
<td>1,200</td>
</tr>
<tr>
<td>Flowing into the river (75%)</td>
<td></td>
<td></td>
<td>900</td>
</tr>
<tr>
<td>Recharging the ground water (25%)</td>
<td></td>
<td></td>
<td>300</td>
</tr>
<tr>
<td>Evapotranspiration</td>
<td>3.6</td>
<td>365</td>
<td>1,314</td>
</tr>
<tr>
<td>Total Output:</td>
<td></td>
<td></td>
<td>2,514</td>
</tr>
<tr>
<td>Runoff</td>
<td></td>
<td></td>
<td>2,021</td>
</tr>
</tbody>
</table>

Table 5 provides the summary of the water conservation function, using replacement cost method, of the Ifugao Rice Terraces. The water conserved in the Ifugao Rice Terraces was estimated to have an equivalent monetary value of about 371.2 million pesos per year.

**Table 5.** Calculated values of the water conservation function using the replacement cost method

<table>
<thead>
<tr>
<th>Type of water</th>
<th>Volume of water (m$^3$/yr)</th>
<th>Value (PhP/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percolated water that flows back to the river/dam (75%)</td>
<td>154,242,000</td>
<td>37,018,080</td>
</tr>
<tr>
<td>Percolated water that recharges the ground water (25%)</td>
<td>51,414,000</td>
<td>334,191,000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>205,656,000</td>
<td>371,209,080</td>
</tr>
</tbody>
</table>
Food Security Function

Food security is defined as access to food at all times, everywhere and everyone. Food security effects include the insurance effect of a certain level of self-sufficiency, and provision of strategic needs relating to food safety and balanced nutrition.

Rice supply and demand

The Ifugao Rice Terraces are basically rice-producing areas. Other crops such as banana and vegetables are grown in areas adjacent to the terraces. Thus, the Ifugao Rice Terraces was evaluated in terms of its capability to provide the security function for producing rice.

Rough rice (palay) production from nine municipalities that comprises the Ifugao Rice Terraces Communities reached 28,284 metric tons equivalent to a supply of 14,547 metric tons of milled rice. Notably, supply (2,911 mt) is highest in the town of Lagawe and lowest in the municipalities of Hungduan and Tinoc. The town of Mayoyao although extensively grown to rice and having an effective area of 1,845 hectares supplied only 1,331 mt from traditional rice production.

The current population in the project (123,476 people) would require a total 13,212 metric tons of rice, based on actual per capita rice consumption of 117 and 112 kg yr\(^{-1}\) for urban and rural population. The rural population, which represents 79 percent of the entire population, had a total demand of 10,909 metric tons. Only the rice terraces in the municipalities of Lagawe, Asipulo, Kiangan, Hungduan, Hingyon and Tinoc were able to meet the demand of their respective rural and urban populace. However, rice production from the terraces of Banaue, Aguinaldo and Mayoyao were not enough to support demand of their respective communities. Among the terraced towns in the project, only the municipality of Banaue has substantial urban development, where terraces were subject to land use conversion.

Based from the information and study conducted by Cordillera Administrative Region (CAR), its was indicated that the rice consumption in the project has exceeded by as much as 748 mt yr\(^{-1}\) rice more than the recommended intake. Based from the recommended dietary allowance and the desirable dietary pattern, the total rice requirement is estimated as 13,212 mt yr\(^{-1}\).

The aggregate supply and demand, presented in Figure 5, reflects surplus of 587 mt yr\(^{-1}\) considering actual consumption and 1,335 mt yr\(^{-1}\) based on recommended dietary requirement.
Food Security Assessment

The contribution or function of the Ifugao Rice Terraces to the general communities in the Ifugao province was evaluated by analyzing the Sufficiency Ratio (a indirect method to illustrate food insecurity in the rice terraces)

The Sufficiency Ratio (SR) is estimated by the following relationships:

$$SR_r = \frac{\text{aggregate supply from local production}}{\text{aggregate demand from rural households}}$$

$$SR_t = \frac{\text{aggregate supply from local production}}{\text{aggregate demand from total households}}$$

where:

Actual demand is based on actual per capita consumption.

Figure 4 illustrates the results in the analysis of Sufficiency Ratio in the project. The result indicates that the rice terraces can support the aggregate rice requirements of the communities, including the seed requirement. Only six municipalities are self reliant in rice requirement: Their combined surpluses, however, are more than enough to supply the additional rice to make the three other municipalities, namely Aguinaldo, Banaue and Mayoyao, self sufficient.

![Figure 4](image.png)

**Figure 4.** Rice sufficiency ratio of rural and urban households, Ifugao Rice Communities, 2001.
Agri-Tourism Function

The famous Ifugao Rice Terraces are expressions of cultural heritage of the sturdy Ifugaos, known for engineering skills and ingenuity. As a focal attraction in Ifugao, the terraces contribute to the growth of agri-tourism that benefits local residents engaged in farming, industry and services.

Provision of Rural Amenities

The Ifugao Rice Terraces provide a rural landscape that is distinctly unique, found nowhere in the country and perhaps in the world. The attractive greenery is best appreciated during the cool and rainy months where the terraces are grown to rice. The panoramic view of the rice terraces provides relaxation and intimacy with nature, away from urban merriment.

Ifugao offers 4 historical, 6 cultural, 14 natural and 6 man-made tourists’ spots and attractions, all within the coverage of the Ifugao rice terraces. The Banaue, Batad, Mayoyao, Hapao, Nagacadan Rice Terraces showcase the engineering skills and ingenuity of the sturdy Ifugaos that have transformed the mountain ranges into scenic attractions with streams and springs tapped to provide irrigation to the rice terraces.

Cultural destinations include six villages, namely: Tam-an Village, Bokiawan Village, Pula and Cambulo Native villages, Matanglag Bronze Smiths and Nuntamangan Village, Bangaan Village, and Batad Village. About 7 cultural festivals are conducted annually and these serve as tourists’ attraction.

Visit to the Ifugao Rice Terraces takes the form of sightseeing, visiting Ifugao villages, learning the indigenous culture of the Ifugaos and buying souvenir items uniquely crafted by them such as wood carvings, woven products, rice wine and basketry.

Records of agri-tourism from 1990 to 2001, showed increasing tourists visit to the Ifugao Rice Terraces. Marked improvement in the number of visitors was observed in 1994 and 1997. Over the last five years, however, tourists arrival average about 50,000. Composition of tourists based on the last two years of records showed that tourists visiting Ifugao are predominantly local tourists comprising 79.4 percent. Foreign tourists made up 20.2 percent with homecoming Filipinos representing 0.4 percent. Among foreign tourists, about 72 percent came from the USA and Japan (Table 7). The remaining 38 percent came from countries such as Australia, Canada, Germany, France, Hongkong, Korea, Switzerland, and United Kingdom. The value of the terraces is reflected as well in
the airfare that the visitors spent to personally see these terraces. Canadians, French and Americans and Indonesians are among those with high cost of airfare.

Table 7. Proportion of foreign tourists and fare from major cities to Manila

<table>
<thead>
<tr>
<th>Nationality of foreign tourists</th>
<th>Percentage (%)</th>
<th>Cost of roundtrip fare from major cities (US $, 2002)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>3</td>
<td>637</td>
</tr>
<tr>
<td>Canada</td>
<td>3</td>
<td>824</td>
</tr>
<tr>
<td>France</td>
<td>2</td>
<td>1,100</td>
</tr>
<tr>
<td>Germany</td>
<td>3</td>
<td>1,245</td>
</tr>
<tr>
<td>Hongkong</td>
<td>2</td>
<td>175</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1</td>
<td>569</td>
</tr>
<tr>
<td>Italy</td>
<td>0</td>
<td>889</td>
</tr>
<tr>
<td>Japan</td>
<td>26</td>
<td>403</td>
</tr>
<tr>
<td>Korea</td>
<td>2</td>
<td>405</td>
</tr>
<tr>
<td>Malaysia</td>
<td>1</td>
<td>499</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>1</td>
<td>692</td>
</tr>
<tr>
<td>Singapore</td>
<td>1</td>
<td>240</td>
</tr>
<tr>
<td>Switzerland</td>
<td>2</td>
<td>1,062</td>
</tr>
<tr>
<td>Taiwan</td>
<td>1</td>
<td>300</td>
</tr>
<tr>
<td>Thailand</td>
<td>1</td>
<td>227</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2</td>
<td>1,100</td>
</tr>
<tr>
<td>USA</td>
<td>46</td>
<td>727</td>
</tr>
<tr>
<td>Others</td>
<td>3</td>
<td>175</td>
</tr>
</tbody>
</table>

Surveys conducted by the Provincial Planning and Development Office (PPDO) revealed that most of the international and local tourists who visited during the month of September to October 1998 have an average length of stay of 2 days. Only a few extended their visits for a day or two. Based on sample questionnaire conducted by PPDO, foreign tourists who visited the province were generally more of the adventurous kind rather than the business type. These tourists travel for purposes of pleasure and recreation such as sightseeing, visiting the Ifugao village, trekking and mountain climbing, and learning about the Ifugao culture. The tourists are between the age group 21 to 60, most of which are classified as vacation tourists.

A total of 33 establishments providing accommodation to local and foreign tourists depend on agri-tourism. Among them, 22 are located in Banaue, 3 in Lagawe, 6 in Kiangan, one each in Mayoyao and Tinoc. Tourism facilities with accreditations are located in Banaue, Kiangan, Lagawe, Mayoyao and Tinoc.
Banaue has one standard class hotel with 90 rooms; 2 hostels with 8 rooms; 22 lodges and inns with 260 rooms; 2 pension houses with 15 rooms; 3 guest house/day centers with 9 rooms; and 4 home stay with 12 rooms (PGO Tourism Office in IPG, 2002 and key informant interviews). Altogether, these establishments can accommodate 839 guests at a certain period of time.

Similarly, a number of tourist-related establishments benefit from agri-tourism. These include restaurants and shopping centers among others.

Transportation facilities plying the Banaue-Lagawe-Kiangan-Baguio route and the Banaue-Lagawe-Manila route registered about 6 transport services. Other transportation facilities plying within the province registered a total of 5 bus companies.

The agri-tourism function of the Ifugao Rice Terraces was evaluated using the travel cost method (TCM). This method uses travel costs as proxy for the price of visiting outdoor recreational sites. This assumes that the costs required when urban residents visit a rural area are equal to the benefits obtained from a visit to a rural area.

\[
\text{Valuation} = (\text{Number of domestic tourists} \times \text{cost per visit of domestic tourists}) + (\text{Number of foreign tourists} \times \text{cost per visit of foreign tourists}) + (\text{Number of homecoming Filipinos} \times \text{cost per visit of homecoming Filipinos}) + \text{Opportunity cost of work}
\]

where:

\[
\text{Number of domestic tourists} = \text{Number of tourists} \times \text{proportion of domestic tourists} \times \text{proportion of tourists with purpose of sightseeing}
\]

\[
\text{Number of foreign tourists} = \text{Number of tourists} \times \text{proportion of foreign tourists} \times \text{proportion of tourists with purpose of sightseeing}
\]

\[
\text{Number of homecoming people} = \text{Number of tourists} \times \text{proportion of homecoming people} \times \text{proportion of tourists with purpose of sightseeing}
\]

\[
\text{Opportunity cost of work} = (\text{Average local daily wage rate} \times \text{Number of domestic tourists}) + (\text{Average foreign daily wage rate} \times \text{Number of foreign tourists}) + (\text{Average foreign daily wage rate} \times \text{Number of homecoming Filipinos})
\]

The estimated value of rural amenities provided by the Ifugao Rice Terraces amounts to **PhP 321.7 million** per year, broken down as follows:

Total cost of visit per year (accommodation and local travel):
Domestic - PhP 101.6 million
Foreign - PhP 37.3 million
Homecoming people - PhP 0.5 million
Total - PhP 139.4 million

Opportunity cost of work/year (based on average wage rate):
Japanese (Y2517/hr) = $160/day (manufacturing)
Americans ($14.38/hr) = $115/day (manufacturing)
Filipinos (PhP250/day) = $ 5/day (non-agricultural)
Total - PhP 132.5 million

Foreign travel costs/yr (20 percent of holidays spent in Ifugao):
Total - PhP 49.8 million

Additionally, the 33 establishments providing accommodation to tourists have created employment for an estimated 175 persons that generated an aggregate income of about PhP13.2 million per year for their families.

Preservation of Cultural Traditions

The Ifugao culture is associated with rituals, festivals and events depicting beliefs, tradition and practices including those associated with rice farming. Tradition includes sacrifices and offerings of animals made to gods.

The Ifugaos have ceremony for every important occasion such as wedding, burials, events of sickness, thanksgiving and the hagabi feast. So far, the cultural tradition have undergone dramatic social changes because the rituals are too expensive to perform, and the rapid cultural change taking place in the province brought mainly by urbanization and modernization of cultural beliefs more adoptive to popular norms (PPDO).

Cultural rituals and festivals

Terraced rice farming is traditionally tied up with rituals performed before, during and after farming activities. The traditional Ifugaos believed that failure to perform all or any of the rituals would result to crop failure and/or grave sickness in the family.

A recent study by Central Cordillera Agricultural Programme (CECAP) and PhilRice (2000) listed six rituals undertaken from land preparation to harvesting (Table 8). Indigenous farming is backed up by the spiritual guidance of the God of the rice terraces (Kabuniyan) with the belief that the rice crop will not be attacked by pests nor eaten by rats. The farmers would not work in their fields
without a sign from the chieftain (Mumbaki) who performs rituals not seen by the community and announces the start to work based on signs from Kabuniyan. Rice wine and chickens are used during the various rituals.

**Table 8.** Rice farming rituals in Ifugao (based on CECAP and Philrice 2000)

<table>
<thead>
<tr>
<th>Ritual</th>
<th>Description</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Impanal ritual</td>
<td>Before the seed is brought to the seedbed, the farmer offers rice wine and two chickens to Kabuniyan to ask his favor to bless the bundles of palay seeds so that calamities and pests will not disturb them. The Mumbayaki and the seed-sowers are expected to abstain from sex.</td>
<td>Land preparation/sowing</td>
</tr>
<tr>
<td>2. Loh-wang ritual</td>
<td>When the seedlings are ready for transplanting, rice wine and two chickens are again offered. This is the chance for the workers to drink wine and be merry.</td>
<td>Planting</td>
</tr>
<tr>
<td>3. Olpi ritual</td>
<td>After the rice fields have been planted, farmers celebrate in their own homes. This serves as thanksgiving for the work done in the rice fields. This is also the time when they ask the Kabuniyan to spiritually protect their ripe plants for a successful harvest.</td>
<td>Growing</td>
</tr>
<tr>
<td>4. Hagophop ritual</td>
<td>A month after the olpi ritual, the ceremony is repeated, especially by those who can afford a second celebration.</td>
<td>Growing</td>
</tr>
<tr>
<td>5. Hanglag or Mamague ritual</td>
<td>The ritual is performed as soon as the rice plants in the field change color, from evergreen to purple yellow. The farmer announces to all the rice goddesses that the harvest season is fast approaching. The offerings (rice wine and one chicken) are not shared with visitors.</td>
<td>Growing</td>
</tr>
<tr>
<td>6. Tungo ritual</td>
<td>This ritual is done in their respective houses or granaries. (If they have both, it is done at the granary.) The people call the goddesses of rice to come down and ask their favors to make the harvest fruitful and abundant and to guard the fields from evil spirits. Two days before this ritual, the leader of the community will announce the day of the holiday after the harvest. This ends the rituals for harvesting. Noise is prohibited during this time. Therefore, each family is expected to have enough rice for the day so that there should be no pounding of rice. No one is expected to go out into the fields.</td>
<td>Harvesting</td>
</tr>
</tbody>
</table>
Cultural festivals are celebrated in Ifugao and have gained popularity as cultural attractions. Celebrated mainly during the summer months of April and May, the festivities gave tourists insights of Ifugao culture, which shows rich indigenous heritage much associated with activities undertaken at the rice terraces. Table 9 enumerates the cultural festivals celebrated annually in various parts of the Ifugao province.

CECAP and PhilRice (2000) cited that rice wine (bayah) is required in large quantities during most Ifugao rituals and other special occasions. It takes around 10 days to make rice wine. To fully enjoy its taste, it must be available just in time for the occasion. In Cordillera custom rice wine should not be enjoyed alone but must be generously shared with friends and neighbors, both men and women. Home made yeast and glutinous rice (e.g. Bangkitan) are ingredients in making rice wine. Rice wine traditionally produced by households is not for sale but for family use and special occasions, which are shared with guests. The rice wine maker is not allowed to have sex throughout the aging period. Any kind of citrus must not be allowed to come near the rice extract or it will affect the flavor.

The traditional rice wine making has turned into commercial scale. A commercial producer of rice wine can produce 70 bottles per day using 74 kilos of glutinous and of non-glutinous rice using four pots but production is thrice a month only. About 100 cavans of palay (Binocboc variety of glutinous rice is used) is used in the production of rice wine. This translates to a total production of 2,520 bottles equivalent to 188 liters a year. He is able to sell 7 to 10 cases (12 bottles per case) per quarter. A month old rice wine is sold at PhP120/ bottle of 750 ml while three-year old rice wine is sold at PhP250/ bottle. Local and foreign tourists purchase rice wine. Four market outlets have been established at Solano, Nueva Viscaya; Banaue, Baguio and Manila. A total of six persons are employed in this business. Annual income is estimated at about PhP384,000 (US$7,680).

According to key informants, the traditional rice wine production is expensive so that the Ifugao has resorted to commercial liquor in home rituals. No longer do they strictly observe their indigenous culture. They have practically opted for much cheaper commercial wine during home rituals. In Banaue, the key informant estimated that only ten percent of the families observed the traditional rituals in rice terraced farming.

Current problems reported in commercial rice wine making included: unstable product quality due to different methods of preparation and population of microorganisms; short keeping quality (turns sour); sediments and turbidity; and poor packaging.
<table>
<thead>
<tr>
<th>Festival</th>
<th>Description</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banaue Imbayah</td>
<td>A three-day festival. Activities include ethnic parade, portraying the evolution of the Ifugao culture, followed by ethnic games participated by barangay delegations.</td>
<td>Every 4 years, April to May</td>
</tr>
<tr>
<td>Tungoh ad Hungduan</td>
<td>Tungoh are rest day for farmers after the planting season. The rest of the municipality and tourists are invited to a cultural night of songs and dances, ethnic parades. Held on mountain top, amidst the highest mountain peaks of the Cordilleras, One and a half climb up the mountain range.</td>
<td>April, every year</td>
</tr>
<tr>
<td>Ti-ghaw Ad Mayoyao</td>
<td>Victory feast among the Mayoyaos. Its celebration today commemorates ancient rituals and features ethnic games.</td>
<td>April</td>
</tr>
<tr>
<td>Gotad ad Hingyon</td>
<td>Gotad is one special day in 12 feasts celebrated by the royal class to please their gods. Cultural parades, ethno-modern sports and booth competition showing the best of Ifugao craft are displayed.</td>
<td>April</td>
</tr>
<tr>
<td>Gotad ad Kiangan</td>
<td>Traditionally, it involves a lot of merrymaking like drinking, singing, chanting and dancing. It has a festive atmosphere and a lot of rice wine is serves to the visitors and folks.</td>
<td>May, every year</td>
</tr>
<tr>
<td>Kulpi ad Lagawe</td>
<td>Kulpi is traditionally performed after the rice planting season to drive away the pests and evil spirits and for a bountiful harvest. The farmers perform this ritual in their respective homes one after the other or sometimes simultaneously. The municipality of Lagawe celebrates its Kulpi by featuring ethnic games, songs, dances, and including an Agri-industrial fair.</td>
<td>April, every year</td>
</tr>
<tr>
<td>Bakle Festival</td>
<td>Celebrated in Kiangan after the harvest season to express their heartfelt gratitude for a bountiful harvest. Abundant binakle (rice cake) and baya (rice wine) are found in every household for anybody to partake with.</td>
<td>September</td>
</tr>
</tbody>
</table>

Aside from rice wine, rice cakes (binakle) are served during rituals and special occasions. Its color varied depending on the variety of the glutinous rice used.
Willingness to Pay for the Conservation of Rice Terraces

Methodology

A survey was conducted covering households in three municipalities of the Ifugao province, namely: Banaue, Kiangan and Lagawe. Altogether, the number of respondents represents about four percent of the entire households in the three study areas. This translates to one percent of the provincial households of 31,346. The respondents are distributed as follows: 42 percent from Banaue, 29 percent each from Kiangan and Lagawe. These sites were selected considering the importance and extent of interventions given of the terraces.

Aside from being the center of agri-tourism and related activities, Banaue has the greatest share of the Ifugao Rice Terraces, which accounts to about 28 percent. Also, Banaue is included in the world heritage site. Kiangan which ranked 8th in terms of extent of rice terraces is also listed in the world heritage sites. On the other hand, Lagawe, which ranked 6th is the seat of the provincial government where interventions in the rice terraces are channeled?

On the average, respondents are 40 years old, ranging from 15 to 85 but mostly with ages 26 to 55. Majority of them are female and have reached college education. Respondents in Banaue are relatively young and mostly engaged in the handicraft business. The older respondents were mainly devoted to farming. About 83 percent have been living within the vicinity of the Ifugao Rice Terraces for at least 16 years and thus have prior knowledge and observations of the previous and current conditions of the Ifugao Rice Terraces. The average year of residence is 36 years.

By occupation, the respondents included those engaged in the agriculture, industry and services sectors; and those unemployed at the time of the survey. Farmers constitute 26 percent while those engaged in the business and services sectors made up 26 and 29 percent, respectively. The unemployed including the retirees and pensioners made up 19 percent.

So far, only three percent of the local respondents have affiliation to environmental group indicating low environmental consciousness among local residents.

Average annual family income is PhP87, 210. Almost 70 percent have annual family income of PhP100,000 and below, supporting a household consisting mostly of 5 to 7 persons. Fifty percent of the respondents have annual family income of less than PhP56,400 but the most has PhP60,000. Family income varied widely from PhP1,140 to PhP540,000.
**Results of Study on Willingness to Pay**

About 52 percent perceived the Ifugao Rice Terraces is at its alarming state but 48 percent believed otherwise. These figures suggest that the respondents are seemingly divided on the state of the rice terraces. About five percent considered the rice terraces in really bad state.

The respondents cited the lack of irrigation and of farm workers as the principal reasons for the lack of conservation and eventual abandonment of farms. Other respondents observed soil erosion, giant worms and water redirected in other areas causing the poor condition of the Ifugao Rice Terraces.

The great majority (89%) of local residents are willing to pay for the conservation and protection of the Ifugao Rice Terraces. Only 11 percent expressed no support in whatever form for this world heritage (Figure 5). The reasons for unwillingness included perception that it is government’s responsibility, while others believed it is farmers’ responsibility.

![Figure 5. Willingness to pay by payment vehicle and mode of payment for the conservation and protection of Ifugao Rice Terraces, 2003](image-url)
About 85 percent of the local respondents are willing to pay for the conservation and protection of the Ifugao Rice Terraces while 14 percent expressed unconcern for this world heritage. The reasons for unwillingness included perception that it is government’s responsibility, while others believed it is farmers’ responsibility.

The distribution of households willing to pay based on amount of one-time and regular donation is shown in Figure 6. The Willingness to Pay varied widely from PhP7 to PhP6,000 with mean of PhP485, median of 200 and mode of PhP100.

**Figure 6.** Households willing to pay for the conservation of the rice terraces and amount of one-time or regular donation

In terms of payment vehicle, most (69%) are willing to pay in cash basis while 30 percent are willing to support by rendering labor (26%) and sharing food (4%) or lending tools and equipment.

On cash basis, 32 percent prefer one-time payment while the majority (68%) is willing to donate on regular basis but most prefer annual payment. There is an association between mode of payment and the amount willing to pay.
Analysis of variance on Willingness to Pay amount against the varying level of income reveals that families with income above PhP 250,000 has the propensity to spend more for the conservation and protection of Ifugao Rice Terraces compared to those whose income is below PhP 250,000. The method of donation, such as cash, labor or in-kind, affects the values of Willingness to Pay amount. Willingness to Pay amount is significantly higher for families whose form of donation is labor as against those who directly give cash, although majority preferred to give cash for the reason of convenience.

Younger residents tend to give more amounts. Increase in income increases the amount willing to pay by the residents. In terms of payment vehicle, residents tend to give more value for labor and in-kind than paying on cash basis. Men tend to pay more than women. Either one-time or annual mode of payment results to lower Willingness to Pay compared to other modes of payment (i.e. monthly, quarterly or semi-annually).

Irrespective of the payment vehicle and the mode of payment, the respondents are willing to pay an average of PhP485 per household. Median and modal values are PhP200 and PhP100 per household, respectively. The mean value accounts to 0.5 percent of the annual family income.

Considering the entire households of Ifugao, the total non-use value of the Ifugao Rice Terraces for the province is PhP15.2 million (US$0.28 million). This however is an initial value as streams of payments are expected for the regular donation.

**SUMMARY AND CONCLUSION**

The Ifugao Rice Terraces was able to perform its traditional roles and sustained its productivity for more than 2000 years through the continuous application of the traditional Ifugao farming practices where the major outputs are non-tradable environmental products such as clean naturally recycled spring water from irrigation, fostering and conservation of water resources, natural aesthetic value of the rice terraces for tourism and other non-use tradable social and environmental goods. However, because of changing economic conditions and the need for the new Ifugao generations to adjust to some realities of development, may Rice Terraces have been abandoned, taken over by owners and new technologies not germane to the environmental requirements of the terraces.

Despite the tremendous pressures of urbanization and influences derived from tourism and tourists from various parts of the globe, the Rice Terraces continuously for 2000 years, was able to achieve its roles on the performance of
religious rites and social obligations. The changing roles of some of the Rice Terraces and the need to adjust to new technologies for making the communities located in urban and urbanizing areas have created complex problems of terrace collapse and declining productivity.

Based from the two-year results of the Philippine case study, the following conclusions can be made:

1. It is important that the multifunctionality of the rice terraces be considered in agricultural policy formulation or development of incentives for Ifugao farmers to sustain the interest on rice terrace farming.

2. Rice productivity in the terraces can be improved through application of sustainable soil and water management technologies. The balanced fertilization strategy developed by the Bureau of Soils and Water Management appears to be an effective technology in increasing the productivity of the Ifugao rice terraces.

3. The Ifugao Rice Terraces provides a variety of environmental functions, worth at least PhP 703.8 million. The sustainability of the century-old mountain farming system was probably brought about by the enormous amount of soil and water conserved by the rice paddies.

4. The Ifugao Rice Terraces contributes to social development, i.e. rural viability. In fact, data analysis showed that agriculture, particularly rice farming has remained the basic source of employment of the Ifugaoos during the last 15 years. Likewise, the rural character of the Ifugao province has been maintained during the last decade.

5. As regards food security, analysis of the self-sufficiency ratio suggests that the Ifugao Rice Terraces can support the aggregate rice requirements of the rural and urban communities.

6. In addition to the pure economic function, the rice terraces continue to provide stable employment to the Ifugaoos, thereby contributing to the sustained overall development of the province.

7. The Ifugao Rice Terraces can provide rural amenities worth at least PhP321.7 million per year. In addition, continuous paddy farming can ensure the preservation and transmission of their rich cultural heritage.

8. Both local residents and tourists are willing to pay for the conservation and protection of the Ifugao Rice Terraces with an average of PhP485 and US$30, respectively.

**FUTURE STUDIES AND ACTIONS**

The non-tradable good/non-use valuation of the Ifugao Rice Terraces in this study covered only local residents of Ifugao. Considering its agri-tourism contribution, tourists both foreign and local are also stakeholders in the
conservation and preservation of the Ifugao Rice Terraces. Thus, the study should be expanded to cover both tourists visiting the Ifugao Rice Terraces. Travel cost as payment vehicle can also be pursued. So far, initial efforts have been undertaken by the ASEAN Japan Project on Multifunctionality of the Ifugao Rice Terraces to conduct survey covering these respondents.

In addition, supplemental survey for the local residents has to be undertaken to determine the extent of payment/donation and estimate the aggregate Willingness to Pay.

REFERENCES


