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Research Article

Indigenous Knowledge on Pest Management in Rice Production in the Province of Masbate

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ABSTRACT

A total of 90 rice farmers who are used in adopting IK in rice pest management were considered using a convenient sampling method in selecting respondents. The data were subjected to descriptive statistics. The result showed that 40% of rice farmers are 51-60 years old, male (80%), married (95%), elementary graduate (44%), with a household size of 1 to 5 members (70%), and 37% were engaged in farming for 5 to 10 years. Furthermore, farmers are dominated by the land owner (57%), planted traditional or local varieties (61%), with farm size of less than 1 hectare (47%), and obtained an average yield of 50 caravans per hectare (35%). Rice farmers claimed that IK was handed down by their ancestors with less intervention from agricultural institutions, and rice farmers have practiced it for 20 to 30 years. Most (32%) farmers perceived they were more familiar with indigenous knowledge than new technology. The level of awareness of IK on pest management in rice production in the province of Masbate revealed that rice farmers were aware of the IK practices with a weighted mean of 2.87. Furthermore, data also revealed that the level of utilization of rice farmers who utilized IK on pest management in rice production is often with a general weighted mean of 2.85. Similarly, the result shows that the IK practices on pest management in rice production in the province of Masbate are cost-effective, with a general weighted mean of 2.85.

Keywords: *Indigenous knowledge, Rice production, Pest, Province of Masbate*

Introduction

Rice production in the Philippines has developed from more or less extensive subsistence farming to intensive agricultural production highly dependent on pesticides and chemical fertilizers. It holds the key to maintaining the country's food security, alleviating poverty, and surviving the existing and future population. However, the staggering increase in the use of synthetic farm chemicals in the past few decades did not result in a significant increase in crop yields. Instead, it affects substantial

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environmental damage to the country's agriculture and natural resources (Tirado & Bedoya, 2008).

Farmers have long used Indigenous knowledge (IK) in rice pest management practices before chemical pest management to mitigate the negative effects of pests and diseases on crops before the advent of chemical pesticides. These practices are regarded as location and pest-specific, cheap, and environment-friendly (Chandola et al., 2001).

Considerably, IK on pest management in rice production is concerned with the natural way of controlling pests that are attuned to the indigenous peoples (IPs) own culture and ancestral beliefs. They are also using indigenous materials such as herbs and other medicinal plants to control plant pests and diseases. Most often, words of prayer are religiously observed to drive away bad elements and other enemies from the area (Gorjestani & Nicolas, 2000). IK is used at the local level of communities as the basis for decisions pertaining to food security, human and animal health; education; natural resource management; and other vital activities resulting in the conservation of natural resources. Therefore, IK is a key element of the social capital of the poor and constitutes their main asset in their efforts to gain control of their lives (Gorjestani & Nicolas, 2000).

In the Bicol region, particularly in the island Province of Masbate, farmers still value the importance of indigenous knowledge in controlling pests of commonly grown crops as their guiding practices in their farming activities since IK is considered as cost-effective and less hazardous to the environment (Gracio & Pateño, 2016). This is essential because farmers in the said province are known to be subsistence-oriented farmers and significantly poor, not to mention that the province of Masbate is the second poorest province in the country (NSCB, 2013).

The study, therefore, was conducted to provide baseline data and information about IK on pest management in rice production in the province of Masbate.

Methodology

Research Design

The study made use of the descriptive research design to obtain baseline data and information about IK on pest management in rice production. It also utilized the convenient research method in the selection of the respondents of the study.

Locale of the Study

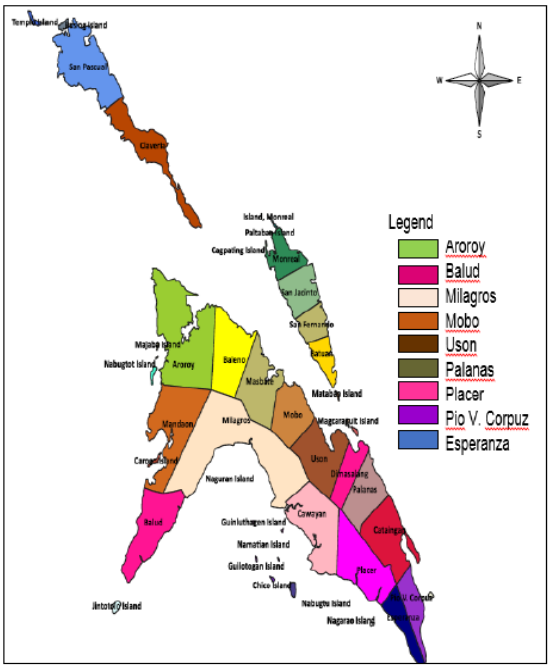

Figure 1. Locale of the study

The study was conducted in the island province of Masbate. Masbate is one of the two island provinces in the Bicol region. It is situated strategically in the center of the Philippine archipelago. It is bounded in the north by Burias and Ticao Islands, east by the San Bernardino Strait, south by the Visayan Sea, and west by the Sibuyan Sea. Relative to mainland Bicol, the province faces the southwestern Camarines Sur, Albay, and Sorsogon coasts.

Concomitantly, the province of Masbate is known to be conservative in its farming activities. They believe that success can only be achieved by following the traditional way of farming using locally available farm resources rather than newly introduced technology. Moreover, farmers in the locality are less receptive to the new technology being introduced by the agricultural authorities due to their belief that new technology is not suitable and sustainable for their farm may be because of their present status in life. Figure 1 shows the locale of the study.

Respondents of the Study

The study was conducted in 9 rice-producing municipalities in the province of Masbate. The said municipalities are as follows: Balud, Aroroy, Milagros, Mobo, Uson, Palanas, Placer, Pio V. Corpuz, and Esperanza. Only 10 respondents with farm size of 1 hectare to 5 hectares per municipality who are used into the adoption of IK in rice pest management were considered. The said respondents were selected based on their IK adoption experience and practice.

Research Instrument

The researcher gathered quantitative and qualitative data using questionnaires, face-to-face interviews, and focus group discussions with the respondents. The questions given to the respondents were categorized into four parts, namely: (i) Socio-Economic Profile of Rice Farmers; (ii) Existing IK, its Sources and Length of Practice; (iii) Reasons for Adopting IK; (iv) Level of Awareness, Frequency of Utilization and Level of Cost Effectiveness.

Data Gathering Procedure

The researcher coordinated and sought permission from the LGUs through the municipal mayors to conduct a survey in the nine pre-identified municipalities in the mainland province of Masbate. Research enumerators were hired to assist the researcher to conduct the survey. After the approval, the researcher and the enumerators conducted the face to-face-interview and focus group discussion among the farmer-respondents regarding the IK on pest management in rice production.

Methods of Data Analysis

The data were analyzed using simple descriptive statistics such as frequency count, percentage, and weighted mean.

Result and Discussions

Socio-Economic Profile (SEP) of Rice Farmers Using IK on Pest Management in Rice Production

The SEP of rice farmers consisted are the following: age, sex, marital status, educational attainment, household size, monthly income, farming experience, tenurial status, rice varieties planted, farm size, and rice yield.

Age. Forty-two percent of rice farmers were between 51 and 60 years old, 30% were 50 and below, and 27.78% were 61 years old and above.

The data show that the age of the majority of rice farmers in the province of Masbate using IK on pest management in rice production ranged from 51 to 60 years old. This finding conforms to the statement of Alcala (2014), who said that the mean age of Filipino farmers who practice organic agriculture is 57 years old. However, this is contradictory to the study of Joshi (2000) that the age of farmers in Ifugao rice terraces who adopted IK ranges from 31 to 50 years old. The majority of the farmer respondents are between 11 to 30 years old. Sex. In the study, there were 80% of male rice farmers used IK for pest management in rice production in the province of Masbate.

The result showed that male rice farmers are dominant. This is consistent with the study of Rahman (2012), who found that there was a

greater proportion of rural men in Bangladesh who practiced indigenous pest control in rice production compared with female farmers. Similarly, in the study of Bamigboye and Kuponiyi (2009), rice cultivation in Southwestern Nigeria was dominated by male farmers, in line with their assertion that crop husbandry is a male-dominated venture.

Marital status**.** Ninety-five percent of the rice farmers who practice IK on pest management in rice production in the province of Masbate are married, and 1.11% single. This is expected since most respondents were in their middle and old ages.

The result on the marital status of rice farmers in this study was comparable with the study conducted by Abdulsalam (2015), which states that most of the 'ofada' rice growers in Ugon State, Nigeria, are married (87.5%). He further emphasized that getting married is a social and cultural expectation apportioned to both males and female in Nigerian farmers. It was also observed in the study of Bamigboye and Kuponiyi (2009) that about 81% of the farmers of Ekiti State, Nigeria, are married, while 13.2% are single. According to him, married farmers are likely to have taken advantage of family labor in their farming enterprises.

Educational attainment**.** The study indicated that 44% of rice farmers who practice IK on pest management in rice production in the province of Masbate are elementary graduates, 37% are high school graduates, and 13% are college graduates. The result implies that being elementary graduates, rice farmers have limited technical know-how in modern or advanced pest management programs, which is why they utilized the IK practices for pest control in rice production.

The result corresponds with the results obtained in the study conducted by Adesiji (2009) on indigenous methods of controlling pests among rice farmers in Patigi, Kwara State, Nigeria. In the said study, the majority of rice farmers have no formal education.

Household size**.** Seventy percent of the rice farmers have one to five household members. This implies that rice farmers in the province of Masbate have large household sizes, which are potential for their manpower or available labor in their respective farms.

The result of the study is consistent with the study conducted by Abdulsalam (2015), who found out that the majority of the rice growers who adopted IK in Nigeria have 4.0 to 15 household members, of which 75% of the labor force comes from.

Monthly income**.** Sixty-four percent of rice farmers have less than 5,000.00 income; 27% have 6,000 to 10, 000.00 monthly income; 4.0% have 11,000 to 15,000 monthly income; and 3.0% have greater than 15,000.00 monthly income per month.

The result implies that most of the rice farmers in the province of Masbate who practice IK on pest management in rice production live below the poverty line. This is significantly true since Masbate is listed in the top 20 of the poorest province in the country.

The result of the study corroborates with the findings in the study of Bamigboye and Kuponiyi (2009), where more than half of the farmers in Nigeria who adopted IK were in the low-income category.

Farming experience**.** The farming experience of the rice farmers apparently shows that they have been in farming for a longer period of time; 37% have 5.0 to 15 years of farming experience, 33% have greater than 25 years of farming experience, and 30% have 16 to 25 years of farming experience.

The result of the study can be inferred that rice farmers are presumed knowledgeable on farming techniques because of their vast and prolonged experiences. Hence, this presumption is supported by the study of Joshi (2000), that the majority of the rice farmers in Ifugao had 11 to 30 years of rice farming experience and are adopters of indigenous knowledge of cultivation practices in rice production.

Land tenure status**.** Fifty-seven percent of rice farmers who practice IK on pest management in rice production are land owners, 41% are tenants, and 2.0% are leasees.

The result of the study supports the findings obtained in the study conducted by Ocliasa (2012), that the tenurial status of rice farmers in Bohol, Philippines, who adopted IK management in rice was dominated by 58.3% owner-operators.

Varieties of rice grown**.** Sixty-one percent of the rice farmers who practiced IK on pest management in rice production were using traditional or native rice varieties, and 39% were using modern rice varieties.

It can be deduced from the result of the study that most of the rice farmers who practiced IK on pest management in rice production utilized traditional or native varieties. This means that the use of traditional or native varieties is a form of indigenous technology in rice production.

In the study of Serrano (2000), it was emphasized that farmers used to plant traditional varieties that are photoperiod sensitive. The leading varieties then included the Milagrosa, Wagwag, Buenavista (Kasungsong), and others. These varieties, although resistant to most pest and diseases and have excellent eating quality, yields only 20-30 cavans per hectare, matures late at around 150 days, and grows by as much as 160 cm tall. This explains the relationship to the outcome of the kind of rice varieties used by rice farmers who practiced IK on pest management.

Farm size**.** Forty-seven percent of rice farmers who practice IK on pest management in rice production have less than 1.0 hectares farm size; 32% have 1.0 to 2.0 hectares of farm size; 12% have 2.1 to 3.0 hectares farm size, and 9% have greater than 3.0 hectares farm size. In general, rice farmers who practice IK on pest management have small farm sizes.

The result obtained in the study conforms to the study of Warren et al. (2005), who that the majority of farmers in most developing countries are small-scale farmers, each working on less than 2.0 hectares of land. These farmers represent hundreds of distinct languages and ethnic groups. In most instances, the knowledge systems of these farmers have never been recorded systematically in written form; hence, they are not easily accessible to agricultural researchers, extension workers, and development practitioners. While they remain invisible to the development community, many indigenous organizations are operating in rural communities to search for and identify solutions to community problems.

Average rice yield. Thirty-five percent of the rice farmers who practice IK on pest management in rice production have an average yield of 50 cavans per hectare; 20% have 31 to 40 cavans yield per hectare; 16% have less than 10 cavans yield per hectare; 11% have 11 to 20 cavans yield per hectare; and 9% have 21 to 30 cavans yield per hectare. The result of the study showed that the average rice yield of rice farmers who practiced IK on pest management is very low. However, the average rice yield of rice production in Masbate, which is 65 cavans per hectare, is similarly low (DA Annual Report, 2015).

Table 1 shows the socio-economic profile of rice farmers in terms of age, sex, marital status, educational attainment, household size, monthly income, farming experience, tenurial status, varieties grown, farm size, and average rice yield.

Table 1. The SEP of the farmer-respondents in terms of age, sex, marital status, educational attainment, household size, monthly income, farming experience, tenurial status, the variety grown, farm size, and average rice yield, 2015 – 2016

VARIABLE	CATEGORY	FREQUENCY (n=90)	PERCENT
Age (years)	35- 50	27	30.00
	51 - 60	38	**42.22**
	61- above	25	27.78
Sex	Male	72	**80.00**
	Female	18	20.00
Marital Status	Single	1	1.11
	Married	86	**95.56**
	Widowed	3	3.33
	Separated	0	0.00

VARIABLE	CATEGORY	FREQUENCY (n=90)	PERCENT
Educational attainment	No formal schooling	5	5.56
	Elementary	40	**44.44**
	High school	33	36.67
	College	12	13.33
Household size	1 - 5	63	**70.00**
	6 - 10	23	25.56
	> 10	4	4.44
Monthly Income	<5,000	58	**64.44**
	6,000 - 10,000	25	27.78
	11,000 - 15,000	4	4.44
	> 15,000	3	3.33
Farming Experience	5 - 15 years	33	**36.67**
	16 - 25 years	27	30.00
	>25	30	33.33
Tenural status	Tenant	37	41.11
	Leassee	2	2.22
	Owner-cultivator	51	**56.67**
Varieties grown	Modern	35	38.89
	Traditional/Native	55	**61.11**
Farm size (ha)	<1.0	42	**46.67**
	1.0 – 2.0	29	32.22
	2.1 – 3.0	11	12.22
	>3.0	8	8.89
Average Rice Yield (cavans/ha.)	<10	14	15.56
	11 - 20	10	11.11
	21 - 30	8	8.89
	31 - 40	18	**20.00**
	41 - 50	8	8.89
	>50	32	35.56

Existing Indigenous Knowledge on Pest Management of Rice Farmers

Twenty-eight IK practices on pest management in rice production were identified and recorded. These practices are categorized into four, namely: cultural control (7), physical control (10); mechanical control (9); and chemical control (2).

Source of IK. The sources of IK were identified as follows: ancestors; other people; blend of local practices; own experience; and DA trainings, SUCs, etc. Over all, the two dominant sources of information of IK on pest management in rice production in the province of Masbate are the ancestors and own experiences.

The IK practices that ancestors dominated as the source of IK is as follows: (1) cultural control: plowing and leveling the field using a carabao moldboard plow; harrowing the field using native comb harrow-like animal-drawn implement; and slashing and trash burning; (2) physical control: rouging and burning of diseased plants and leaves; correct timing of planting to minimize pest and diseases; (3) mechanical control: hand picking and squeezing of insect pests; placing scare crew and small flags; and placing coconut fronds in strategic locations, (4) chemical control: using botanical pesticides to control pests and pulverizing neem seed kernel and soaking in an equal amount of water overnight as pest control in rice production.

On the other hand, own experience as another source of IK on pest management is as follows: (1) cultural control: slashing without burning; slashing and trash burning; and

harrowing the field using native comb harrow-like animal-drawn plow; (2) physical control: varietal mix cropping to control pest life cycle; and clipping off the tip of rice seedlings before transplanting; (3) mechanical control: placing scare crew, small flags (banderitas); and placing coconut fronds in strategic locations; and (4) chemical control: using botanical pesticides to control pest; and pulverizing neem seed kernel and soaking in equal amount of water overnight. Appendix Tables 1 to 9 show the source of IK.

Length of the practice of IK. The length of practice of IK is classified as follows; 5 to 10 years, 11 to 20 years, 21 to 30 years, and 31 years and above. In general, the two dominant lengths of the practice of IK on pest management in rice production in the province of Masbate are 21 to 30 years; and 11 to 20 years.

The IK practices with 21 to 30 years length of practice are as follows: (1) cultural control: slashing without burning; plowing and leveling the field using carabao moldboard plow; harrowing the field using native comb like animal-drawn plow; and slashing without burning; (2) physical control: varietal mix cropping to control pest life cycle; rouging and burning of disease plant and leaves; and correct timing of planting to minimize insect pest infestation; (3) mechanical control: placing scare crew, small flags (banderitas) made of plastic; hand picking and squeezing of insect pest; and placing coconut fronds in strategic location in the rice field; and (4) chemical control using botanical pesticides to control pest; and pulverizing neem seed kernel and soaking in equal amount of water overnight.

Similarly, IK practices with 5 to 10 years of practice are as follows: (1) cultural control: slashing without burning; slashing with trash burning; and plowing and leveling the field using carabao moldboard plow; (2) physical control: varietal mix cropping to control pest life cycle; rouging and burning of diseased plant and leaves and correct timing of planting to minimize insect pest infestation; (3) mechanical control: placing scare crew, small flags (banderitas) made of plastic; hand picking and squeezing of insect pests; and placing coconut fronds in strategic location in the rice field; (4) chemical control: using botanical pesticides to control pest; and pulverizing neem seed kernel and soaking in equal amount of water overnight. Appendix Tables 10 to 18 show the length of practice of IK.

Reasons for Adopting IK on Pest Management in Rice Production

Thirty-two percent of the rice farmers who practice IK on pest management in rice production said that they are more familiar with IK than new technologies; 27% claimed that modern methods are expensive, IK is less hazardous and easy to use, and 14% revealed that resources for IK are always available. The result discloses that the rice farmers practicing IK in the province of Masbate had almost perfected the use of IK in pest management in rice production rather than applying the conventional method of pest management. Hence, they were accustomed to the IK practices that are available.

The result of the study conforms with the study of Kuponiyi (2009), who revealed that the most domineering reason in IK on pest management utilization by farmers in Ekiti State, Nigeria was that IK practices are always available and believed that modern methods are more expensive and hazardous than IKs.

Table 2 shows the reasons for adopting IK in rice production.

Table 2. Reasons of farmer-respondents in the Province of Masbate for adopting indigenous knowledge, 2015 -2016

REASONS ADOPTING IK	MUNICIPALITIES									TOTAL
	ESP F	PVC F	PLA F	PAL F	USO F	MOB F	MIL F	BAL F	ARO F	
1. Modern methods are expensive	9	10	9	10	9	9	10	9	8	83
Percentage (%)	**26.47**	**30.30**	**27.27**	**29.4**	**30**	**27.27**	**18.86**	**30**	**29.62**	**27.03**
2.Resources for IK are always available	7	6	5	6	5	6	4	2	3	44
Percentage (%)	**20.58**	**18.18**	**15.15**	**17.64**	**16.66**	**18.18**	**7.54**	**6.66**	**11.11**	**14.33**
3.More familiar with IK than new technologies	8	8	10	8	7	9	30	10	7	97
Percentage (%)	**23.52**	**24.24**	**30.30**	**23.52**	**23.33**	**27.27**	**56.60**	**33.33**	**25.92**	**31.59**
4.IK is less hazardous and easy to use	10	9	9	10	9	9	9	9	9	83
Percentage (%)	**29.41**	**27.27**	**27.27**	**29.41**	**30**	**27.27**	**16.98**	**30**	**33.33**	**27.03**
Total	**34**	**33**	**33**	**34**	**30**	**33**	**53**	**30**	**27**	**307**
Percentage (%)	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Legend:

ESP	Esperanza	**USO**	Uson	**PLA**	Placer
PVC	Pio V. Corpuz	**BAL**	Balud		
MOB	Mobo	**ARO**	Aroroy		
MIL	Milagros	**PAL**	Palanas		

Level of Awareness, Frequency of Utilization and Cost-effectiveness of IK

Level of awareness**.** Reflected in Table 3 is the level of awareness of rice farmers on IK on pest management in rice production in the province of Masbate. It was described using a four-point Likert scale as *"Highly aware," "Aware," "Moderately aware," and "Not aware."* Data show that rice farmers in the Province of Masbate who practiced IK on pest management in rice production are "*Aware*" of the IK practices with a weighted mean of 2.87.

The IK practices of farmers on pest management in rice production with the verbal interpretation of *"Aware"* are as follows: (1) cultural control: slashing without burning; slashing and trash burning (kaingin); plowing and leveling the field using carabao moldboard plow; harrowing the field using native comb harrow-like animal-drawn implement; flooding the field after plowing; hand weeding; and sanitation in the field; (2) physical control: clipping off the tip of rice seedlings before transplanting; spreading kakawate leaves; application of water; and intercropping; (3) mechanical control: hand picking and squishing of insect pest;

pieces of tree branches are randomly fixed in the rice field; burning of a discarded rubber tire in the field; placing coconut fronds; and utilizing CTBS; and (4) chemical control: using botanical pesticides to control pest and diseases; and pulverizing neem seed kernel and soaking in an equal amount of water overnight.

However, IK practices of rice farmers on pest management in rice production with a verbal interpretation of "*Highly aware*" were observed in IK practices such as varietal mix cropping; placing scare crew, small flags; and rouging and burning of disease plants and leaves. Furthermore, IK practices of rice farmers on pest management, such as practicing rice duck farming; burning destructive insects in the field; making conversation with insect pests; and burning invertebrate pests in the middle of the field, had a verbal interpretation of "*Moderately aware*".

It can now be inferred that farmers in the Province of Masbate are *"Aware"* of IK on pest management in rice production, especially on the control method in pest management.

The results of the study conform to the study conducted by Adekunle (2006), who found that the level of awareness of small-scale farmers regarding indigenous insect pest control methods in the Eastern Cape, South Africa was "*High".* It was further emphasized that the farmers are aware of indigenous insect pest control methods. Unfortunately, such methods are currently being neglected, and knowledge of their application was found to be eroding.

Table 3. Farmer-respondents' level of awareness of IK on pest management in rice production. Province of Masbate, 2015 - 2016

IK PRACTICES AND ITS CLASSIFICATION	LEVEL OF AWARENESS										
		ESP	**PVC**	**PLA**	**PAL**	**USO**	**MOB**	**MIL**	**BAL**	**ARO**	**GM**
Cultural Control											
Slashing without burning	**WM**	2.33	2.60	2.71	3.00	2.67	2.83	2.67	2.50	2.43	**2.64**
	VI	MA	A	A	A	A	A	A	A	MA	**A**
Slashing and trash burning (Kaingin)	**WM**	2.60	2.50	2.50	2.60	3.25	2.75	2.75	3.25	2.50	**2.74**
	VI	A	A	A	A	HA	A	A	HA	A	**A**
Plowing and leveling the field using carabao moulboard plow	**WM**	2.50	3.63	3.00	3.30	3.00	3.11	2.70	3.00	2.86	**3.01**
	VI	A	HA	A	HA	A	A	A	A	A	**A**
Harrowing the field using native comb harrow-like animal drawn implement	**WM**	3.25	3.40	3.00	3.10	3.00	3.00	3.22	3.25	2.71	**3.01**
	VI	HA	HA	A	A	A	A	A	HA	A	**A**
Flooding the field after plowing	**WM**	5.07	3.33	2.75	2.70	3.00	2.86	3.33	3.00	2.75	**3.20**
	VI	A	HA	A	A	A	A	HA	A	A	**A**
Hand weeding	**WM**	3.00	2.83	3.00	3.75	3.33	3.00	3.80	2.67	1.75	**3.01**
	VI	A	A	A	HA	HA	A	HA	A	MA	**A**
Sanitation in the field	**WM**	3.00	3.50		4.00	2.67		3.33	3.00	2.00	**3.07**
	VI	A	HA		HA	A		HA	A	MA	**A**
Physical Control											
Practicing rice duck farming	**WM**	2.43	2.00	2.50	2.50	3.00	3.50	2.00		2.00	**2.49**
	VI	MA	MA	A	A	A	HA	MA		MA	**MA**
Varietal mix cropping to control pest life cycle	**WM**	3.40	3.33	3.00	3.20	3.33	3.00	4.00	4.00	2.25	**3.28**
	VI	HA	HA	A	A	HA	A	HA	HA	MA	**HA**
Rouging and burning of disease plant and leaves	**WM**	3.50	3.00	3.25	3.60	3.33	3.50	3.50	3.33	2.25	**3.25**
	VI	HA	A	HA	HA	HA	HA	HA	HA	MA	**HA**
Correct timing of planting	**WM**	5.04	3.67	2.88	3.40	3.50	2.50	3.50	3.00	2.40	**3.32**
	VI	A	HA	A	HA	HA	A	HA	A	MA	**HA**
	WM	2.67	2.00	3.33	3.40	2.50	3.50	3.20	4.00	2.60	**3.02**

IK PRACTICES AND ITS CLASSIFICATION		LEVEL OF AWARENESS									
		ESP	**PVC**	**PLA**	**PAL**	**USO**	**MOB**	**MIL**	**BAL**	**ARO**	**GM**
Clipping off the tip of rice seedlings before transplanting.	**VI**	A	MA	HA	HA	A	HA	A	HA	A	**A**
Spreading kakawate leaves	**WM**	2.00	3.33	2.75	3.50	3.00	2.50	4.00	2.50	2.00	**2.84**
	VI	MA	HA	A	HA	A	A	HA	A	MA	**A**
Application of water	**WM**	2.80	3.67	2.43	3.50		3.00	3.33	3.00	1.33	**2.88**
	VI	A	HA	MA	HA		A	A	A	NA	**A**
Planting of cover crops	**WM**	1.00	0.00		2.50				4.00	1.50	**1.80**
	VI	NA	NA		A				HA	NA	**NA**
Intercropping	**WM**	2.00	1.00		2.50		4.00	3.33	4.00	1.67	**2.64**
	VI	MA	NA		A		HA	A	HA	NA	**A**
Making a conversation to insect pest	**WM**	1.50	2.50	3.20	1.00	3.00	3.00	2.00	3.25	2.50	**2.44**
	VI	NA	A	A	NA	A	A	SA	HA	A	**MA**
Mechanical Control											
Hand picking and squishing of insect pest	**WM**	3.33	3.00	3.50	4.00	2.20	2.75	2.80	3.13	2.60	**3.04**
	VI	HA	A	HA	HA	MA	A	A	A	A	**A**
Pieces of tree branches are randomly fixed in the rice field	**WM**	2.75	4.00	3.33	3.00	3.00		3.00	4.00	1.75	**3.10**
	VI	A	HA	HA	A	A		A	HA	MA	**A**
Burning of discarded rubber tire in the field	**WM**	3.00	3.00	3.00	3.00	2.50		3.00	3.33	3.00	**2.98**
	VI	A	A	A	A	A		A	HA	A	**A**
Placing scare crew and small flags (banderitas)	**WM**	3.00	2.71	3.00	2.40	4.00	2.89	3.25	3.00	2.40	**3.96**
	VI	A	A	A	HA	HA	A	HA	A	MA	**HA**
Placing coconut fronds	**WM**	2.50	3.00	3.50	4.00	2.60	1.60	3.00	3.00	1.60	**2.75**
	VI	A	A	HA	HA	A	NA	A	A	NA	**A**
Burning of destructive insect in the field	**WM**	1.50	4.00		2.00				2.00	2.00	**2.30**
	VI	NA	HA		MA				MA	MA	**MA**
Utilizing CTBS	**WM**	4.00	0.00	2.67	3.50	1.00	3.20	4.00	4.00	1.00	**2.60**
	VI	HA	NA	A	HA	NA	A	HA	HA	NA	**A**
Using putrefying meat	**WM**	1.00	1.00		1.00	2.60			3.50	1.00	**1.68**
	VI	NA	NA		NA	A			HA	NA	**NA**
Burning of invertebrate pest in the middle of the field during midnight	**WM**	1.00	2.00	2.80			3.00	3.00	3.50	1.00	**2.33**
	VI	NA	MA	A			A	A	HA	NA	**MA**
Chemical Control											
Using botanical pesticides to control pest and diseases	**WM**	3.00	3.50	3.00	3.43	3.25	3.00	3.40	2.80	2.80	**3.13**
	VI	A	HA	A	HA	HA	A	HA	A	A	**A**
Pulverizing neem seed kernel and soak in equal amount of water over night	**WM**	3.67	4.00	2.22	3.00	3.40	3.50	3.00	3.33	2.00	**3.12**
	VI	HA	HA	MA	A	HA	HA	A	HA	MA	**A**
Weighted Mean	**WM**	2.74	2.73	2.93	3.00	2.92	3.00	3.16	3.23	2.09	**2.87**
	VI	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**MA**	**A**

Legend:

ESP	Esperanza	**USO**	Uson	**PLA**	Placer
PVC	Pio V. Corpuz	**BAL**	Balud		
MOB	Mobo	**ARO**	Aroroy		
MIL	Milagros	**PAL**	Palanas		

Level of utilization of IK. The level of utilization of IK practices of rice farmers on pest management in rice production in the province of Masbate were analyzed using four points scale such as rarely, seldom, often, and always. Data revealed that the level of utilization of rice farmers who utilized IK on pest management in rice production have a level of utilization of often with general weighted mean of 2.85 (Table 4).

The IK practices of rice farmers on pest management in rice production that have a level of utilization of often were as follows: (1) cultural control: slashing without burning; slashing and trash burning (Kaingin); plowing and leveling the field using carabao moulboard plow; harrowing the field using native comb harrow-like animal drawn implement; flooding the field after plowing; and hand weeding, (2) physical control: practicing rice duck farming; varietal mix cropping to control pest life cycle; rouging and burning of disease plants and leaves, correct timing of planting to minimized insect infestation, clipping off the tip of rice seedlings before transplanting; intercropping; and making conversation with the insect pest, (3) mechanical control: burning of discarded rubber tire in the field, placing scare crew and small flags (banderitas); placing coconut fronds; spreading kakawate leaves; burning of destructive insect in the field; utilizing CTBS; and burning of invertebrate pest in the middle of the field during midnight, (4) chemical control: using botanical pesticides to control pest and diseases; and pulverizing neem seed kernel and soaking in equal amount of water overnight (Table 4).

Apparently, IK practices of rice farmers on pest management in rice production, such as hand picking and squishing of insect pests and pieces of tree branches that were randomly fixed in the rice field, have a verbal interpretation of always as IK practices on pest management in rice production.

The result of the study implies that rice farmers who practiced IK on pest management in rice production in the province of Masbate utilized IK often. This means that IK on pest management is already in their farming culture, which can be considered an institutionalized farming technology for their sustainability.

The result of the study reveals that it is related to the study of Kiruba (2006), which states that indigenous pest control practices play an important role in the management of agricultural crops. It is an inevitable practice for sustainable agriculture.

Table 4. Farmer-respondents' level of utilization of IK on pest management in rice production, Province of Masbate, 2015 – 2016.

IK PRACTICES AND ITS CLASSIFICATION		FREQUENCY OF UTILIZATION									
		ESP	**PVC**	**PLA**	**PAL**	**USO**	**MOB**	**MIL**	**BAL**	**ARO**	**GM**
Cultural Control											
Slashing without burning	**WM**	2.67	2.80	2.57	3.29	3.00	2.33	3.00	2.75	2.57	**2.76**
	VI	O	O	O	A	O	S	O	O	O	**O**
Slashing and trash burning (Kaingin)	**WM**	3.20	3.00	3.33	2.60	2.50	3.00	3.00	2.75	2.00	**2.82**
	VI	O	O	A	O	O	O	O	O	S	**O**
Plowing and leveling the field using carabao moulboard plow	**WM**	3.30	3.75	3.22	3.90	2.90	2.56	2.70	3.11	1.86	**3.03**
	VI	A	A	O	A	O	O	O	O	S	**O**
Harrowing the field using native comb harrow-like animal drawn implement	**WM**	3.50	3.40	3.44	3.20	3.00	2.90	3.11	3.13	2.86	**3.17**
	VI	A	A	A	O	O	O	O	O	O	**O**
Flooding the field after plowing	**WM**	3.00	3.50	3.25	3.20	2.67	2.14	3.00	3.33	2.25	**2.97**
	VI	O	A	A	O	O	S	O	O	S	**O**
Hand weeding	**WM**	3.00	2.33	4.00	3.25	3.33	2.00	3.40	2.67	3.00	**3.00**
	VI	O	S	A	A	A	S	A	R	O	**O**

IK PRACTICES AND ITS CLASSIFICATION		FREQUENCY OF UTILIZATION									
		ESP	**PVC**	**PLA**	**PAL**	**USO**	**MOB**	**MIL**	**BAL**	**ARO**	**GM**
Sanitation in the field	**WM**	3.50	3.17		3.00	2.67		3.33	4.00	3.25	**3.27**
	VI	A	O		O	O		A	A	A	**A**
Physical Control											
Practicing rice duck farming	**WM**	5.04	1.00	3.00	3.00	3.50	2.00	2.00		2.25	**2.73**
	VI	A	R	O	O	A	S	S		S	**O**
Varietal mix cropping to control pest life cycle	**WM**	3.20	3.33	3.25	3.00	3.33	2.50	3.00	1.00	2.75	**2.82**
	VI	O	A	A	O	A	O	O	R	O	**O**
Rouging and burning of disease plant and leaves	**WM**	3.0	2.80	3.08	3.00	2.33	2.50	2.67	3.00	2.50	**2.76**
	VI	O	O	O	O	S	O	O	O	O	**O**
Correct timing of planting	**WM**	3.0	3.17	2.63	2.80	3.00	1.75	2.00	3.00	1.80	**2.57**
	VI	O	O	O	O	O	S	S	O	S	**O**
Clipping off the tip of rice seedlings before transplanting.	**WM**	3.00	1.00	3.33	2.0	3.50	3.00	3.00	3.50	2.80	**2.79**
	VI	O	R	A	R	O	O	O	F	O	**O**
Application of water	**WM**	2.20	2.00	2.86	3.50		2.00	2.67	2.33	2.33	**2.49**
	VI	S	S	O	A		S	O	S	S	**S**
Planting of cover crops	**WM**	3.50	0.00		4.00				1.67	1.50	**2.13**
	VI	A	R		A				R	R	**S**
Intercropping	**WM**	1.62	3.50		2.00		2.00	2.67	4.00	2.67	**2.64**
	VI	R	A		S		S	O	A	O	**O**
Making a conversation to insect pest	**WM**	3.50	2.50	2.80	3.00	2.00	3.00	2.00	2.50	4.00	**2.81**
	VI	A	O	O	S	S	O	S	O	A	**O**
Mechanical Control											
Hand picking and squishing of insect pest	**WM**	5.0	3.33	3.75	3.20	3.40	3.00	2.20	3.00	2.80	**3.30**
	VI	A	A	A	O	A	O	S	O	O	**A**
Pieces of tree branches are randomly fixed in the rice field	**WM**	3.0	4.0	3.67	4.00	4.00		3.00	4.00	2.50	**3.52**
	VI	O	A	A	A	A		O	A	O	**A**
Burning of discarded rubber tire in the field	**WM**	3.20	3.00	3.00	4.00	2.00		3.00	3.00	2.25	**2.93**
	VI	O	O	O	A	S		O	O	S	**O**
Placing scare crew and small flags (banderitas)	**WM**	2.50	3.0	3.14	3.20	4.00	2.67	2.63	2.50	2.60	**2.92**
	VI	O	O	O	O	A	O	O	O	O	**O**
Placing coconut fronds	**WM**	3.50	2.50	2.50	2.75	2.60	2.67	3.00	2.50	2.60	**2.74**
	VI	A	O	O	O	O	O	O	O	O	**O**
Spreading kakawate leaves	**WM**	2.50	2.67	3.13	1.50	2.00	2.25	4.00	4.00	3.00	**2.78**
	VI	O	O	O	R	S	S	A	A	O	**O**
Burning of destructive insect in the field	**WM**	3.50	4.00		3.00				4.00	1.00	**3.10**
	VI	A	A		O				A	R	**O**
Utilizing CTBS	**WM**	4.00	0.00	2.67	3.50	4.00	2.60	4.00	2.50	1.00	**2.70**
	VI	A	R	O	A	A	O	A	O	R	**O**
Using putrefying meat	**WM**	4.00	1.00		2.00	2.60			3.00	2.00	**2.43**
	VI	A	R		S	O			O	R	**S**
Burning of invertebrate pest in the middle of the field during midnight	**WM**	4.00	1.50	2.40			4.00	1.00	2.50	3.00	**2.63**
	VI	A	R	S			A	R	O	O	**O**

IK PRACTICES AND ITS CLASSIFICATION		FREQUENCY OF UTILIZATION									
		ESP	**PVC**	**PLA**	**PAL**	**USO**	**MOB**	**MIL**	**BAL**	**ARO**	**GM**
Chemical Control											
Using botanical pesticides to control pest and diseases	**WM**	2.83	3.50	2.50	2.43	2.50	2.50	2.40	3.60	3.20	**2.83**
	VI	O	A	O	S	O	O	S	A	O	**O**
Pulverizing neem seed kernel and soak in equal amount of water over night	**WM**	3.00	3.00	3.00	4.00	3.20	2.00	3.00	3.00	1.80	**2.89**
	VI	O	O	O	A	O	S	O	O	S	**O**
Weighted Mean	**WM**	**3.26**	**3.00**	**3.07**	**3.05**	**2.96**	**2.52**	**2.80**	**2.98**	**2.43**	**2.85**
	VI	**A**	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**S**	**O**

Legend:

ESP	Esperanza	**USO**	Uson	**1.00-1.74**	Rarely (R)
PVC	Pio V. Corpuz	**BAL**	Balud	**1.75-2.49**	Seldom (S)
MOB	Mobo	**ARO**	Aroroy	**2.50-3.24**	Often (O)
MIL	Milagros	**PAL**	Palanas	**3.25-4.00**	Always (A)

Level of cost-effectiveness of IK. The level of cost-effectiveness of the IK of rice farmers on pest management in rice production in the province of Masbate was determined using four-point Likert's scale, as follows: *"Highly cost-effective", "Cost-effective", "Moderately cost-effective"* and *"Not effective".* Result shows that the IK on pest management in rice production in the Province of Masbate is *"Cost-effective"* with a general weighted mean of 2.85 (Table 5).

The IK practices of rice farmers on pest management in rice production that have verbal interpretation of "*Cost-effective"* as pest control against rice pests are as follows: (1) cultural control: slashing without burning; slashing and trash burning (kaingin); plowing and leveling the field using carabao moulboard plow; harrowing the field using native comb harrow-like animal drawn implement; flooding the field after plowing; hand weeding; and sanitation in the field; (2) physical control: practicing rice duck farming; varietal mix cropping to control pest life cycle; rouging and burning of disease plants and leaves, correct timing of planting to minimize insect infestation, clipping off the tip of rice seedlings before transplanting; intercropping; and making conversation with the insect pest; (3) mechanical control: hand picking and squishing of insect pest control; pieces of tree branches are randomly fixed in the rice field; burning of discarded rubber tire in the field, placing scare crew and small flags (*banderitas*); placing coconut fronds; spreading kakawate leaves; utilizing CTBS; using putrefying meet in a bag as bait; and burning of invertebrate pest in the middle of the field during midnight; and (4) chemical control: using botanical pesticides to control pest and diseases; and pulverizing neem seed kernel and soaking in equal amount of water overnight.

On the other hand, IK practices of rice farmers on pest management in rice production with the verbal interpretation of *"Moderately cost-effective"* are as follows: application of water, planting cover crops and burning destructive insects in the field (Table 5).

The result of the study is attributed to the high cost of production of modern rice farming since Masbateño farmers are considered very poor. It is further revealed that IK on pest management in rice production in the Province of Masbate is cost-effective as pest control of rice pests due to the availability of resources that can be found in the locality.

The study is supported by the study of Brouwer (2003) that IK is low-cost, users' friendly, and safe practice used by farmers since time immemorial, if organized and use scientifically, would go a long way in the management of pests. Indigenous knowledge can

minimize the use of harmful and expensive synthetic chemical pesticides. IK practices have advantages over outside knowledge, and it is cost-effective and readily available. Indigenous knowledge systems and technologies are found to be socially desirable, economically affordable, sustainable, and involve minimum risk to rural farmers and products.

Furthermore, the result is connected to Kiruba's (2006) study, which stated that properly controlling pests minimize economic losses and environmental damage. IK on pest management is an economical and environment-friendly approach, as chemicals are costly and cause adverse effects on an ecosystem's biotic and abiotic components.

Table 5. Level of cost-effectiveness of IK on pest management in rice production, Province of Masbate, 2015 – 2016

IK PRACTICES AND ITS CLASSIFICATION		LEVEL OF COST-EFFECTIVENESS									
		ESP	**PVC**	**PLA**	**PAL**	**USO**	**MOB**	**MIL**	**BAL**	**ARO**	**GM**
Cultural Control											
Slashing without burning	**WM**	2.44	2.80	2.71	2.86	3.00	2.33	3.17	2.88	2.57	**2.75**
	VI	SE	CE	CE	CE	CE	SE	CE	CE	CE	**CE**
Slashing and trash burning (Kaingin)	**WM**	3.00	3.50	3.33	2.60	2.50	2.25	3.50	3.00	2.25	**2.88**
	VI	CE	HE	HE	CE	CE	SE	HE	CE	SE	**CE**
Plowing and leveling the field using carabao moulboard plow	**WM**	3.00	3.63	3.00	2.90	2.80	2.67	3.10	3.33	2.71	**3.02**
	VI	CE	HE	CE	CE	CE	CE	CE	HE	CE	**CE**
Harrowing the field using native comb harrow-like animal drawn implement	**WM**	3.25	3.70	3.22	3.70	3.00	2.80	2.22	3.13	2.43	**3.05**
	VI	HE	HE	HE	HE	CE	CE	SE	CE	SE	**CE**
Flooding the field after plowing	**WM**	3.00	3.83	3.25	2.60	2.67	2.57	2.83	3.67	2.50	**2.99**
	VI	CE	HE	CE	CE	CE	CE	CE	HE	CE	**CE**
Hand weeding	**WM**	3.75	3.00	3.33	3.25	2.67	2.00	3.20	3.33	3.25	**3.09**
	VI	HE	CE	HE	HE	CE	SE	CE	HE	HE	**CE**
Sanitation in the field	**WM**	3.00	3.50		1.00	2.67		3.33	4.00	3.25	**2.96**
	VI	CE	HE		NE	CE		HE	HE	HE	**CE**
Physical Control											
Practicing rice duck farming	**WM**	1.86	3.00	2.50	3.50	3.25	3.00	3.50		2.50	**2.89**
	VI	SE	CE	CE	HE	HE	CE	HE		CE	**CE**
Varietal mix cropping to control pest life cycle	**WM**	3.20	4.00	3.25	2.60	3.33	2.25	3.00	4.00	3.00	**3.18**
	VI	CE	HE	HE	CE	HE	SE	CE	HE	CE	**CE**
Rouging and burning of disease plant and leaves	**WM**	2.67	2.80	2.50	1.00	2.33	3.38	2.00	4.00	2.50	**2.58**
	VI	CE	CE	CE	NE	SE	HE	SE	HE	CE	**CE**
Correct timing of planting	**WM**	2.71	2.83	2.50	2.80	3.00	2.00	3.00	3.00	2.60	**2.75**
	VI	CE	CE	CE	CE	CE	SE	CE	HE	CE	**CE**
Clipping off the tip of rice seedlings before transplanting.	**WM**	2.17	3.00	3.33	3.00	3.50	3.00	2.80	2.50	2.80	**2.90**
	VI	SE	CE	HE	CE	HE	CE	CE	CE	CE	**CE**
Application of water	**WM**	2.40	1.33	2.71	3.00		2.00	2.00	3.33	2.33	**2.39**
	VI	ME	NE	CE	CE		ME	ME	HE	ME	**ME**
Planting of cover crops	**WM**	3.50	0.00		3.00				3.33	2.00	**2.37**
	VI	HE	NE		CE				HE	ME	**ME**
Intercropping	**WM**	3.33	1.50		3.00		3.00	3.33	4.00	3.33	**3.07**
	VI	HE	NE		CE		CE	HE	HE	HE	**CE**

IK PRACTICES AND ITS CLASSIFICATION		LEVEL OF COST-EFFECTIVENESS									
		ESP	**PVC**	**PLA**	**PAL**	**USO**	**MOB**	**MIL**	**BAL**	**ARO**	**GM**
Making a conversation to insect pest	**WM**	2.50	2.00	3.20	2.00	2.00	3.00	2.00	3.50	3.00	**2.58**
	VI	CE	ME	CE	ME	ME	CE	ME	HE	CE	**CE**
Mechanical Control											
Hand picking and squishing of insect pest	**WM**	3.00	2.33	3.50	3.40	2.80	2.50	2.60	2.75	3.00	**2.86**
	VI	CE	SE	HE	HE	CE	CE	CE	CE	CE	**CE**
Pieces of tree branches are randomly fixed in the rice field	**WM**	2.50	4.00	3.33	3.50	3.00		3.00	4.00	2.25	**3.20**
	VI	CE	HE	HE	HE	CE		CE	HE	SE	**CE**
Burning of discarded rubber tire in the field	**WM**	2.20	3.00	3.00	2.50	2.50		3.00	3.00	2.00	**2.65**
	VI	ME	CE	CE	CE	CE		CE	CE	ME	**CE**
Placing scare crew and small flags (banderitas)	**WM**	2.63	3.75	3.14	2.80	4.00	2.22	3.00	3.00	3.00	**3.06**
	VI	HE	HE	CE	CE	HE	SE	CF	CE	CE	**CE**
Placing coconut fronds	**WM**	2.50	3.75	3.50	2.75	3.20	2.60	3.00	3.17	3.60	**3.19**
	VI	CE	HE	HE	CE	CE	CE	CF	CE	HE	**CE**
Spreading kakawate leaves	**WM**	2.00	2.33	3.13	2.75	2.00	2.50	3.00	2.50	3.00	**2.59**
	VI	SE	SE	CE	CE	SE	CE	CE	CE	CE	**CE**
Burning of destructive insect in the field	**WM**	2.00	4.00		3.00				1.00	2.00	**2.40**
	VI	ME	HE		CE				NE	ME	**ME**
Utilizing CTBS	**WM**	4.00	0.00	3.00	1.50	1.00	2.80	4.00	3.50	3.00	**2.53**
	VI	HE	NE	CE	NE	NE	CE	HE	HE	CE	**CE**
Using putrefying meat	**WM**	4.00	1.00		2.00	3.00			4.00	1.00	**2.50**
	VI	HE	NE		ME	CE			HE	NE	**CE**
Burning of invertebrate pest in the middle of the field during midnight	**WM**	4.00	2.00	2.80			3.50	3.00	3.00	4.00	**3.19**
											CE
Chemical Control											
Using botanical pesticides to control pest and diseases	**WM**	2.50	3.00	2.67	3.00	2.50	2.50	3.00	4.00	2.80	**2.89**
	VI	CE	CE	CE	CE	CE	CE	CE	HE	CE	**CE**
Pulverizing neem seed kernel and soak in equal amount of water over night	**WM**	2.50	3.50	3.00	2.50	3.20	2.50	3.00	3.33	2.80	**2.93**
	VI	CE	HE	CE	CE	CE	CE	CE	HE	CE	**CE**
	VI	HE	SE	CE			HE	CE	CE	HE	**CE**
Weighted Mean	**WM**	**2.84**	**2.75**	**3.04**	**2.69**	**2.78**	**2.61**	**2.94**	**3.27**	**2.70**	**2.85**
	VI	**CE**	**CE**	**CE**	**CE**	**CE**	**CE**	**CE**	**HE**	**CE**	**CE**

Legend:

ESP	Esperanza	**USO**	Uson	**1.00-1.74**	Not Effective (NE)
PVC	Pio V. Corpuz	**BAL**	Balud	**1.75-2.49**	Moderately Cost-Effective(ME)
MOB	Mobo	**ARO**	Aroroy	**2.50-3.24**	Cost-Effective (CE)
MIL	Milagros	**PAL**	Palanas	**3.25-4.00**	Highly Cost-Effective (HE)

Conclusion

Based on the foregoing findings, the following conclusions are hereby drawn:

1. The rice farmers were dominated by 51-60 years old; males, married, elementary graduates, with a household size of 1 to 5 members, and are engaged in farming for 5 to 10 years. Furthermore, farmers are dominated by land-owners; plant traditional or local varieties; have farm sizes of less than 1.0 hectares; and obtained and average yield of 50 cavans per hectare.
2. The sources of information of rice farmers regarding IK on pest management in rice

production in the Province of Masbate are dominated by ancestors with 21 to 30 years of practicing IK on pest management in rice production.

3. As to the level of awareness on IK on pest management in rice production in the Province of Masbate revealed that rice farmers are "*aware*" of the IK practices. Furthermore, data also revealed that farmers *"often"* utilized IK on pest management in rice production. Similarly, result shows that the IK practices on pest management in rice production in the Province of Masbate is cost-effective.

Recommendation

Based on the conclusions derived, the researchers, hereby recommends the following:

1. Since most of the rice farmers who practice IK on pest management in rice production are categorized as old age already, it is, highly recommended that rice farming using IK practices must be disseminated to succeeding generation in order to sustain the utilization of IK practices in pest control in rice production. Further, recommends that rice farmers who practiced IK on pest management should also plant other varieties of rice that are high yielding, pest resistant, and came from reliable sources.
2. It is likewise recommended to do continuous documentation of IK practices on pest management in rice production in order to ensure that the utilization of IK will not perish. However, when recording, it is important to find who knows what, in order to tap the right source of information. Otherwise, data will not truly reflect as IK in the community.
3. The need to conduct further scientific research is wanting in order to verify the farmers' reasons for adopting IK practices and to have documented data as source of evidence.
4. Indigenous knowledge is, indeed, considered to be of great importance to the rice farmers in their agricultural life. Hence, it is highly recommended that scientific investigation should be done by agricultural institutions in order to verify or to prove its effectiveness in managing pest problems in rice production.

References

ABDULSALAM ET AL., (2015). "Enhancing sustainable environmental management through indigenous pest and diseases control practices by Ofanda rice growers in Ogum State, Nigeria". Journal of Agricultural Extension and Rural Development. Vol. 7 (3), pp 80-86 (Accesed 25th March, 2016) (http://www.academicjournal.org/JAERD)

ADEKUNLE, O. A. (2006). "An Analysis of Indigenous Knowledge Practices by Crop Farmersin Africa". *Applied Tropical Agriculture: An International Journal.* Vol. 2, No. 2, 114 – 151

ADEWALE, J. G. (2002). "Nigerian Farmers' Use of Indigenous Agricultural Practices". *Journal of Rural Development,* 35 (1), 91-100

AKANDE S.O (2006). "The use of indigenous knowledge systems (IKS) in rice production by farmers in Ekiti." International journal of Agriculture Economics & rural Development – 2 (2):2009

ANDERSEN PP, & HAZELL BR (2000). "The Impact of Green Revolution and prospects for the future." Food Rev Int, 1 (1) (2000) 1-25 (Accessed 24th March, 2016)

BANDURA, A. (1977). Social Learning Theory. Englewood Cliffs, N.J.: Prentice-Hall, p.2

BROUWER, JAN. (2003). Perspective on Indigenous Knowledge Systems, Development, Oral Tradition and Globalization. Seminar paper presented in Vanishing Wisdom: Unheard Voices: The Indigenous Knowledge System & Cultural Preservation in the time of Globalization. Kolkata: Adaan Foundation.

CH ANDOLA, M., RATHORE, S. & KUMAR, B. (2001). Indigenous Pest Management Practices Prevalent among Hill Farmers of Uttarakhand. Indian Journal of Traditional Knowledge. Vol. 10 (2). pp. 311-315

CH HETRY, G. K. N. AND L. BELBAHRI. (2009). Indigenous pest and disease management practices in traditional farming systems in

Northeast India. Journal of Plant Breeding and Crop Science 1(3): 28-38

ES TUDILLO J. AND OTSUKA K. (2006). "Lessons from three decades of green revolution in the Philippines Developing Economies." 44, 123–148 (Accessed 24th March, 2016)

G ORJESTANI AND NICOLAS (2000). Pest management strategies in traditional agriculture: An African perspective. Annu Rev Entom. 45:631-649.

GILBERT, E.H., D.W. NORMAN AND F.E. WINCH. 1980. Farming Systems Research: A Critical Appraisal. MSU Rural Development Paper No. 6; Department of Agricultural Economics, Michigan State University, East Lansing, Michigan, USA.

GR ACIO AND PATEÑO (2016). Indigenous Knowledge on Pest Management in the Mandaon Masbate. Unpublished Research.

GROLINK. 2005. Organic Agriculture Development Training Material. Torfolk, Sweden. 228pp.

KOLAWOLE, O. D. (2001). "Local Knowledge Utilization and Sustainable Rural Development in the 21st Century" The Hague: Indigenous Knowledge and Development Monitor. 9 (3), pp13-15.

KU PONIYI, F. A. AND E. O. BAMIGBOYE (2009). "The use of indigenous knowledge systems (IKS) in rice production by farmers in Ekiti State, Nigeria." International Journal of Agriculture Economics & rural Development – 2 (2):2009 (Accessed 25th March, 2016)

MANISH CHANDOLA, SURYA RATHORE & B. KUMAR (2009). Indigenous pest management practices prevalent among hill farmers of Uttarakhand. Indian Journal of Traditional Knowledge. Vol. 10(2), April 20011, pp 311-55

OKUNEYE, P. A. (2004). Rising cost of food prices and food insecurity in Nigeria and its implication for poverty reduction. Central Bank of Nigeria *Economic & Financial Review. Vol.* 39, 4.

PANGGA, G.V. 2010. Status of Philippines' Organic Agriculture in the Organic Standard. Issue #82, February 2010. Pp3-6. U.K:

R. C. JOSHI, O. R. O. MATCHOC, R. G. BAHATAN, F. A. DELA PENA (2000). "Farmers knowledge, attitudes and practices of rice crop and pest management at Ifugao Rice Terraces, Philippines". International Journal of Pest Management Vol. 46, Iss. 1, 2000 (Accessed 25th March, 2016) (http://www tandfonline.com/toc/ttpm20/46/1)

RAHMAN (2012). "Practice of indigenous knowledge system by the farmers in maintaining ecosystem in Bangladesh." Journal of Agricultural SciencesVol. 57, No. 3, 2012 Pages 155-168 (Accessed 25th March, 2016)

RANJAY K SINGH & AMISH K SUREJA (2006). Indigenous knowledge and sustainable agricultural resources management under rainfed agro-ecosystem. Indian Journal of Traditional Knowledge Vol. 7(4), October 2008, pp. 642-657

S ERRANO. FB. (2000). "In: A half century of Philippine Agriculture." The Rice industry and scientific research. pp 170-178. BA Golden Jubilee Committee. Graphics house. Manila. 463 pp. (Accessed 24th March, 2016)

SHARLAND, R.W. (1991): Indigenous knowledge systems, the cultural dimension of development. In: Warren, D.M., Slikkerveer, L.J., Brokensha, D. (Eds.). The cultural dimension of development: Indigenous knowledge systems, Intermediate Technology Publications, London, pp. 182-185.

SHERPA, S. N. (2005). Indigenous peoples of Nepal and traditional knowledge. International workshop on traditional knowledge, Panama City, September 21-30, 1-9.

SINGH RK, SUREJA AK (2008). Indigenous knowledge and sustainable agricultural resources management under rainfed agro-ecosystem. Ind. J. Trad. Knowledge 7 (4): 642-654.

VIVEKANANDAN, P. (2003). Approaches in documenting traditional technologies: process and outcomes in Tamil Nadu. Paper Presented at the National Seminar on Indigenous Technologies for Sustainable Agriculture, New Delhi, March 23- 25.

WARREN, D.M., G.V. LIEBENSTEIN AND L.J. SLIKKERVEER. (2005). "Networking for Indigenous Knowledge." Indigenous knowledge and development Monitor, 1(1):2-4.

Web sites

NSCB (National Statistical Coordination Board): http://www.nscb.gov.ph

PSA (Philippine Statistics Authority): https://www.psa.gov.ph

http://www.neda.gov.ph/wp-content/uploads/2013/10/RegV_RDP_2011-2016.pdf

http://masbate.gov.ph/wp-content/uploads/2014/10/Gov-Lanete-SOPA-2013.pdf

http://www.mb.com.ph/da-cites-young-filipino-farmers-in-agri-sectors-growth/#SVLsWtgi7fZH6PO8.99