THE INTEGRATED PLANNING TO INCREASE TOTAL HOUSEHOLD INCOME OF PADDY FARMERS IN EAST KALIMANTAN, INDONESIA

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Abstract

There werevarious problems and challenges in the development of paddy farming in East Kalimantan such asthe high number of farmers, the low level of paddy farm income and the low level of farm household income. Consequently, effort is needed to increasepaddy household income and to develop the agricultural sector simultaneously. The objective of this study was to create the integrated planning to increase total household income of paddy farmers. Two stage cluster sampling was used to determine the study areas and the total 380 households of paddy farmers as respondents. This study applied regression and descriptive analysis to make the integrated planning of agricultural development in the study areas. The planning matrix is designed to help stakeholders answer some issues such as the reasons why programmes should be done, which programmes should be carried out, the methods to conduct the programmes, people involved, locations and timing.

Keywords: PLANNING, HOUSEHOLD INCOME, PADDY FARMER, EAST KALIMANTAN.

1. INTRODUCTION

Paddy is one of the most important commodities in the agricultural sector whereby it produces rice as a staple food for most Indonesians. Paddy farming is still the main occupation in rural areas of Indonesia, especially in East Kalimantan. The number of households in Indonesia in 2009 was 58,421,900 of which 17,488,276 (29.93%) were engaged in paddy, corn, soybean and sugar-cane farming. As part of that, the total paddy households in East Kalimantan in 2009 was 119,555 or 0.2% of total households in Indonesia (BPS of East Kalimantan, 2009; BPS of Indonesia, 2011).

The development of paddy farming in East Kalimantan faced various problems and challenges such as the high number of farmers, the low level of paddy farm income and the low level of farm household income. In this province, the total labour force in the agricultural sector in 2009 was 456,950 persons where it was higher than the number in the manufacturing sector (240,566 persons). However, the labour income of the agricultural sector was lower than the manufacturing sector. In addition, paddy farm income in 2008 was lower than the average in Indonesia, and paddy farm income in 2009 was lower than the average household expenditure (BPS of East Kalimantan, 2009; BPS of Indonesia, 2008; 2011).

Agricultural development is needed not only to increase farmer's income but also to achieve food security, improve competitiveness and increase value added of agricultural products. It is needed the development of ideas and strategies in order to help farmer getting better income.According to Hadwiger (1992), the government can provide a framework to facilitate the development of a productive and efficient agriculture.

The objective of this study was to create the integrated planning to increase total household income of paddy farmers in East Kalimantan, Indonesia. The planning matrix is important as a foundation and a guideline in agricultural development planning. It provides information on what policies and decisions should be implemented to manage natural, physical and human resources for agricultural and other sectors development.

2. LITERATURE REVIEW

Household income is total income from every members of a household that is gained from many sources (Hernanto, 1996). Households derive their incomes from three basic sources. They are wages or salaries (64%),

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property such as capital and land (22%) and the government transfer payment (14%) (Case et al., 2009). Zaini (2004) mentioned that most Indonesian households depend on the income obtained from wages.

According to Swastika et al. (2004), the main source of household income in Central Java (Blora and Temanggung), Nusa Tenggara Barat (East Lombok) and Central Sulawesi (Donggala), Indonesia, was gained on-farm. It was followed by non-farm income at the second and off-farm as the last. Thus, it emphasized that the main source was mostly generated from farm labourers. Irawan et al. (2007) identified that the majority of households in West Java, Central Java, East Java, North Sumatera and South Sulawesi, Indonesia, had two or three sources of income. A small number of households had more than four sources of income. Agricultural income (including services from productive assets, land rent, livestock and machinery) was the main source of rural household income in their study areas, especially the revenue from wetland rice farming. The other incomes were obtained from trading and services.

Ilham et al. (2007) reported that the contribution of farming to household income in West Java, Central Java and South Sumatra, Indonesia, in 2007, varied from 40 to 81%. It was based on the type of commodity, agro-ecosystem and planting intensity.According to Lokollo et al. (2007), within the last three decades, income from the agricultural sector still dominated the rural household's income in Indonesia. The contribution of agricultural sector, non-agricultural sector and other sectors were 60.49, 16.3 and 23.21% of household income in 2007, respectively. They explained that based on the employment status, the majority of household income came from self-employment activities.A study by Kustiari et al. (2008) conducted in Lampung, South Sulawesi, West Java, Central Java and East Java, Indonesia, discovered that the contribution of the agricultural sector to household income was in the range of 58 to 94% in 2008. Farm activity was the main source of income in rural areas.

3. METHODOLOGY

This study chose East Kalimantan, Indonesia, as the study location. The Republic of Indonesia is located in Southeast Asia and borders Papua Nugini in the East, Malaysia in the North and Timor Leste in the South. East Kalimantan is a province in Indonesia that is located on Kalimantan island. According to BPS of East Kalimantan (2011), it lies between 113˚44'East Longitude and 119˚00'East Longitude and at $4^0$24'North Latitude to 2˚25'South Latitude. East Kalimantan borders with Sulawesi ocean and Makassar strait in the East, Central Kalimantan Province, West Kalimantan Province and Malaysia in the West, in the North with Malaysia and South Kalimantan Province in the South.

This study used the two-stage cluster sampling as the method of determining the study areas and the number of respondents. The total 380 households of paddy farmers were selected in the sampling frame.Respondents reside in TenggarongSeberang (128 households), Loa Janan (17 households), MuaraMuntai (4 households), Babulu (128 households), Penajam (84 households), Waru (16 households), South Bontang (2 households), North Bontang (1 household) and West Bontang (0 household) (Figure 1). Regression function was applied to determine factors influencing total household income of paddy farmers. Descriptive analysis was used in formulation the integrated planning to increase total household income of paddy farmer in East Kalimantan, Indonesia.

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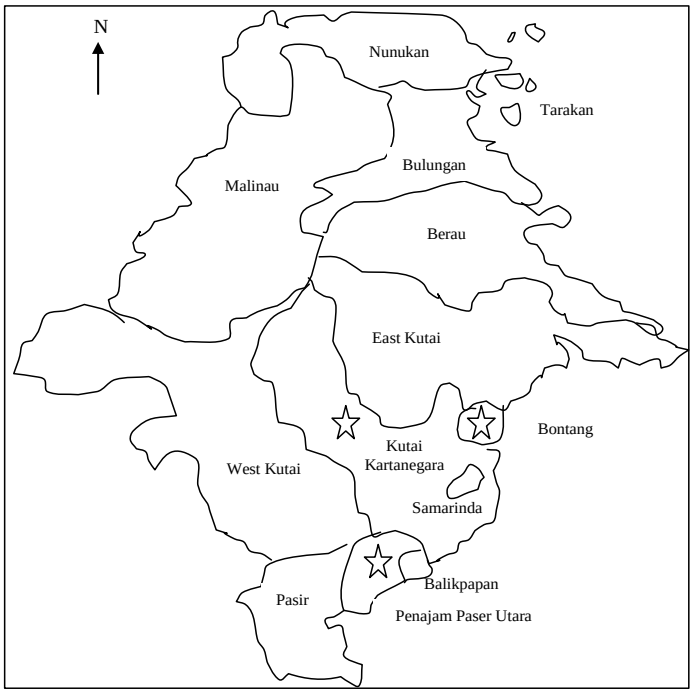

Figure 1. Study areas in East Kalimantan, Indonesia.

4. RESULTS AND DISCUSSION

The integrated planning of agricultural development in the study areas is summarized in a planning matrix to increase total household income of paddy farmers in East Kalimantan, Indonesia, as shown in Table 1.The planning matrix is made to give direction, to integrate and to ensure all activities and stakeholders focus their attention to give the direct and indirect contributions to agricultural development, especially in the increase of total household income of paddy farmers.In general, the planning matrix is designed to help stakeholders answer some issues such as the reasons why programmes should be done, which programmes should be carried out, the methods to conduct the programmes, people involved, locations and timing.

The results of this study show that land cultivation cost, paddy farm size, the number of non-paddy farm jobs and the number of non-paddy farm labourers influence total household income of paddy farmers in East Kalimantan, Indonesia.This results become a foundation in the making planning matrix. The programmes that will be offered in the matrix are selected based on the results of this study that become the reasons why theprogrammes should be done. This study identified fourprogrammesthat have the potential ability to increase total household income of paddy farmers. They are (1) increasing tractor numbers, (2) creating on farm and off farm jobs, (3) increasing the number of family labourers and (4) extensification, intensification and diversification. The matrix consists of some activities that have ability to raise total household income of paddy farmers in East Kalimantan, Indonesia.

The stakeholders in agricultural development include farmers, private entrepreneurs, government agencies, non government institutions and researchers. The planning matrix has been identified and determined persons or institutions who are stakeholders in each activity. Stakeholders should take responsibility or to act as the catalyst so all programmes and activities could be done, whether individual or together, they also have a role to ensure the activity to be effective/workable. This is relevant to Barrow (2005) who mentioned that stakeholders should take the initiative, steer the development and implementation of activities, ensure co-ordination and regular review. Stakeholders also have a role as environmental managers because the environment is included in the scope of agricultural development.

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Activities in the integrated planning work out at many areas such as provincial, district, sub-district and village levels. The matrix consists of yearly planning, short term, long term and special planning to increase total household income of paddy farmers. According to Henson and Sekula (1994), in the longer term, the planning of food production is not be driven by any rational assessment of market demand or requirements for efficiency in production. The authors argued that the perceptions of regional and/or national requirements for food products held by the central planners and the wider social role of industry within the community such as ensuring local full employment or the provision of social services should be the basis. Implementation of all proposed activities is done throughout a year depending on financial ability.

4.1. Increasing Tractor Numbers

The first programme to increase total household income of paddy farmers is the increase of tractor numbers. This programme is recommended based on the reason that land cultivation cost very significantly negatively influences total household income of paddy farmers in East Kalimantan, Indonesia, *ceteris paribus*.Some activities could be done by farmers, privates, government, non-government institutions, researchers and financial institutions in order to realize this programme in rural and urban areas.

Farmers could save parts of their income minimum as much as depreciation cost periodically in financial institutions. Therefore, the farmers have the ability to buy tractors and the owners of tractors could renew their tractors when needed. Private entrepreneurship can set up businesses in selling, renting and maintaining of tractors in rural and urban areas during the year. Researchers, government and non government institutions are needed to do studies related to efficiency of tractor utilization. Such study is important in order to know optimal numbers of tractors needed in agricultural areas. The findings become a foundation for action to provide tractors through agricultural institutions at village level; the activities are done depending on planning in each target area.

Table 1.Planning matrix to increase total household income of paddy farmers in East Kalimantan, Indonesia.

No.	Background	Programme	Activity	Stakeholder	Place	Time
1	Land cultivation cost very significantly negatively influences total household income of paddy farmers in East Kalimantan, Indonesia, *ceteris paribus*.	Increasing tractor numbers.	Saving parts of income minimum as much as depreciation cost of tractor.	Farmers	Financial institution	Periodi-cally.
			Set up business in selling, renting and maintaining of tractors.	Privates	Rural and urban areas.	During a year.
			Providing tractor to agricultural institution at village level.	Government and non-government institutions.	Rural areas.	Depends on target.
			Studying related to efficiency of tractor utilization to know optimal numbers of tractors needed in agricultural areas.	Researchers, government and non-government institutions.	Research institution, rural and urban areas.	Depends on target.
2	Paddy farm size very significantly positively influences total household income of paddy farmers in East Kalimantan, Indonesia, *ceteris paribus*.	Intensi-fication, extensifica-tion and diversifi-cation.	Input intensification.	Farmers	Village	Short and long terms.
			Crops diversification.			
			Increasing planted and harvested areas.			
			Renting land to farmer.	Privates	Village	During a year.
			Expanding agricultural areas, developing infrastructure and regular maintenance.	Government	Province, district, village.	Short and long terms.
			Studying related to the optimal farm size for paddy farming.	Researchers, government and non-government institutions.	Research institution, rural areas.	Depend on target.

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3	The number of non-paddy farm jobs very significantly positively influences total household income of paddy farmers in East Kalimantan, Indonesia, *ceteris paribus*.	Creating on-farm and off-farm jobs.	Developing crops diversi-fication and home industries that utilized local resource.	Farmers	Village	Short and long terms.
			Set up business and developing public–private partnership.	Privates and government.	Rural and urban areas.	Short and long terms.
			Developing and regular maintaining the infrastructure such as economic, physical, capacity building and services.	Researchers, government, non-government, financial institutions, privates.	Research institution, rural and urban areas.	Short and long terms.
4	The number of non-paddy farm labourers very significantly positively influences total household income of paddy farmers in East Kalimantan, Indonesia, *ceteris paribus*.	Increasing the number of family labourers.	Leading household members to have skills, work experience, education.	Farmers	Rural and urban areas.	During a year.
			Employing household members in paddy farming and non-paddy farming.			
			Increasing business size and recruiting more labourers especially from household members of paddy farmers.	Privates	Rural and urban areas.	During a year.

4.2. Intensification, Extensification and Diversification

The fourth programme to increase total household income of paddy farmers is intensification, extensification and diversification. Foundation of this program is paddy farm size very significantly positively influences total household income of paddy farmers in East Kalimantan, Indonesia, *ceteris paribus*. There are some activities that support the implementation of this programme.

Farmers can take action to use raw materials in optimal numbers during the planting season. Farmers need to intensify the use of inputs besides expansion of paddy areas in order to increase crop yields per hectare. Diversification can improve cropping frequency and make marginal land more productive. Farmers need to adopt new technology to increase productivity such as trying to use new brands of fertilizer and agrochemical inputs, adopting new high-yielding seed varieties and applying new packing systems. According to Danes et al. (2007), business innovation practices (such as new products and services, new methods, new marketing techniques) influence gross business revenue.

Governments could stabilize the market's input prices through procurement purchases, management of stocks and trade measures (Calpe, 2004). Syafa'at et al. (2006) stated that the highest retail price of fertilizer was not effective because farmers still buy fertilizer at the higher level. They mentioned that the increase of the retail price must be followed by an increase of profit in the same degree. Another activity to stabilize market price is supplying or distributing the subsidized raw materials. Support to producers is mainly channeled through the distribution of improved seed (Calpe, 2004). The specific arguments to subsidize fertilizers in Indonesia are explained as follows: (a) to encourage fertilizer usage as part of the improved production practices associated with the new rice varieties, (b) to stabilize the price to farmers by providing a ceiling price on the dominant cash input, and (c) to provide a relatively efficient transfer of resources from government (tax sources) to farmers to foster rural development (Hedley' & Tabor, 1989). Protection and subsidies entice higher prices for farmers, will help rice producers to increase productivity, enabling them to earn enough to invest (Rakotoarisoa, 2011) for the next planting season. According to Hadwiger (1992), government could assist the development of a productive and efficient agriculture through guaranteeing high and stable prices for commodities to expand their holdings and further modernize their technology.

Paddy households have some alternatives to increase planted and harvested area of paddy such as buying wetland or dryland, renting land from private owners in the same village and using marginal land.The expansion of

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agriculture areas is not only done by paddy households but it should be led by the government, particularly to guarantee land supply for farmers because of the small number of land owners. Large-scale developments such as transmigration, agriculture and infrastructure development will improve access into the new areas (Chokkalingam et al., 2005). The expansion of agriculture areas should be followed by development of infrastructure and regular maintenance as formulated in the programme on creating on farm and off farm jobs. The existence of infrastructure forces the development of rural areas, both agricultural and non agricultural sectors. Study is required to determine the optimal farm size for paddy farming in the study areas. Study could be done by researchers, government and non government institutions in rural areas. The implementation of this activity depends on targets and financial ability.

4.3. Creating On-Farm and Off-Farm Jobs

The second programme to increase total household income of paddy farmers is to create on farm and off farm jobs. This programme is suggested based on the reason if the number of non-paddy farm jobs significantly positively influences total household income of paddy farmers in East Kalimantan, Indonesia, *ceteris paribus*. Many activities could be done in relation to the implementation of this programme.

Paddy household members can perform crop diversification by utilizing leisure time between planting and harvesting seasons. Besides crops diversification (the development of annual and perennial crops planting), other occupations such as seller, fisher, breeder of livestock and carpenter have opportunities to develop in rural areas. Previous studies suggested that paddy farmers adopt rice-fish culture. Rice-fish culture has potential to enhance the net returns per unit-farmed area, while fish has a high market value compared to rice (Mohanty et al., 2009) and offers the possibility to improve the protein intake of the local population (Rehm&Espig, 1991). Rice-fish culture as a farming system is as part of an integrated ecosystem and sustainable management, in line with the local cultural, environmental, economic condition, national, regional and international development programmes(Halwart, 2004; Lu & Li, 2006). It plays important ecological service roles, such as bio-control, nitrogen fixation and landscape combination. Rice fields provide shade and organic matters for fish, which in turn oxygenate soil and water, eat rice pests and favour nutrient recycling (Lu & Li, 2006). Other activity aimed to increase household income is the developing home industries utilize local resources such as rice powder and rice food.

Private sector is encouraged to set up small, medium and big businesses, whether affiliated or not to paddy in rural and urban areas. Developing public-private partnership in the long term is an important issue in the community. According to Narrod et al. (2009), public–private partnerships could be complementary in infrastructure development. Establishment of certification agencies that provide affordable services to smallholders requires public–private partnerships. Although some certification agencies have been established, however there is a need to increase their role to support faster agricultural growth. Government could influence formation of standards (jointly with the private sector) customized to the needs of smallholders such as standards and certifications for agricultural products.

The urgent need is the development of infrastructure in rural and urban areas to support the growth of on farm and off farm jobs. According to Barrios (2008), intervention in development can be broadly classified into four categories (possibly overlapping). They are (1) economic infrastructure (for instance credit and production support); (2) physical infrastructure (for instance manufacturing, roads and irrigations); (3) capacity building (for instance training and information dissemination) and (4) support services.

Developing economic infrastructure is helpful and needed not only for farmers but also for private entrepreneurship. Establishing financial institutions is needed in urban and rural areas such as private banks, government banks and cooperatives. Government is needed to facilitate financial support to farmers for the development of paddy, non-paddy farming and other businesses and to private entrepreneurship for the development of small, medium and big business in rural and urban areas. Based on study in Thailand, India, Syria and Vietnam, Kruijssen et al. (2009) found that individual annual income depends on the working capital available in a particular household. The important activities are price supports, price controls and the provision of credit (Scobie et al., 1991).

The development of physical infrastructure and regular maintenance are required for the development in the study areas for instance roads, irrigations, markets, manufacturing and social facilities. According to Hadwiger (1992), the government creates infrastructure for marketing, transportation, storage, water, electric power and credit,

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which are virtual prerequisites to modernize agriculture and to develop a productive and efficient agriculture. Several studies reported that the critical problem in the rural areas is the condition of infrastructure (Agustian et al., 2005; Barham&Chitemi, 2009; Ministry of Agriculture of Indonesia, 2006). Most the study areas face the limited number of infrastructure, the low quality of infrastructure and the lack of maintenance services. It is needed the investment for infrastructure development (Scobie et al., 1991), the increasing quality of infrastructure and the regular maintenance for most physical infrastructure in the studies areas. Roads are the main infrastructures that are easily found in the study areas but it need regular maintenance. Irrigations are important for paddy farming but their existence are limited in the study areas because of water supply limitation. Larson and Plessmann (2009) reported that irrigation and pump irrigated land significantly influence rice yield in the Bicol region of the Philippines. Moreover, Abegunawardana and Pope (1986) found that tank irrigation techniques influence Sri Lankan farmer's management plan decisions more than consideration of price and yield variability. Government must support the development of upstream and downstream industries such as rice bran oil and husk power plants. According to Haggblade et al. (2010), the transformation of raw agricultural products by milling and packaging becomes main component of the rural non-farm economy. There are some impacts of industry development such as absorbing labour (Hayami et al., 1988; Janssen, 1993), creating new jobs and firms (Martin &Warr, 1994; Molee, 2001), leading to efficient utilization of farm resources, increasing income (Hayami et al., 1988) and reducing nutritional poverty (Hassan &Babu, 1991).

According to Folke et al. (2005), community empowerment may help in improving the livelihood options and enhancing community well-being. This requires community engagement with institutions that give incentives to respond and to shape change for social-ecological sustainability. It also requires governance systems that allow and provide support to community processes that improve the ecosystem's capacity to generate services. There are some activities in related to establish community empowerment (farmer groups, cooperatives, agricultural and non-agricultural institutions) as part of capacity building such as regular research hearings, entrepreneurship training, study and extension services (Scobie et al., 1991), guidance and supervision of local business. According to Knipscheer and Suradisastra (1986), the general objectives of the regular research hearings are divided into (a) enhancing dialogue between farmers, researchers and extension personnel (a lack of understanding by participants would result in a lack of motivation to discuss specific situations, problems and technologies), (b) developing field recommendations for village farmers and increasing the probability of 'new discoveries' at the farm level, (c) contributing to the farmer's knowledge of farming practices and (d) increasing the researcher's understanding on problems and constraints of production in the village. According to Janssen (1993), training is the key that will turn processing into a growth activity in generating additional employment. Barham and Chitemi (2009) mentioned that it is needed to provide training to farmers to be more business-oriented, such as managing their crops as commodities.Researchers corporate with government and non-government institutions can do studies in the rural and urban areas. Study and extension services are important activities which need to develop (Scobie et al., 1991). Public investment in agricultural study, extension and education can produce enormous returns in productivity (Hadwiger, 1992). Study is needed because it generates revenues which are significantly higher than the returns that other investments yield (Kafouros, 2008). The ability to lead farmers to more productive techniques becomes an indicator that could be used to assess if an agricultural study becomes a successful programme (Hardaker& Fleming, 1989). Activity aims to guide and to supervise for instance organizing group activities (such as the farmer groups) as business enterprises in order to reduce production risk and to increase income.

Support services include the development of efficient and effective marketing systems as well as investment in agro-industrial capacity (Janssen, 1993). According to Hellin et al. (2009), Kruijssen et al. (2009) and Malian et al. (2005), farmer organization, market organization and collective action are often seen as key factors in enhancing farmer's market access, adding value of products and determining farmers share. It is important to find and to develop the national, regional and international markets for local products and protection of local products. Agricultural production has big opportunity to develop in the rural areas when the cooperative can be well accommodated and the cooperative number is increase. According to Riethmuller (1994), the cooperatives may guarantee production cost if the farmers give a commitment to produce output withthe cooperative's specifications. In a way, therefore, the cooperatives provide a form of price support to farmers not dissimilar or higher to the support from the government. The increasing role of cooperatives in the study areas could be started from the marketing of inputs for farming and agricultural products. Farmers buy raw materials and sell their products through agricultural cooperatives in villages and cooperatives buy at appropriate prices. Even the role of farmer's groups in the production activity was very small and almost did not exist in the marketing activity (Agustian et al.,

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2005). However, this study suggests farmers also could buy raw materials together with other farmers in the same village through farmer groups. This is recommended because farmers in the study areas faced problems similar to those in other study areas, such as lack of market access (Markelova et al., 2009), long marketing chains (Agustian et al., 2005; Ministry of Agriculture of Indonesia, 2006), lack of information on prices, lack of connections to established market actors, distortions or absence of input (Poulton et al., 2005).

4.4. Increasing the Number of Family Labourers

The third programme to increase total household income of paddy farmers is by increasing the number of family labourers. This programme is recommended based on the reason that the number of non-paddy farm labourers very significantly positively influences total household income of paddy farmers in East Kalimantan, Indonesia, *ceteris paribus*.

Effort to increase skill, work experience and education should become the main consideration of the household head and his spouse. Although the result of this study shows that their impact is not significant on wages, however, factors of skill, work experience and education still play important role in labour recruitment in most jobs. The increasing the number of non-paddy farm labourers could be done by employing household members in paddy farming and non-paddy farming in rural and urban areas during a year.

The private sector could absorb more labourers than the non-private sector, so this sector must be developed seriously in rural and urban areas. Kruijssen et al. (2009) mentioned that if private entrepreneurs could increase their business size, business has a greater capability to recruit local labourers. All activities that proposed in this programme relate closely to creating on farm and off farm jobs. If programme creating on farm and off farm jobs could be done in rural and urban areas, the number of family labourers will increase.

5. IMPLICATIONS

The integrated planning gives direct and indirect contributions to agricultural development through its significant impact on the increasing total household income of paddy farmers. According to Janssen (1993), the direct contribution of agricultural development can be viewed from the aspect of creating more employment within agricultural production itself. The indirect effect is by enhancing the forward and backward linkages with agro-industrial activities. Agricultural development depends on the improvement of existing production systems, makes them at once more productive and more sustainable. Goodland and Daly (1993) mentioned that the priorities for sustainable economic development are population stability, renewable energy, human capital formation (education and training, employment creation, technological transfer), job creation, direct poverty alleviation, including social safety nets and targeted aid, conservation and prudent management of natural resources. This study describes the efforts to achieve sustainable paddy development in East Kalimantan, Indonesia, through some programmes and activities that presented in the planning matrix to increase total household income of paddy farmers.

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