

Adoption Factors Of Components Of Integrated Crop Management For Rice In Banten Province-Indonesia

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Abstract

The research of actual conditions of Integrated Crop Management (ICM) for Rice in Banten Province had been conducted. The goal of this study were: 1) To know the application of technology component of ICM for Rice in Banten Province, 2) To analyze factors adoption of ICM in Banten Province. The method used is survey method. The survey was conducted in four districts with a total of 120 farmer respondents. Methods of data analysis using qualitative and quantitative analysis, each respectively descriptive tabulations and odds function of logistic regression (logic). The results of this study are: 1) The use level of new high yield varieties (NHVY) in Banten province is as high as 100% in the fourth regency. The use level of certified seeds ranged 83 - 97% in Banten Province. Adoption of the young age of planted seeds was carried out by 54 - 100% of the farmers. The number of young seeds 1-3 stems per plant hole have implemented by 61 - 93% of the farmers. Planting system of legowo parallel has been implemented by 46 - 100% of the farmers. 2) Based on the logic function, the determinants factor of innovation adoption of young seed age namely ever heard of ICM and hand tractor wages. The adoption factor of the seed certified is ever heard of ICM, the long to follow of ICMFS and non-certified seed prices. Advice on the implementation of ICMFS namely the additional of area wide of ICMFS, precision-assisted seed distribution, provision of equipment aid Leaf Color Chart, The Rice Field Soil Test Device (PUTS), Soil pH meter, and the escort honor escort for extension worker, chief of district agricultural or chief of Agricultural Extension Office.

Keywords: Innovation, Integrated Crop Management for Rice, distribution pattern, adoption.

1. Introduction

The ICM for Rice consists of 12 components technology is a tool to achieve national rice production target, which in the year 2011 target of 70.6 million tons of paddy a year increased 6.3% compared to 2010. The ICM approach made through Field Schools (FS) of ICM. In Banten province ICMFS of Paddy in 2009 performed at 80,000 ha by 3200 FS, spread across four regencies (Purwanto S. 2009). In 2011 extensive ICMFS non hybrid paddy in the province of Banten area of 82 000 ha by 3288 FS, spread across four regencies and four cities. Besides, there are 1,580 ha of hybrid paddy ICMFS and 11,425 ha of paddy dry land ICMFS (Anonymous 2011).

The ICM technology component consists of four basic components and eight of choice components. Four basic components are: 1) Modern varieties (New Yield Variety, Hybrid Paddy, New Type Paddy), 2) Seed quality and healthy, 3) Fertilization based on Leaf Color Chart, Rice Soil Test Tool (RSTT), and omission plots, 4) Integrated Pest Management according to Pest Plant Organisms. Eight of choice components are: 1) The management of plants, population of legowo row (jajar legowo) planting system, 2) Age of seedlings (removal of the age-old young seedlings 15-21 days after the spread), 3) Plant the seeds 1-3 stem per plant hole, 4) Management of land according to season and cropping patterns, and irrigating effectively and efficiently, 5) Providing organic material, 6) The use of liquid fertilizer (Liquid Fertilizer Component, organic fertilizers, Growth Stimulant Substances, and micro fertilizers), 7) Weeding with a hedgehog or gasrok, 8) Harvesting proper time and post-harvest (Center for Food Crops 2008; The Agriculture Body of Tangerang Regency 2010).

According to Rogers E. M. (2003) Innovation is something the idea (opinion), practice or object perceived as new manner by an individual or other unit that adoption. If an idea seems to be new to the individual then it is an innovation. Lionberger and Gwin (1982) in Indraningsih KS (2010) defines innovation is not only something new, but more broadly as a something that can encourage reform in the community or a particular locality.

It is necessary to know the application of technology component of ICM for Rice in Banten Province, and to know factors adoption of ICM in Banten's Province, and socioeconomic characteristics of the target beneficiaries of innovation. By knowing the things above, is useful as an input in making policy on paddy ICM.

2. Methodology

2.1. Location and Time

The study was conducted at the location of ICM for rice. The Location were purposively selected purposive) based on the innovations that developed and less developed. Locations that are considered developing in Serang and Lebak regency, while the less developed is Pandeglang and Tangerang regency. Based on discussions with the Regency Agriculture Office. The districts is selected in Serang regency namely Pontang district, and from discussions with the chief of agriculture district elected village was the village of Lebak Kepuh. The elected district in Tangerang regency was Cisoka district with elected village namely Carenang village. The elected district in Pandeglang is Cimanuk district with elected village is the Sekong village. The elected district in Lebak regency was Bayah district with elected village was Tambak Bayah village. The study time as long as eight months starting from March to October 2011.

2.2. Types, Sources and Methods Data Collection Data

Based on data type, data to be collected in this study included primary and secondary data. Primary data at famer level were collected from the farmer group, the board of famer group, extension worker, and government officials. Secondary data is data that supports the required information on this study, include population, land area, area planted, area harvested, production, productivity, the number of farmer group and the union of farmer group of ICM participants. Secondary data collection conducted at institutions such as the Provincial and Regency Agriculture Office, Center Agency of Statistic of province and Regency, District Office, Agriculture Extension Center, Village Office, and related agencies. Literature study was also conducted to obtain literature that linkage to this study.

Primary data collection techniques to be used in this study were interviews with using a structured questioner. Secondary data collection carried out by approaching the relevant agencies. Sampling method using a cluster sampling method with a cluster of successful regency of paddy ICM and less successful regency of paddy ICM. The selection of respondent farmers conducted at the farmer group level simple random (simple random sampling). The number of respondents selected as many as 30 persons from each sample regency. The total number of respondent farmers (beneficiaries of innovation) amount to 120 respondents.

2.3. Methods Data Processing and Analysis

Analysis of data to be used in this study consisted of qualitative and quantitative analysis. Qualitative analysis using the tabulations that interpreted descriptively. Descriptive analysis is used to describe characteristics of the observed variables.

Quantitative analysis using logistic odds function (logic), used to look at success determinant factors of innovation distribution. Logic regression function is the equation where the dependent variable is qualitative, can have two classes (binary) or more than two classes or multinomial (Widarjono A. 2010). The general form logic function as follows (Pindyck and Rubinfeld, 1984 in Susilawaty and Simatupang 1990):

$$\text{Log} \frac{P_i}{1 - P_i} = \sum a_i X_i + a_0 \dots\dots\dots 1)$$

$$\text{Log} \frac{P_i}{1 - P_i} = a_0 + a_1 X_1 + a_2 X_2 + a_3 X_3 + a_4 X_4 + a_5 X_5 + a_6 X_6 + \dots a_n X_n \dots\dots\dots 2)$$

$a_1 > 0, a_2 > 0, a_3 > 0, a_4 > 0, a_5 > 0.$

Where:

- P_i = Opportunities to i for farmers to adopt innovations ICM
- P_1 = The farmer who uses the young seedling age 15-21 DAD (Day After Distribution)
- P_2 = the number of seeds farmers use 1-3 stems per hole

- P_3 = Farmers who use the legowo row planting
- P_4 = Farmers who use certificated seed
- P_0 = If not using the ICM component.
- X_i = The factors that influence adoption of innovation
- X_1 = Age of farmers (years)
- X_2 = Level of education (years)
- X_3 = Area of land (ha)
- X_4 = Area of operate land (ha)
- X_5 = household income level of farmers (Rp/year)
- X_6 = Plant productivity (ton/ha)
- X_n = other factors affecting adoption.
- a_i (1, 2, 3, 4, 5, 6, ... n) = guess parameter/logistic regression coefficients.
- a_0 = constant or intercept.

In more detail to find out the determinants (socioeconomic) the implementation of adoption Age Young seedlings, we used logistic distribution function of opportunity (logic models) are:

$$\begin{aligned}
 &P_1 \\
 \ln \frac{P_1}{1 - P_1} &= a_0 + a_1 \text{UMR} + a_2 \text{PDDK} + a_3 \text{JLAK} + a_4 \text{LMSW} + a_5 \text{LGRP1} + a_6 \text{DGRPTT} + \\
 &a_7 \text{LMSLPTT} + a_8 \text{HBENS1} + a_9 \text{HBENNS1} + a_{10} \text{UPHTAN1} + a_{11} \text{UPTRAK1} + a_{12} \\
 &\text{HURE1} + a_{13} \text{HSP361} + a_{14} \text{HNPk1} + a_{15} \text{HPUDC1} + a_{16} \text{HPUDP1} + a_{17} \text{HPUL1} + \\
 &a_{18} \text{HPESC1} + a_{19} \text{HHERBC1} + a_{20} \text{PENDPET} \dots\dots\dots 1)
 \end{aligned}$$

Sign of the expected parameters are:

$$a_1, a_2, a_3, a_4, a_5, a_6, a_7, a_9, a_{20} > 0, \quad a_8, a_{10}, a_{11}, a_{12}, a_{13}, a_{14}, a_{15}, a_{16}, a_{17}, a_{18}, a_{19} < 0$$

To find out the determinants of Certified Seeds adoption, it is guess by the logic function:

$$\begin{aligned}
 &P_2 \\
 \ln \frac{P_2}{1 - P_2} &= b_0 + b_1 \text{UMR} + b_2 \text{PDDK} + b_3 \text{JLAK} + b_4 \text{DGRPTT} + b_5 \text{LMSLPTT} + b_6 \text{LMSW} \\
 &+ b_7 \text{LGRP1} + b_8 \text{HBENS1} + b_9 \text{HBENNS1} + b_{10} \text{UPHTAN1} + \\
 &b_{11} \text{UPTRAK1} + b_{12} \text{HURE1} + b_{13} \text{HSP361} + b_{14} \text{HNPk1} + b_{15} \text{HPUDC1} + b_{16} \text{HPUDP1} + \\
 &b_{17} \text{HPUL1} + b_{18} \text{HPESC1} + b_{19} \text{HHERBC1} + b_{20} \text{PENDPET} \dots\dots\dots 2)
 \end{aligned}$$

Sign of the expected parameters are:

$$b_1, b_2, b_3, b_4, b_5, b_6, b_7, b_{20} > 0, \quad b_8, b_9, b_{10}, b_{11}, b_{12}, b_{13}, b_{14}, b_{15}, b_{16}, b_{17}, b_{18}, b_{19} < 0$$

Where:

- P_1 = Farmers who use young seedlings Age 15-21 DAD, where 1 = for the use of young seedlings, 0 = not used young seedlings.
- P_2 = Farmers who apply Certified Seed adoption, where 1 = apply for the Certified Seed, 0 = do not apply certificated seed.
- a_0 = constants.
- b_0 = constants.
- a_i (1, 2, 3, 4, 5, 6, ... 20) = guess parameter /logistic regression coefficients
- b_i (1, 2, 3, 4, 5, 6, ... 19) = guess parameter /logistic regression coefficients
- PDDK = Level of farmer education (years).
- JLAK = Number of Family Members (people).
- LMSW = Wide of Ricefield Owned Land (ha).

LLHN	= Land owned and non-owned (ha).
LGRP1	= Operate Land Area on Rainy Season (RS) 2010/2011 (ha).
DGRPTT	= where 1 = farmer who ever heard the ICM, 0 = never heard of ICM.
LMSLPTT	= Long follow ICMFS (day) training.
HBENS1	= Price of Certificated Seed on RS 2010/2011 (Rp/kg).
HBENNS1	= Price of non Certificated Seed on RS2010/2011 (Rp/kg).
UPHTAN1	= Wages of Planting during the Rainy Season 2010/2011 (Rp/Day of Work).
UPTRAK1	= Wages of cultivation by Hand tractor (Rp/ha).
UTANJLG1	= Wages of Plant of Vacant Spacing Row on RS 2010/2011 (Rp/Day of Work).
UTANTG1	= Wages of Plant of Square on RS 2010/2011 (Rp/ Day of Work).
HURE1	= Price of Urea Fertilizer on RS 2010/2011 (Rp/ kg).
HSP361	= Price of SP36 Fertilizer on RS 2010/2011 (Rp/ kg).
HNPk1	= Price of NPK1 Fertilizer on RS 2010/2011 (Rp/ kg).
HPUDC1	= Price of Leaf Liquid Fertilizer on RS 2010/2011 (Rp/kg).
HPUDP1	= Price of Leaf Solid Fertilizer on RS 2010/2011 (Rp/kg).
HKDG1	= Price of Manure on RS 2010/2011 (Rp/kg).
HPUL1	= Price of Other Fertilizer on RS 2010/2011 (Rp/kg).
HPESP1	= Price of Solid Pesticides on RS 2010/2011 (Rp/kg).
HPESC1	= Price of Liquid Pesticides on RS 2010/2011 (Rp/kg).
HHERBC1	= Price of Liquid Herbicide on RS 2010/2011 (Rp/kg).
PENDPET	= Farmers Household Income (Rp/year).

Existing data is entries, validated, and tabulated using Excel software program, while for data analysis using the logic function of SAS / ETS version 6.12.

3. Results and Discussion

3.1. Implementation of Public Performance of ICMFS for Rice in Banten Province

Banten Province has an area of 9,662 km², with a population in 2009 year amounted to 9,782,779 persons. Rice harvested area in 2010 year covering 406,358.5 ha with a production of 2,048,047 tons or 5.04 tons with the productivity of paddy/ha (Directorate General of Food Crops 2011).

Implementation of Integrated Crop Management Field School (ICMFS/SLPTT) non hybrid paddy in Banten Province has been done since 2008. In 2008 the wide of paddy fields carpet for ICMFS program as wide as of 58 875 has, with the number of 2,355 units (25 ha/unit), consist of 2,164 farmer group, six regencies/municipal, and 1,033 villages. As known the wide of one ICMFS area is 25 ha (1 FS) and every 25 ha there is one Field Laboratory (FL). The details are listed in Table 1 below.

Table 1. Wide of ICMFS Implementation in the Banten Province of 2008 – 2010 Year

Year	Area (ha)	FS Unit	Farmer Group	Regency/ Municipal	District	Village
2008	58.875	2.355	2.164	6	132	1.033
2009	80.000	3.200	3.200	7	116	852
2010	71.650	3.043	3.043	5	156	1.208
Total	210.525	8.598	8.407	18	404	3.093

Sources: Primary data is processed, 2011.

Based on Table 1 above until the 2010 year, the land wide for the ICMFS implementation totaled 210,525 ha. This area already covers 51.8% of the paddy harvested area of Banten Province in 2010 year. In 2011 year, the implementation has been delayed ICMFS where dropping (distribution) seeds not all done. Dropping the seeds in some regencies/cities have been done through the National Seed Reserve (NSR) namely on the month of March-April, and while through SSDA (Superior Seeds Direct Aid) is done after the month of April. So, a part of the area as a part of Lebak and Tangerang Regency and all the Municipal (Municipal: Serang, Tangerang and South Tangerang) have not received the seed aid as much as 25 kg/ha until the time of the survey was conducted in June 2011.

Implementation procedures of ICMFS are submission of Recipients Candidate of Location Candidate (RCLC) of farmer groups to the Head of District Agriculture Office (HDHO). The RCLC then proposed to the regency and verified by the Regency Agricultural Office. Then RCLC proposed to provincial and verified again, after being accepted (approved) then made the Decree by the Chief of Agriculture Province and Regency. From the province, RCLC is proposed to the government center.

The new yield varieties that distributed on assisted seed aid package (SSDA and NSR) majority is Ciherang (70%), partly (30%) consists of Mekongga, IR-64, Inpari-13, Inpari-1, Inpari-3, Inpari-8, and Inpari-10. From interviews with key informants (officials of Province Agriculture Office) has known that the farmers interest to Inpari-13 is quite high but the availability of seeds is less from the extension seed producers (PT Sang Hyang Sri and Pertani Company).

Training provided from Field Guide/FG I - FG III. Field School for farmers is as much as 3-8 times/Season that conducted in farmers' land by the Head of Center of Agriculture Extension and HDHO.

3.2. Application Level of Component Technology Adoption of ICM in the Banten Province

Application level of ICM technology component in the province is good enough with ranged 50-75% of all ICM components. The regencies is relatively well are Pandeglang and Lebak especially in the application of vacant spacing row (jajar legowo), the number of 1-3 seeds per hole, and the age of young seedlings. Tangerang regency is also relatively good, especially in the application of organic fertilizers and integrated pest management.

The level of use of New High Yield Varieties (NHVY) in Banten province is as high as 100% in the fourth regency. The New High Yield Varieties that are used 77- 97% still Ciherang, then NHVY Inpari 6, 9, 10, and 13, the implementation just 3 - 23%. The use level of certified seeds ranged 83 - 97% in Banten province, the highest usage in the Pandeglang Regency, and lowest in the Lebak Regency. It's cause because Lebak regency far from seed producer.

The treatment of healthy seeds just about 7- 36% of farmers who do, the rest just by soaking 24 - 48 hours, to sort seeds sink, drain and direct to seed.

Adoption of the young age of planted seedlings was carried out by 54 -100% of the farmers namely is the highest in Pandeglang regency and the lowest in Serang regency. The number of young seedlings 1-3 stem per plant hole just do by 61 - 93% of the farmers, the highest in Serang regency, and the smallest in Tangerang regency which 61% of the farmers.

Vacant spacing row planting system (legowo row) has been implemented by 46 -100% of the farmers, where the highest in the Pandeglang regency, and smallest in the Serang regency. Most of Vacant spacing row are vacant spacing 4:1, then 2:1 and 6:1. The way to manufacture organic fertilizer such as the ICMFS suggestion (manure + paddy straw + decomposer) is only 7 - 16% is applied, the highest in the Pandeglang regency and lowest in the Serang regency. System of discontinued irrigation (intermittent) has carried out by 60-80% of the farmers.

Paddy productivity generally increases before implementation of ICMFS compare after its implementation, as well as the paddy productivity in the ICMFS village is higher compared with non ICMFS village.

3.3. Adoption Factors of ICM Innovation Implementation in Banten Province

3.3.1. Adoption Factors Age Seed Youth Component Application

According to ICMFS that recommended seedling age namely range 15 - 21 Days After Disperse (DAD). From the survey results in Banten province, as many as 91 respondents (75.8%) using the recommended seed according to ICMFS guidance and 29 respondents (24.2%) did not fit with ICMFS namely the age of seedlings 22 - 30 DAD. The average young seed age is 20 DAD with range of 15 - 30 DAD. Social and economic factors that affect decisions to implement (adoption) young paddy seedling age is described in Table 2 below.

Table 2. Guess Results of Adoption Function Implementation of Young Seedlings Age in Rainy Season (RS) 2010/2011 in Banten Province

Parameters	Symbol	Guess Parameter	t-counted	Significant
Intercept	a_0	2.086611	1.700	0.0923
Farmer Age	UMR	-0.102134	-0.603	0.5476
Education Long	PDDK	-0.041393	-0.501	0.6174
The Number of Family Member	JLAK	-0.117175	-1.192	0.2361
Wide of Ricefield Owned Land	LMSW	0.018956	0.347	0.7293
Wide of Operated Land on RS 2010/2011	LGRP1	0.033642	0.479	0.6328
Ever Heard of ICM, where 1= ever, 0= never	<i>DGRPTT</i>	0.259648	2.353	0.0206
Long Follow of ICMFS Training	LMSLPTT	-0.013444	-0.266	0.7910
Price of Certificated Paddy Seed on RS	HBENS1	-0.008608	-0.882	0.3797
Price of Non Certificated Paddy Seed on RS	HBENNS1	-0.024615	-1.247	0.2154
Wage of Planting on RS	UPHTAN1	0.001903	0.194	0.8468
Wage of Hand Tractor on RS	<i>UPTRAK1</i>	-1.646375E-8	-1.839	0.0690
Price of Urea Fertilizer on RS	HURE1	0.011206	0.533	0.5952
Price of SP-36 Fertilizer on RS	HSP361	0.019116	1.505	0.1355
Price of NPK Fertilizer on RS	HNPk1	-0.002078	-0.118	0.9061
Price of Liquid Leaf Fertilizer on RS	HPUDC1	0.021006	1.887	0.0621
Price of Solid Leaf Fertilizer on RS	HPUDP1	-0.024736	-1.558	0.1225
Price of Others Fertilizer on RS	HPUL1	0.015523	0.887	0.3774
Price of Liquid Pesticide on RS	HPESC1	0.007255	0.832	0.4074
Price of Liquid Herbicide on RS	HHERBC1	-0.010624	-1.332	0.1860
Farmer Household Income	PENDPET	-0.057183	-0.980	0.3295
R ²	0.2439			
F	1.597			0.0684

Source: Primary data, processed 2011.

The table above is based on social factors that influence the adoption significantly (real) age of the young seedlings are variable *DGRPTT* (who hear or not hear ICM) with logistic regression coefficient value 0.259648, meaning that every farmer who heard the ICM the opportunity to adopt a young seedling age greater than 26.0% of farmers who do not hear ICM at 95% confidence level, *ceteris paribus*. Based on the survey only 75% (90 respondents) who had heard of ICM, while the other 25% had never heard of ICMFS. From as much as 75% who had heard of ICM in Banten province only 58.3% of the follow ICMFS, while another 41.7% have not been followed.

Other social variables namely age of farmers (UMR), length of formal education (PDDK), Number of Family Members (JLAK), Ricefield-Owned Land, Operated Land on the RS 2010/2011 (LGRP1), and length to follow ICMFS/SLPTT (LMSLPTT) had no effect real impact on farmers' decisions to adopt a young seedling age.

Economic factors that influence farmers to adopt younger age of the seeds significantly are Hand Tractor Wages on RS 2010/2011 (*UPTRAK1*). Whereas no significant effect of other variables.

Hand Tractor Wage variable have the value of logistic regression coefficients namely $-1.646375E-8$ or 0.00000001646 , meaning that if tractor wages rise, so the operate land will decrease, it's means the number of young seedling age will be reduced, any increase in wages tractor Rp 1 million/ha will increase the chances of adopting age young seedlings of 0.01646 at 90% confidence level.

3.3.2. Adoption Factors Application of Certified Seed

The use of certified seeds in Banten province is relatively high. Based on the survey as many as 111 respondents (92.5%) already use certified seed, and 9 respondents (7.5%) others have not been certified. Socio economic factors that affect the chances of adoption of the use of certified seeds is described in Table 3 below.

Tabel 3. Guess Result of Adoption Function of Seeds Certified Implentation on Rainy Season 2010/2011 in Banten Province

Variables	Symbol	Guess Parameter	t-counted	Significant
Intercept	d_0	0.324698	0.530	0.5970
Farmer Age	UMR	0.056014	0.652	0.5161
Education Long	PDDK	0.003706	0.091	0.9275
The Number of Family Member	JLAK	0.013016	0.264	0.7927
Ever Heard of ICM, where 1= ever, 0= never	<i>DGRPTT</i>	0.095061	1.726	0.0874
Long Follow of ICMFS Training	<i>LMSLPTT</i>	0.050303	1.981	0.0503
Wide of Ricefield Owned Land	LMSW	0.009920	0.366	0.7153
Wide of Operated Land on RS 2010/2011	LGRP1	0.012329	0.351	0.7264
Price of Certificated Paddy Seed on RS	HBENS1	0.005165	1.075	0.2848
Price of Non Certificated Paddy Seed on RS	<i>HBENNSI</i>	-0.076265	-7.615	0.0001
Wage of Plant on RS	UPHTAN1	0.006234	1.286	0.2014
Wage of Hand Tractor on RS	UPTRAK1	-2.875882E-9	-0.640	0.5234
Price of Urea Fertilizer on RS	HURE1	0.014692	1.402	0.1640
Price of SP-36 Fertilizer on RS	HSP361	-0.000534	-0.084	0.9329
Price of NPK Fertilizer on RS	HNPk1	-0.007292	-0.831	0.4080
Price of Liquid Leaf Fertilizer on RS	HPUDC1	-0.005705	-1.025	0.3080
Price of Solid Pesticide on RS	HPESP1	0.013395	3.021	0.0032
Price of Liquid Pesticide on RS	HPESC1	0.003692	0.813	0.4179
Price of Liquid Herbicide on RS	HHERBC1	-0.003124	-0.786	0.4340
Farmer Household Income	PENDPET	0.003535	0.121	0.9036
R ²	0.5423			
F	6.236			0.0001

Source : Primary Data, processed 2011.

Social factors which influenced significantly adoption of the certified seeds use is Heard of ICM, with a logic regression coefficient value 0.095061 , meaning that the farmer who hears a higher chance of adopting ICM certified seeds of 0.095 compared to farmers who did not hear the ICM.

Other social factors that affect significantly the adoption of the use of certified seeds is Long Follow of ICMFS (LMSLPTT) with a value of coefficient logic regression namely 0.050, which means that every increase of 1 day will increase the odds logistic ICMFS adoption certificate for 0.050 seeds.

Economic factors that affect significantly the adoption of the use of certified seed is the Price of Non seed Certificated (HBENNS1) with a logic regression coefficient value of -0.076, meaning that any increase in Price of Non Certificated Seed at Rp 10/kg will lower the chances of adopting the certified seed of 0.76. Other variables such as Price of Certified Seeds (HBENS1), Wages of Plant (UPHTAN1), and Wage of Hand Tractor (UPTRAK1), and so on, no significant effect.

3.5. Socio-Economic and Cultural Characteristic of ICM Innovation Target Recipients

The average age of the respondent farmers in the Banten province is 47 years with a range of 20 -72 years. It's mean age of farmers in Banten, including productive age. The Long of education average of 7 years of with range of 0 - 12 years. It's mean educational level equivalent with first class of School of First Levels Advanced (SLTP), and there are who blind letters and most height educated School of Senior Levels Advanced (SLTA). Number of family members on average 4.6 people with a range of 1-10 people/household.

Average ownership of irrigated land is 0.43 ha with a range from 0 to 3.0 ha. Area of irrigated land under cultivation does not belong as wide as of 0.28 ha with the range 0 to 10.0 ha, so that the irrigated land size that operated is 0.72 ha with a range from 0 to 10.0 ha. Area of rainfed land is 0.15 ha, while non-owned land size is 0.06 ha, so the total area of cultivated area of 0.21 ha. Thus the total area of land irrigated and rain-fed and is 0.58 ha and not owned operated land area as wide as of 0.34 ha. So the total area of rice fields are 0, 92 ha/household.

Household income of farmers in the Banten province in 2011 an average of Rp 18,564,256/year. With the average number of household members 4.6 people/house hold then income per capita is Rp 4,035,708/year farmer respondents. Farm household income comes from farm income (on farm) namely Rp 17,666,659 (95.2%), off-farm income, but still related to agriculture (off farm) namely Rp 267 667 (1.4%), and from outside agricultural business (non farm) namely Rp 629 930 (3.4%). Farm income come from rice farming income namely Rp 15,839,485 (89.7%) and non-rice farm income of Rp 1,827,174 (10.3%).

4. Conclusions and Policy Implications

Application level of technology component of ICM in the province is good enough with ranged 50 - 75% of all ICM components. The regency relatively well is Pandeglang and Lebak especially in the legowo row application, the number of 1-3 seeds per hole, and the age of young seedlings. Tangerang Regency is also relatively good, especially in the application of organic fertilizers and integrated pest management. Adoption of the young age of planted seedlings was carried out by 54 - 100% of the farmers namely is the highest in Pandeglang regency and the lowest in Serang regency. The use level of certified seeds ranged 83 - 97% in Banten province, the highest usage in the Pandeglang Regency, and lowest in the Lebak Regency.

Based on the logic function, the determinants of innovation adoption for young seedling age are Have Heard ICM and Wage of hand tractor service. While adoption factor of certified seeds are Had heard of ICM, long follow of ICMFS and price of non-certified seed.

The age of farmer quite young namely 47 years with low education namely 7 years of long education. Total operated land area of rice filed is 0.92 ha/household in Banten Province, whre average ownership of land is 0.58 ha and not owned operated land area as wide as 0.34 ha. Household income of farmers in the Banten province in 2011 an average of Rp 18,564,256/year or Rp 4,035,708 per capita. Most the source of income come from farm income (95.2%).

Advice on the implementation of the additional acreage of ICMFS, precision-assisted seed distribution, provision of equipment aid of Leaf Color Chart, The Rice Soil Test Device (PUTS), Soil PH meter, hand tractors assistance, the addition of irrigation water discharge and the accompanying fees FWE, HDHO/HAEO.

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