

Implementation of Modern Agricultural Food System in Timor-Leste, 1982-2007

Joaquina Tavarez*, Yety Rochwulaningsih, Haryono Rinardi

Master Program of History, Faculty of Humanities,
Universitas Diponegoro, Semarang, Central Java - Indonesia

*Corresponding Author: quina09.vares@gmail.com

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Abstract

This article study examines modern process of agriculture in Timor-Leste in the period of 1982 and 2007. The modern agricultural system has been conducted in the 1980s, when the Indonesian government worked together with a non-governmental organization (NGO), namely the East Timor Agricultural Development Program (ETADEP) to overcome famine during the civil war in the region. The Indonesian government and the NGO ETADEP have modernized farmers by using tractor machines to cultivate the land, but at that time 95% were categorized as traditional farmers. Thus, it was difficult for them to implement modern agriculture at that time. This article uses the historical method which includes four stages, including heuristics, source criticism, interpretation, and historiography. The modern process of agriculture in Timor Leste has been conducted since 1982 when was marked by the implementation of the Mass Guidance program (BIMAS). Through the Bimas program, the government has succeeded in developing farmers' business credit to facilitate the credit provision in the form of agricultural tools and inputs to the farmers. After its independence, Timor-Leste faced new challenges in food self-sufficiency. The adoption and adaptation of new technologies in organic farming, such as the Intensive Design System (SRI) and Integrated Crop Management (ICM) are organic farming technologies. However, SRI and ICM replaced the modern agricultural system which had been adopted from Indonesia. Since 2007, the implementation of both the SRI and ICM models have been continued to date. The Timor-Leste government has made great efforts to implement SRI and ICM organic farming even though the implementation of both models is considered troublesome for farmers and indirectly resulted the failure of food self-sufficiency policy in Timor-Leste.

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Introduction

Timor-Leste was the 27th province, before gaining independence from Indonesia. Since 1976, Timor-Leste has been part of the territory of the Republic of Indonesia, marked by Law Number 7 on the Ratification of the Unification of East Timor into the Unitary State of the Republic of Indonesia (NKRI) and the establishment of the

Province of East Timor. The beginning of rapid progress in the development of the agricultural sector occurred in the 1980s. This was marked by the implementation of a program of intensification, diversification, and rehabilitation of food fields that occurred widely in all districts in the Province of East Timor. Some progress occurred during this period, one of which was reflected in the growth of harvested area, good agricultural infrastructure, and maximum land productivity (Tamin et al., 1992, pp. 164-165).

This is an interesting phenomenon because in 1978-1980 Timor-Leste experienced famine due to the civil war that occurred in that region. The cause of hunger occurs due to lack of food, but the hunger is related to violations of human rights (HAM) with international humanitarian law (Komisi Penerimaan, Kebenaran dan Rekonsiliasi (KPKR) dan Penutupan KPKR, 2005, pp. 7-8), so that Timor-Leste received assistance from several countries such as Australia. The assistance was provided by a foreign minister named Andrew Sharp Peacock who told the government that it would provide \$200,000 in preparation for aid to Timor-Leste ("Aid to Timor Leste", 1979, p. 3.). According to the Australian Government's Ministry of Welfare, in principle an agreement has been reached to return representatives of the Red Cross Committee to support the distribution of food aid to Timor-Leste.

Basically, the famine that occurred in Timor Leste is also related to the existing agricultural conditions in the region. The agricultural system in Timor-Leste previously relied on dry land cultivation or shifting agriculture. This type of agriculture has historically been adopted in tropical forest ecosystems. Humans clear the forest and burn the residue, then prepare the land to plant it and the products obtained are consumed for two to three years after which the area is left for replanting about ten or twenty years later (Jesus et al., 2015, pp. 194-195). However, the traditional food crop farming system is not able to meet food needs because it is subsistence, so Timor-Leste needs to carry out modernization of food crops with the aim of increasing food production.

The Indonesian government had attempted to modernize agriculture in Timor-Leste in the 1980s. However, the Indonesian government at that time collaborated with NGOs engaged in agriculture, namely ETADEP, the NGO through the Catholic Relief Service (CRS) which was a continuation of the American aid program, and had helped to overcome the famine that occurred in Timor-Leste during this period. In addition, in the mid-1980s ETADEP was established in Sare, Ermera and has a laboratory in the area (Saldanha, 1994, p. 218).

The implementation of modern agriculture in Timor-Leste began with the Bimas program. The program was implemented in 1982 with the introduction of subsidized assistance in the form of agricultural production facilities such as fertilizers, pesticides and seeds by the government. When the Bimas Program was terminated in the middle of the 1984/1985 planting season, the government then provided Farmer Business Credit (Kredit Usaha Tani/ KUT), to help ease the purchase of production facilities for farmers, but the implementation was accompanied by Field Agricultural Extension Officers (PPL) (Interview with Alfredo Soares, September 20, 2019).

Furthermore, in 1982, the central government, in this case the Government of the Republic of Indonesia, placed 100 heads of families (KK) consisting of 433 people to transmigrate to Timor Leste (Tamin, 1992, p. 231). They come from Java and Bali. This transmigration program has helped local farmers in cultivating agricultural land. The 1982 transmigration program in Bobonaro, has helped farmers there to change the way of cultivating rice fields. The traditional way of plowing rice fields is to use about 20-30 buffaloes to be herded together in rice fields without using a plow. Local farmers in Bobonaro were then introduced to the plow which was placed on the back of the buffalo to be used to plow the fields. Through this new method, it only takes 2 buffaloes to plow the rice fields (Interview with Pedro Maudasi Lopes, October 1, 2019).

One of the impacts of modern agriculture in Timor-Leste is the increasing ability of farmers to manage rice fields. Through modern farming models, East Timorese farmers can harvest twice a year. The effect is the increase in agricultural production to be better than the previous situation. Then the main goal is to improve the lives of farmers. It can be seen that previously the ability of farmers in Timor-Leste to engage in land cultivation was only one harvest a year due to their limited ability to manage land. With the new agricultural technology, farmers can manage the land twice a year, thereby increasing the yields obtained (Selvia et. al., 2019, p. 768)

The implementation of the modern agricultural system in Timor Leste is actually related to the Green Revolution Program which is a program to utilize new agricultural technologies. Increased agricultural production occurs through the presence of skilled farmers who have successfully adapted new cultivation systems for various types of crops. One thing to note is that the majority of skilled farmers are capital-owning farmers, meaning that capitalism has dominated the new agricultural system. Thus, the traditional cultivation system which has been replaced with a modern system, in its implementation requires a large amount of capital. Modern agricultural systems that emphasize farmers with capital have an impact on increasing the productivity of food crops, but not for the welfare of farmers. This happened in Timor-Leste during The Mass Guidance (Bimas) program and has helped farmers to adapt new agricultural cultivation systems through subsidizing agricultural production advice such as fertilizers, pesticides and seeds. However, the modern agricultural system puts pressure on farmers with capital, while for small farmers it is a disaster for them (Rinardi et al., 2019, p. 126).

Related to modernization, it can be interpreted as renewal with the understanding of shaping into modern tastes, carrying out modern procedures, changing traditional tools with modern tools (Samsudin, 1982, p. 122). Meanwhile, agricultural modernization is a major change in agricultural patterns from traditional methods to more advanced or modern ways. The changes cover various aspects which include agricultural institutions, agricultural technology, natural resource development (SDA) (Rifkian et. al., 2017, p. 40). Therefore, it can be said that the modernization of agriculture in Timor-Leste occurred in the Bimas program which changed farmers from traditional to modern. Through the Bimas Program, Timor

Leste's farmers who initially used simple equipment such as hoe or luku were replaced with hand tractors, initially using drum fertilizers instead of chemical fertilizers. The rice field cultivation system which is only rainfed uses an irrigation system.

Important changes in the agricultural system in Timor-Leste occurred when the organic farming system was officially implemented ICM and SRI in 2007. However, both organic systems were new technologies at the time of independence, but SRI has applied during the Indonesian period until some farmers were used to the system. The aim of SRI and ICM is both organic and its function is to manage rice seed nurseries (Alberto Amaral. 10 October 2019). With the implementation of ICM and SRI means that farmers need to make a paradigm shift in the management of paddy fields for rice crop productivity. ICM and SRI eliminate fertilization that uses pesticides or chemicals instead of animal manure as a natural composer.

Based on the explanation of the background above, it can be argued that the implementation of the modern agricultural system as part of the modernization of agriculture that has been carried out since the New Order era, the role of non-governmental organizations in the development of the modern agricultural system. This can be formulated in two questions, among others; First, what was the background and development of the modern agricultural system in Timor-Leste in 1982? Second, what was the role of non-governmental organizations in the development of a modern agricultural system during the independence of Timor-Leste?

Method

The historical research method is a systematic set of rules and principles for collecting historical sources effectively, critically assessing, and proposing a synthesis of the results achieved in writing. There are four steps in the historical method, including heuristics, criticism or verification, interpretation and historiography.

Heuristics is a technique of tracing historical sources that are primary or secondary and in the form of written or oral sources. The historical explanation in this study uses primary sources such as the annual report on the plan for intensification of food crops in Timor-Leste in 1991/1992, the annual report on the condition of food crop agriculture in the Level I Region of East Timor Province in 1998, statistical sources namely East Timor in figures. from 1989 to 1997, Bobonaro in 1998, sources conducted in Semarang, especially at the Central Information Office (PIK), sources of reports on agriculture obtained online from the Australian National Library newspaper, and magazines from America Independent Voices to complete this writing.

In addition to written sources, the author also explored oral sources in the form of interviews. Interviews were conducted with farming communities in several municipalities in Timor Leste. They made a living as owner farmers and sharecroppers during the same temporal period as this study. Interviews were conducted with village government officials, one of whom was the village head and the secretary of the farmer cooperative who served during the Indonesian era. Interviews were also conducted with the former regent during the independence era of Timor Leste, and several PPL

employees. The interview is used to complete information that is not contained in written sources.

This study also uses secondary sources from books, journals, proceedings, and reports that are relevant to the research topic. The use of secondary sources is testimony that does not come from direct eyewitnesses, namely from someone who was not present at the events narrated (Gottschalk, 1975, p. 35). Secondary sources were obtained at several documentation institutions both in Indonesia and Timor Leste. Meanwhile, other secondary sources were obtained online in the form of articles, proceedings, and books. Thus, obtaining secondary sources needs to be done offline or online. After collecting sources (heuristics), the next stage is verification or criticism of the validity of sources. Verification is carried out on all primary sources that have been obtained, including annual reports on food crop agriculture (Abdurahman, 2007, pp. 68-70). The criticism that is emphasized in writing this thesis is internal criticism to test the credibility of sources through collaboration (comparing between sources). One of the sources of this collaboration is done on sources of official government reports and newspapers.

Interpretation means interpreting facts or historical evidence that has been obtained (Daliman, 2015, p. 81.). Interpretation is necessary because it is basically the essence of reading sources. Facts, evidence, or witnesses cannot speak of a phenomenon or event in the past. It takes the analytical power of the historian or researcher to reveal the meaning of the facts that have been obtained. Therefore, from the interpretation process, meanings and relationships between facts are generated. Historiography or historical writing can be used as a means of communicating research results that are revealed, tested (verified), and interpreted. At this stage, reconstruction is carried out through analytical writing of history.

Geographical Location, and Topographical Conditions of Timor-Leste

Timor-Leste is part of the island of Timor, the island is divided into two parts, namely the western part is part of Indonesia's territory, the other part is part of the colony of Portugal. The island is a plain consisting of savanna and steppes and the same area, namely rows, hills and mountains as well as primary and secondary forests. Many small rivers flow from these mountains, cutting the savanna and steppes (Koentjaraningrat, 1975, p. 198).

The type of land in Timor-Leste is dominated by dry land (Priyanto & Dwiyanto, 2014, p. 207). This is caused by the characteristics of the climate and wind. The Monsoon in Timor-Leste that blows from Australia to the west and north tends to be hot and dry. This causes rain to rarely fall in the territory of Timor Leste. Under these conditions, Timor Leste is actually more suitable to develop livestock than agriculture based on rice fields as in Java. Timor-Leste is geographically located longitudinally from southwest to east with an astronomical position of 80 17' South Latitude-100 22' South Latitude and 1230 25' East Longitude-1270 19' East Longitude (Tamin, 1992, pp. 21-23).

The topography of Timor-Leste is in the form of limestone or clay deposits with

lithosol, podzolic and alluvial soil types. There are types of dry and wet land used for food crop production, including land for irrigated and rainfed rice fields. The existing condition of Timor-Leste is a dry area with low rainfall. The dry season is longer than the rainy season with a relatively lower average number of rainy days. In 1997 there was an average of 84 rainy days with a total rainfall of 716.14 mm (East Timor Statistics Bureau, 1998, p. 15). Previously, in 1992 the average amount of rainfall was 919.64 mm (Tamin, 1992, p. 23). The potential of fertile land in Timor-Leste is found in the Bobonaro and Lautem areas with an area of land developed for agriculture is 70,000 km². Other potential fertile lands are located in Viqueque, Manatuto, Baucau, and Ambeno. The potential of the land is suitable for planting food crops, in this case in the form of rice and corn. Plantation crops also grow with coffee, coconut, vanilla, candlenut, cloves (Costa et al., 2003, p. 4), and sandalwood (Saldanha, 1994, p. 226).

Background of the Implementation of Agricultural Modernization

The Indonesian government Prior to the 1980s it had attempted to modernize agriculture in Timor-Leste. The Indonesian government at that time collaborated with non-governmental organizations (NGOs) engaged in agriculture, namely the East Timor Agricultural Development Program (ETADEP), the NGO through the Catholic Relief Service (CRS) which was a continuation of the American aid program, and had helped to overcome famine that occurred in Timor-Leste during that period. ETADEP has existed in Sare, Ermera Regency since the 1980s. In its efforts to help modernize agriculture in Tomor Leste, Etadep has a laboratory in the Sare area.

In their work, NGOs try to develop farmers to cultivate good paddy fields. They introduced the use of tractors to the farming community in Sare. However, the tractor introduction program was too early because at that time the illiteracy rate among farmers was 95%. With this condition, it can be said that using tractors to cultivate paddy fields is considered too early. Another difficulty is that farmers in Sare still find it difficult to speak Indonesian, while the instructors who introduce hand tractors are mostly foreigners who only speak English. Therefore, there are great difficulties among local farmers when NGOs try to introduce the use of hand tractors and modern cultivation methods (Saldanha, 1994, p. 218).

The agricultural modernization program in Timor-Leste has progressed with the placement of transmigration in Timor-Leste in 1982. The central government in this case is the Government of the Republic of Indonesia, placing 100 heads of households consisting of 433 people to transmigrate to Timor-Leste (Tamin, 1992, p. 231). They came from Java and Bali to be placed in several districts in Timor-Leste. The transmigrants then transmit their knowledge to local residents around the transmigration area. Thus, local farmers indirectly learn new ways of farming for transmigrants. One of the districts that has benefited greatly from the above is Bobonaro District. Transmigrants stationed in Bobonaro Regency have helped local farmers in cultivating agricultural land.

The majority of transmigrants have experience and knowledge of food crop cultivation. One of the knowledge or knowledge transmitted by transmigrants to local

farmers, is changing the way of plowing the land. Traditional land cultivation requires a lot of buffalo, because the buffaloes are only herded to trample the land without using any plow. In this case, the soil layer on the agricultural land will naturally feel like it has been plowed, because it has been trampled by dozens of buffaloes. This method changed when the plow was introduced which was placed on the back of the buffalo to be pulled to plow agricultural land. The use of the plow is more efficient because it only uses two buffaloes to cultivate the rice fields. In addition, the production of rice fields that can be harvested up to twice a year, with the support of adequate irrigation sources (Interview with Pedro Maudasi Lopes, September 26, 2019). The transmigrants in Bobonaro have tried to become trainers to teach paddy rice farmers in the area, in particular the use of the plow to plow the paddy fields properly. One interesting thing is that the process of training a cow or buffalo to pull a plow takes 2-3 months, other requirements include; farmers have to bring 3 cows, 1 cow is given to the trainer and 2 cows are given training from the trainer with the farmer. Furthermore, you can see in the Figure 1.



Figure 1. Farmers use Luku cultivator to plow their field
Source: Suranny, 2014, p. 48.

Based on the picture above, it can be explained that the farmer is learning to plow the field using a plow pulled by a cow. The plow blade is made of iron or steel with a pointed shape to penetrate into the ground to be plow. In addition, the plow blade consists of three-sided steel with the tamping and the cutting plane of the plow blade as the flat side. To pull the plow, farmers use tame animals such as buffalo or cows.

***Bimas* Program in Timor-Leste**

In 1982, there was a massive *Bimas* program in Timor-Leste. The program was considered a period of agricultural modernization, when it was introduced by the government by providing subsidies, especially agriculture in the form of production infrastructure such as fertilizers, seeds and pesticides. The government also improved irrigation in several districts and established Village Unit Cooperatives (KUD) with the aim of reducing farmers' costs for purchasing sarprodi through farmer credit.

Starting from the provision of subsidies, farmers are simultaneously trained to cultivate the land with tractor machines, plant in rows, use proper fertilizers and spray pesticides properly on crops. The implementation of the Bimas program is carried out accompanied by PPL, or extension agents who are very helpful to farmers because some farmers lack the motivation to change behavior (van den ban et al., 1999, p. 27).

Agricultural credit is part of the Bimas Program. The credit is a government policy to help farmers obtain Saprodi in order to increase agricultural production. The general objective of agricultural credit politics is, of course, to ensure that the use of credit available to the agricultural sector can be used as efficiently as possible, which means that agricultural credit is able to help increase production and the value of agricultural production as high as possible. This goal is a technical-economic goal, but seen from agricultural credit, it does not only have a technical-economic objective but in the end, it also has other goals such as improving the welfare of farmers and farming communities (Mubyarto, 1987, pp. 119-123).

With the above rationale, the agricultural credit policy was continued even though the government stopped the Bimas Program in the 1984/1985 planting season. The government then introduced KUT in its implementation, PPL was needed to assist farmers participating in KUT in Timor-Leste/Bobonaro in the 1990s. Through the KUT Program in Timor-Leste, especially in Bobonaro, it is expected to change the behavior of farmers from traditional to modern accompanied by PPL by providing credit. The main requirement that must be met by farmers to become members of KUT is to have an area of rice fields and be domiciled in the area. The task of a PPL is to establish a farmer group with a minimum of 8 group members and a maximum of 15-25 farmers. The purpose of KUT in Bobonaro is to help farmers reduce costs and persuade farmers to learn how to use a five-farm-based farming system. Provision of five farming businesses in KUT in Bobonaro/Maliana includes money, fertilizers, pesticides, seeds and tractors. The production facilities, money and tractors can be done on credit after harvesting the produce (Interview with Alfredo Soares, October 1, 2019).

The form of agricultural modernization in Timor-Leste was in the beginning rice farmers in their work only use simple equipment, for example in cultivating the fields previously only used hoe, shovel, pointed wood, buffalo as a plow and used a simple plow pulled by cows/buffaloes. After the Bimas program was continued with Inmas, farmer's rice fields using a hand tractor, the traditional time for farmers to plant by spreading and then replacing it with nurseries. Previously, farmers were not familiar with fertilizers and anti-pest drugs. After the Guidance Program, farmers used chemical fertilizers and pesticides to increase farm production. Previously, farmers in Timor Leste were rainfed farmers, who only expected rainwater to irrigate their fields. Through the Bimas Program, patents recognize good irrigated rice fields and water pumps to help irrigate their fields. Previously, farmers used their feet to trample the cut rice to separate the grains and stalks, with Bimas farmers only collecting rice and then threshing it by machine (Selvia et al., 2019, p. 768).

This happened in Bobonaro during the Bimas program, some farmers did not have adequate knowledge and insight for the problems they understood. Some

farmers in Bobonaro are not familiar with fertilizers, with the government's Guidance Program providing assistance to farmers there. The interesting thing is that local farmers then take sacks and fertilizers to spill on the ground (Interview with Alfredo Soares, October 1, 2019). This is due to their low knowledge due to lack of education, experience and cultural factors. With the extension agent, local farmers in Bobonaro know how to use chemical fertilizers and anti-pest pesticides. They made demonstration plots as examples to farmers so that they can understand how to cultivate, plant and harvest and use good and appropriate infrastructure. Therefore, it can be said that the Bimas program implemented in Timor-Leste can change farmers from traditional to modern. Through the Bimas Program, rice cultivation can be carried out twice a year so as to increase agricultural production. In this way, self-sufficiency in rice was created which occurred around 1986 (Interview with Raul Borges, September 9, 2019).

Mass Intensification Program (Inmas)

Inmas is the same extension facility but without credit. Inmas from the outset includes rice fields that meet all the technical requirements of Bimas, among others, technically irrigated rice fields or semi-technical irrigated rice fields. However, the farmers are considered quite advanced even without credit from the government they still carry out a complete business implementation. Furthermore, the conditions that must be met for the success of Inmas are that the farmers involved are advanced farmers and are willing and able to apply new technologies.

Basically, in Timor-Leste, the farmers who participate in the Bimas and Inmas Programs can be equated. The Bimas and Inmas program in Timor-Leste was initiated by the massive implementation of the Bimas that occurred in 1982-1984. One example taken from here in particular occurred in Bobonaro. The implementation of the Bimas program begins with the provision of subsidies for production facilities from the government to farmers. However, farmers are not familiar with production facilities such as fertilizers, pesticides and seeds so that in its implementation various obstacles arise. The reason is that the majority of Timor-Leste's farmers are classified as field farmers, only a small number of rice farmers with traditional processing methods. Important changes emerged when Bimas was discontinued and gradually replaced by KUT. In the KUT program, PPLs are involved to enter the countryside to provide demonstration plots (*demplots*) to farmers. Through *Demplot*, farmers get an example of how to cultivate rice fields in a modern way. The interesting thing is that the *Demplot* in the KUT was only established in Bobonaro Regency, especially the Maliana sub-district (Interview with Alfredo Soares, October 1, 2019). Other agricultural development efforts have been carried out by the government by building irrigation networks (Interview with Juliao Boumali, September 25, 2019). In the next stage, when East Timorese farmers are getting to know the modern agricultural cultivation system, they are entering the Inmas program. In the program, farmers get credit not in the form of cash, but directly in the form of production infrastructure. The farmers involved in Inmas are farmers who have implemented five farming businesses in their cultivation

system.

Adoption of SRI and ICM during the Timor-Leste Period

In 2007, the agricultural modernization implemented in Timor-Leste was organic farming, namely Integrated Crop Management (ICM) and the Intensive Design System (SRI), but SRI has been implemented during the Indonesian period even though it is only a side activity for farmers, so that the independence period for some farmers has ended. familiar with the application of SRI technology (Alberto Amaral. 10 October 2019). Timor-Leste implemented ICM and SRI in 2007, the training session was carried out by the ministry of agriculture and fisheries in collaboration with the German NGO, German Technical Cooperation (GTC). The difference between ICM and SRI lies in the method of plant cultivation, namely the spacing, for ICM if transplants are carried out on infertile or poor soil, the distance between rice planted is only 20 cm, if the soil is fertile, the spacing is 25 cm (Ogoshi et al., 2008, p. 6). While SRI, the distance of rice plants in a square pattern with a minimum distance of 20x20 with the aim that all rice leaves remain photosynthetically active (Noltze et al., 2012, p. 65).

Timor-Leste does not produce enough rice to meet local demand. Therefore, every year Timor-Leste has to import rice from abroad, one of which is Thailand and Vietnam, around 65,000 tons. Although Timor-Leste has a potential rice field area of approximately 196,312.22 ha. However, the productivity of lowland rice only reaches an average of 2.5 tons/hectare. It was against this background that new rice cultivation methods were tried. This method is known as the System of Rice Intensification (SRI), which is an innovation in rice cultivation in Timor Leste. This method was first introduced in two districts namely Bobonaro and Viqueque in Timor-Leste in 2002 with the support of the government to promote SRI. In a further development in 2007, the implementation of SRI coincided with the village development program in Timor-Leste (RDPII). The implementation of SRI is in conjunction with the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) and the Timor-Leste Ministry of Agriculture and Fisheries (MAP). Implementation of promotion of SRI production, with the aim of increasing domestic rice production and being able to account for the growing demand for food because the population of Timor-Leste is always increasing (Soares et al., n.d., p. 2).

There are similarities between SRI and ICM, namely the reduced number of seeds used in rice cultivation. This means that the cost of buying seeds is also reduced. Before the ICM and SRI methods were used, the rice seeds needed for breeding reached 30-40kg/hectare. With the ICM and SRI methods it only takes 10-15kg/hectare, with the same production results. Another benefit is that the Government of Timor-Leste can reduce imports of fertilizers and pesticides from abroad (Interview with Afonso da Conceicao, August 19, 2019). The ICM nursery model is always carried out with mat media, not directly on the ground. Nurseries are always spread with palm leaves which serve as fertilizer and then covered with banana leaves to avoid damage from birds. Therefore, this system is considered less effective for farmers because it takes extra effort to create and control the natural composition. The ICM model (Figure 2),

on the other hand, is difficult to apply in dry paddy fields, which in fact constitute the majority of land types in Timor-Leste (Ogoshi et al., 2008, p. 3).



Figure 2. Example of ICM and SRI Nurseries

Source: Ogoshi et al., 2008, p. 6.

The disadvantage of the ICM and SRI methods is that it takes a lot of work and time to collect animal waste for breeding. On the other hand, ICM and SRI are suitable for lowland rice fields with permanent irrigation. The ICM and SRI methods of water use control must be strict, because rice must be maintained so as not to experience excess or lack of water. In other words, rice plants must be in a wet soil condition and control is carried out every time and permanently (Interview with Longuinhos John, August 26, 2019). One advantage of the ICM and SRI methods is the reduced use of artificial fertilizers. Under these conditions, East Timorese farmers are lazy to apply the two technologies. In other words, East Timorese farmers continue to use the rice cultivation model as taught by the Indonesian government. Therefore, until the second decade of the XXI century Timor-Leste has not implemented granary and rice self-sufficiency.

Conclusions

Agricultural modernization is part of social change in society, therefore every agricultural modernization program must pay attention to the community as the culprit. The success of the Agricultural Modernization Program must be supported by the condition of the community, in this case the farmers as the perpetrators. The introduction of various agricultural modernization programs followed by the use of various agricultural technologies will not be accepted by farmers, if their socio-cultural conditions do not change. In the sense that farmers as actors in agricultural modernization activities must be empowered first, starting from recognizing various new cultivation methods, agricultural technology, to using production inputs to support the success of the Agricultural Modernization Program. At the same time, there must be an increase in skills as well as expertise for farmers as actors in agricultural modernization. This last factor is often overlooked because most, if not almost all, of the Agricultural Modernization Program are top-down activities. The

program comes from the government without paying attention to the condition of the community as the perpetrators. With this background, it can be understood that the Agricultural Modernization Program is always good in concept, but always almost falls apart at the implementation stage.

Another factor is environmental conditions, in the sense of the geographical nature that exists in the community. The existing geographic environment must support the implementation of the Agricultural Modernization Program. In many cases, because the Agricultural Modernization Program is top-down, it often does not pay attention to social conditions and the natural environment. In this case, there is a thought among decision makers at the top level, that what is planned is good, regardless of the condition of the community and the natural environment that will be the perpetrators of the activity. These factors have then caused various kinds of Agricultural Modernization Programs to fail. The decision makers at the top level only think that what is theoretically planned is the best, regardless of the conditions of society and nature. One of the failure factors in implementing agricultural modernization in Timor Leste is the unfavorable geographical environment. The Agricultural Modernization Program run by the Government of Indonesia, through Bimas, requires a very good rice field environment. In the sense that the Bimas Program in its implementation requires rice fields with a technical irrigation system. This is needed because the rice grown in the Bimas Program requires regular and controlled irrigation water. This condition clearly cannot be met by Timor's natural environment.

The agricultural modernization program carried out in Timor Leste, both Bimas and the various modernization programs that followed, as well as activities carried out by the Government of Timor Leste and NGOs from Germany, German Technical Cooperation (GZT) with the Integrated Crop Management (ICM) program and the Intensive Design System (SRI). The three agricultural modernization programs did not work as expected, because the East Timorese farmers as the perpetrators of the activities did not have a social and cultural background that could support the success of the program. In this case, the agricultural modernization program must have the support of the socio-cultural conditions of the community as actors in the modernization program. A clear example of this is the ignorance of East Timorese farmers about the use and use of chemical fertilizers in rice cultivation. Due to the lack of knowledge of East Timorese farmers, they just pour chemical fertilizers into their rice fields. East Timorese farmers do not know how to use chemical fertilizers. There are several stages that must be done by farmers to use chemical fertilizers. This was not done by Timor Leste farmers, as a result, the yield of rice cultivation in Timor Leste did not increase much even though the Bimas Program had been implemented in Timor Leste.

The cultural condition of the community is an equally important factor. The failure of the Government of Timor Leste's Cooperation Program with the German NGO, German Technical Cooperation (GZT) through the Integrated Crop Management (ICM) and Intensive Design System (SRI) program clearly shows the

unpreparedness of East Timorese farmers to carry out various types of work in an effort to increase agricultural production. With their traditional mentality, East Timorese farmers consider that the various jobs that farmers have to do in the Integrated Crop Management (ICM) and Intensive Design System (SRI) programs are too many. They are not ready to do a variety of jobs on farms that are not known before. Therefore, there is an assumption that East Timorese farmers are too lazy to carry out various types of work in the new rice cultivation method according to the Integrated Crop Management program. The fact is that farmers do not yet have the mental readiness to carry out new cultivation methods in growing rice in accordance with the direction of the Integrated Crop Management (ICM) and Intensive Design System (SRI).

By above situation, what should be done in carrying out the Agricultural Modernization Program is that farmers must be mentally prepared so that they can participate in various activities according to program directions. One interesting thing has been done by the KUT Program, namely by involving PPLs to assist farmers to participate in the program. The PPLs are not only tasked with helping farmers get to know various types of new agricultural tools and new technologies in rice cultivation. However, the task of assisting farmers participating in the program is to prepare proposals to obtain agricultural credit assistance. PPL helps farmers determine how much credit they need to buy fertilizers, pesticides, or living costs. One of the successes of KUT comes from the success of PPL in assisting farmers in carrying out agricultural modernization programs.

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