

On Farm Conservation Practices of Upland Rice Varieties in Selected Towns of Apayao

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Abstract: This study was conducted to document on-farm conservation practices of traditional upland rice varieties in some selected towns of Apayao. Specifically, it was intended to describe farming practices including beliefs and attitudes in the conservation of upland rice varieties; identify factors or reasons for erosion of traditional upland rice varieties; propose measures or programs that directly concerns on conservation of traditional rice varieties at the farmer's level.

The study made use of the descriptive survey method of research with key informant interview and observation as data-gathering tools.

Results revealed that there are 15 traditional rice varieties being cultivated by upland farmers in Apayao. Most of these are used by farmers since time immemorial. The most preferred varieties are Palawan, azucena, saba, ginobyerno pawangwang and others. Majority of the respondents acquire their seed from their own farm and use the same variety for the next planting season. They store their seed by hanging the bundled panicles or dried and placed in a sack. The basis of selecting their seeds were gastronomic (good eating and cooking quality), panicle length, and healthy seeds.

The major causes of genetic erosion in upland rice are gastronomic, agronomic and socio-cultural which includes poor cooking and eating quality, low yield, unavailability of planting materials, less cultural use, introduction of new varieties and shifting to other crops.

Keywords: Upland Rice, In Situ conservation, Production Practices.

I. INTRODUCTION

Rice (*Oryza sativa*) is human's most important food crop [1]. It is the most important commercial food crop [2]. It is recognized as the most important crop in the world feeding some 400 million metric tons are harvested each year, and these familiar grains are the daily nourishment of billions of people. Rice provides 21% of global human per capita energy and 15% of per capita protein. Although rice protein ranks high in nutritional quality among cereals, protein content is modest. Rice also provides minerals, vitamins, and fiber, although all constituents except carbohydrates are reduced by milling. [3] It accounts for an average of 35% of the total calorie intake and even reaches to as high as 60-65% for households in the lowest income bracket. It can be processed into varied products such as rice cakes (bibingka, puto, sinuman, tupig and others) [4]. Rice by products are used in the production of animal feeds like rice bran, handicrafts from rice hays and ingredients for shampoo from upland rice hays, organic fertilizers and carbonized rice hull. [5] It gives employment to millions of people through the development of rice-based products which includes cream puff, fortified brownies and espasol, Maligaya rice bar, Shangrice, tikoy, pasta and noodles, dry soup mix, rice wine, rice beer, and rice-based foods.

The Philippine average rice yield per hectare for the past five years (1985-1989) was 2.7 tons. From 1985 to 1987 the area planted to rice was about 3.4 million hectares (43 percent irrigated lowland, 45 percent rainfed and 12 percent upland area respectively). Eighty-seven percent of this area was planted with modern rice varieties. Meanwhile, expansion of riceland is not possible, ail land suited for rice is already being cultivated; and, urban expansion is steadily forcing more land out of production. [6] Among the rice producing countries worldwide, the Philippines ranks tenth in 1989 with China leading and India second. [7] In terms of production area, India has the largest, next is China and the Philippines on the eight ranks.

The major rice producing regions in the country were Nueva Ecija, Isabela, Pangasinan, Cagayan, Ilo-Ilo, Tarlac, Camarines Sur, Cotabato, Leyte and Negros Occidental. These regions collectively contributed about 63% of the total rice production. The highest producing provinces were Nueva Ecija, Isabela, Pangasinan, Iloilo, Cagayan, Tarlac, North Cotabato, camarines Sur, Bulacan and Sultan Kudarat[8]. The provinces of Apayao, Kalinga, Pangasinan, Ilocos Norte, Cagayan, Isabela, Nueva Vizcaya, Tarlac, Nueva Ecija, Occidental and Oriental Mindoro, Antique, Capiz, Iloilo, North Cotabato and Sultan Kudarat produced rice surplus but were not able to offset large deficits of rice demands in Metro Manila and other provinces [9].

Today in the Philippines, rice is the humans most extensively grown crop in every region. It's important is highlighted by the fact that it has been the principal staple crop since the time it was originally introduced. Thus, small-scale rice farming system such as shifting cultivation of rugged island interior still continue to exist. Hence, traditional rice varieties has been kept because it is inter-woven into the peoples culture and beliefs.

The continuous research and development efforts to produce hybrid rice varieties that can take place the traditional ones posed a threat to the preservation of traditional varieties.

The needs to study farmer’s method of keeping traditional varieties make up the essential matter of this study. In Situ or on farm conservation has historically been the main method used by the farmers for conserving crop genetic diversity. Farmers traditional farming practices as still carried on and pass through to their generations as they continually clash for existence.

In situ or on-farm conservation is an important complement to ex situ conservation of traditional crop varieties. On –farm conservation of crop genetic resources is defined as the continued cultivation and management of a diverse set of crop populations by farmers in the agroecosystems where a crop has evolved.

Any attempt at in situ crop genetic conservation much struggle to preserve the agro-eco-system in which this resources occur.

Objectives

Generally, the study was intended to document on farm conservation practices of upland rice varieties in some selected towns of Apayao.

1. Describe farming practices including beliefs and attitudes in conservation of upland rice.
2. Identify upland rice varieties cultivated by farmers.
3. Identify factors or reasons for erosion of traditional varieties of upland rice.

II. METHODOLOGY

Research Design

This study made use of the descriptive survey method of research with key informant interview and observation as data-gathering tools.

The Respondents

The researcher purposively selected 43 respondents. The key informants were believed to have significant knowledge or information on in situ conservation of upland rice. The barangay captains of the said area where the study was conducted help identified the key informants who also served as the respondents of the study.

Locale of the Study

This study was conducted in the municipalities of Luna, Pudtol, Flora and Calanasan. It is in these municipalities where slash-and –burn agriculture is predominantly practiced and their major crop produced is upland rice. Preliminary information revealed that people from the selected site have been practicing kaingin and upland rice were cultivated .

Data Gathering Procedure

Data were gathered from farmers who engaged in upland rice farming by means of semi-structured interviews. Responses from the interview were validated with the use of actual observation. respondents were asked about the indicator they use as basis or clues o how they conserve their traditional varieties. Other information includes their beliefs and practices in shifting cultivation.

Research Instrument

The semi-structured interview and observation was the main instrument used in collecting the data needed in this research. Vital data were documented with the use of a camera and tape recorder.

Data Analysis

The data gathered from the respondents were tabulated, computed and analyzed with the use of frequency counts, percentage and ranking. Verbal responses were also recorded to emphasize/ highlight their existing beliefs and practices on cultivation upland rice. Some data were presented in narrative form as deemed necessary especially on their beliefs and practices relevant to conservation and uses of the rice varieties.

III. RESULTS AND DISCUSSION

Demographic Profile of Respondents

Table 1. Demographic profile of respondents

Characteristics	Frequency	Percentage
Age		
20-29	17	39.53
30-39	8	18.60
40-49	12	27.91
50-59	3	6.98
60-69	3	6.98
Sex		

Male	27	62.79
Female	16	37.21
Highest educational Attainment		
None	1	2.32
Elementary level	23	53.49
High School Level	11	25.58
College level	8	18.60
Ethnicity		
Ilocano	10	23.25
Isnags	25	58.14
Igorot	8	18.61
Civil Status		
Married	31	72.1
Single	9	20.9
Widow	3	6.98

Majority of the respondents are on the middle ages ranging from 20- 49 years old. More than fifty percent of the respondents are male because of the nature of the work in the kaingin site which requires physical strength and stamina. Majority of them are elementary level and a few of them were able to reach high school. Fifty eight percent of the respondents are Isnags and seventy two percent were married.

Perception of farmers on Upland rice Cultivation

Table 3. Perception of farmers on rice cultivation

Response	Frequency	Percentage
Easy	17	39.5
Difficult	24	55.8
No response	2	4.7
Total	43	100

More than half of the respondents, view upland farming as difficult. Other see it as an easy job. This may be due to the distance of the kaingin site where they need to hike to reach the area. Upland farming has been viewed by most ethnic minorities as an opportunity for them to earn for a living due to lesser farm inputs and greater area for cultivation.

Table 4. Frequency of farmers who use the same variety in planting the next cropping season

Response	Frequency	Percentage
Yes (the same variety)	39	90.7
No	4	9.3
Total	43	100

The choice of variety to be planted is one consideration that needs to be looked into in farming. Among the respondents asked, 91 percent of them use the same variety for the next planting season. This fact is maybe attributed to the availability of supply of seeds in upland cultivation. Unlike lowland rice varieties, there are more seed centers established for seed procurement.

Table 5. Rice varieties usually cultivated in each research site

Site	Rice varieties	F
Luna	Palawan, ginobryerno, azucena, arimuran, ballatinaw, Mindanao, gudoy, tangtang, talipugo, wagwag, saba	11
Pudtol	Palawan, ginobyerno, azucena, ibuwan, kalayan, pawangwang, ballatinaw, burikan, saba, tangtang	10
Flora	Palawan, azucena, ginobyerno, pawangwang, ballatinaw, kalayan, Mindanao, wagwag, talipugo, tangtang, saba	11
Calanasan	Palawan, Mindanao, ballatinaw, burikan, sinumay, kalagan, saba, wagwag, tngtang, talipugo	10

The most common upland rice varieties being cultivated in the study area are palawan. Ginobyerno, ballatinaw, and saba. The municipalities of Lua and Flora has the greatest number of traditional rice varieties followed by the municipalities of Pudtol and Calanasan.

Table 6. Preferred upland rice varieties and their reason for choosing the variety for cultivation .

Upland rice varieties	Frequency	Reason for choosing
1. Palawan	43	Good eating quality, resistant to pest and diseases
2. Azucena	38	High yield, long panicle, aromatic, early maturity
3. saba	37	For festivities/ making delicacies
4. Ginobyerno	35	Aromatic/ high market demand
5. pawangwang	33	Good eating quality, resistant
6. Mindanao	32	Sturdy

7. kalayan	31	Sturdy
8. sinomay	29	Aromatic
9. talipugo	29	High yield, panicle length
10. ibuwan	27	Aromatic
11. Ballatinaw	25	For winemaking/ delicacies
12. wagwag	24	Good eating quality
13. burikan	21	Good eating quality, drought resistant
14. gudoy	20	Sturdy
15. tangtang	18	High yield

Among the traditional upland rice varieties, palawan is the most preferred. This is being followed by azucena, saba, ginobyerno, pawangwang, Mindanao, kalayan, sinomay, talipugo, ibuwan, ballatinaw, wigwag, burikan, gudoy and tangtang. The main reason why palawan was chosen by most upland farmers is maybe this is one of the most traditional varieties and has been used since time immemorial.

Seed Supply and seed acquisition

Table 7. Seed supply or seed acquisition

Sources of seeds	Frequency	Percentage
Own farm	38	88.4
Other farm (friends and relatives	4	9.3
Public institutions	1	2.3
Private institutions	0	0
Method of seed acquisition		
Existing stock	38	88.4
Bought	1	2.3
exchanged / Barter (with other varieties, commodities, labor)	1	2.3
Government subsidies seeds	1	2.3
Government supply		
Given free by friend / relatives	2	4.7

Most of the seed supply used by the respondents came from their own farm meaning they intend to preserve seeds ready for planting the next planting season. Others came from friends and relatives and other institutions. The reason behind preserving seeds from their own produced is due to unavailability of seeds in the market or there are no or few institutions selling traditional rice varieties. A similar situation is being observed on seed procurement for lowland rice. With regards to their method of seed acquisition, 88.4 percent acquire their seeds from their own stocks, the remaining percentage came from other seed sources such as friends and relatives, from individuals who have stocks, exchanged or bartered with different seeds or commodities and some from government subsidies through LGU initiatives.

Method and place of Seed Storage

Table 8. Method and place of seed storage

Method of seed storage	Frequency	%
Bundled in panicle and Hang	38	88.3
Treated with chemicals/Treated with botanical pesticides/ ash/ etc.	1	2.3
Dried and placed in sack	3	9.3
Place of storage		
Inside their house	30	69.8
Separate storage houses	13	30.2
Special container	0	0
Storage rooms	0	0

Eighty eight percent store their seed by bundling the panicles and hanged. Some dried it and placed the panicles in sacks, 9.3%. the rest treat it with commercial pesticides or botanical pesticides to control pest such as weevils, and others. Their seeds are stored in their house, 69.8%, while 30.2% store their seeds in separate storage houses. This scenario is common among marginal group of farmers who can not afford to build storage house. Among Isnags who reside in a more remote area where building materials such as wood, bamboo, and others are available, they opt to construct their sipi, a storage house with detachable ladder.

Basis of Seed Selection

Table 9. Basis of seed selection

Basis of selection	Frequency	Rank
1. healthy seeds	24	3
2. panicle length	27	2
3. absence of disease	21	4
4. gastronomic	43	1

Seeds that has good eating and cooking quality is the most preferred seed to be planted. Upland rice of good eating and cooking quality has high market demand and command a higher price. Next to gastronomic is panicle length with the belief that it will give greater yield. Other basis of seed selection are healthy seeds and absence of disease.

Farming system

Table 10. Farming system

Farming system	Frequency	Percentage
1. monocropping (Rice-rice)	9	20.9
2. Intercropping (rice + Other crops)	23	53.5
3. Crop rotation (rice- other crop)	11	25.6
Total	43	100

More than half of the respondents (53.5%) used intercropping farming system, that is integrating other crops in their rice field while 25.6 of them do crop rotation, that is planting the area with other crop after rice. Only 20.9 % use monocropping, rice-rice.

Table 10.1. Crops usually intercropped with rice

Crops	Frequency	Rank
1. Eggplant and other vegetables	2	5
2. banana	28	1
3. gabi (taro)	17	4
4. Legumes	1	6.5
5. pineapple	23	2
6. papaya	21	3
7. ginger	1	6.5

Crops that are usually intercropped with rice includes banana, pineapple, papaya, gabi, eggplant, legumes and ginger. Banana ranks first because of this is the permanent crop usually established by upland farmers, besides there are available supply of planting materials from the place. Other reason are: low labor input, less maintenance, and has good market.

Table 10.2 . Crops usually planted after rice in crop rotation

Crops	Frequency	Rank
1. cassava/ other root crops	39	2
2. pineapple	23	5
3. legumes	37	3
4. banana	42	1
5. corn	28	4
6. Ginger	10	7
7. coconut	13	6
8. Fruit trees	7	8

Similar to intercropping method, banana ranks first among the crop planted after rice. this is being followed by cassava/ other root crops and next is legumes. Others includes corn, pineapple, coconut, ginger and last is fruit trees. Availability of planting materials, high maintenance cost and late maturity are maybe the reasons why fruit trees ranks last among the crops planted after rice.

Cultural Management Practices

Among the cultural management practices used by upland farmers include land preparation usually done by slash and burn method. For existing kuman , Some use herbicides or zero tillage in planting the next cropping season. To control broadleaves, they use 2-4-D. Power herbicides is usually used after harvesting the panicle ready for planting the next cropping season. Planting is usually done manually with the use of a dibble stick sharpened at the tip. Planting density is usually 2-3 seed per hill at a planting distance of 30 x 70 cm. Others plant 4-5 seeds/ hill at a distance of 20 x 70 cm.

Cultivation is done manually with the use of a hand hoe or bolo. This is also use in weeding. Spraying is done when needed. Fertilizer application is seldom practiced. Harvesting is done manually with the use of harvesting knife called rakam.

Prevalence of Pest and Diseases and Method of Control

Table 11. Incidence of pest and disease and their method of control

Pest/ Disease	Method of control (framer's practice)
Tungro	uprooting and putting it into fire/ spraying
White heads / dead hearts	Spraying
Wild animals	trap/ (patungkab)
Nematodes	Spraying
Rodents	use bamboo traps
Beetles	Spraying

Birds	scarecrow / string with can
Stem borer	Spraying

Pest and disease usually observed by farmers include tungro, white heads/ dead hearts, the occurrence of wild animals, nematodes, rodents, beetles, birds and stem borer. Spraying is the most practiced method of controlling plant disease/ pest. Pesticides such as Cymbus, Karate, decis-R are usually used in the control of pest and diseases.

Wild animals, rodents and birds are being controlled through the use of traps, scarecrow or string with can to catch them or drive them away.

Causes of erosion of upland rice varieties as perceived by farmers

Table 11. Perceived causes of erosion of upland rice varieties by farmers

Causes	Frequency	Rank
1. Agronomic		
a. low yield	12	5.5
b. susceptibility to disease	10	7.5
c. Susceptibility to heat / drought	9	9.5
d. late maturity	10	7.5
e. Susceptibility to lodging	23	2
2. Gastronomic		
a. poor cooking/ eating quality	37	1
b. less processing potential	9	9.5
3. Socio-economic and cultural		
a. poor market value	13	4
b. unavailability (loss / lack of planting materials)	12	5.5
c. introduction of new varieties	5	11
d. less cultural use (rituals/ festivities)	21	3

Among the perceived causes of erosion of upland rice varieties are gastronomic, agronomic and socio-economic and cultural factors. Poor eating and cooking quality ranks first followed by susceptibility to lodging. This is due to the fact that Apayao is often visited by more than 10 strong typhoons each year. Aside from this, the province is also characterized by Corona type three climatic conditions that prolonged wet season. Susceptibility to lodging affects yield. Culture has something to do with retention of the rice variety being planted because rice is held with high regards among cultural minorities living in the upland. Other factors include poor market value, low yield, unavailability of planting materials, susceptibility to disease, late maturity, less processing potential, susceptibility to drought, and introduction of new varieties.

VII. CONCLUSION

From the result of the study, it can be said that conservation of traditional upland rice varieties in Apayao is not yet a serious problem. However, this can be done in the near future due to varietal erosion brought about by introduction of new varieties. Farmers' preferences affect their choice of varieties. In general, good cooking and eating quality together with good yield, early maturity and resistance to pest and diseases are the most common consideration in the choice of varieties.

VIII. RECOMMENDATION

In the light of the findings and conclusion, the following are recommended:

1. An effort for the collection and conservation of traditional upland rice varieties should be done.
2. Establishment of in-situ conservation site for the maintenance of these varieties.
3. Establishment of seed centers where upland rice varieties can be availed of by farmers.
4. Conduct forums and symposia promoting traditional upland rice varieties, farmers' technology on upland farming system and farming system technology on hilly lands such as the contouring, alley cropping, the use of natural vegetation strips, etc.
5. Establish inter-agency collaboration for strengthening conservation efforts.
6. Conduct similar study on in-situ conservation to other crops.
7. Rice Festival should be conducted to promote the different upland rice varieties, the various products derived from it, its importance to culture and.

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