



## ANALYSIS OF INSTITUTIONAL ENGINEERING IN ONE OF THE WET CLIMATE DRY LAND AGROECOSYSTEM VEGETABLE PLANTING

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### Abstract :

This study is the first to apply a relationship approach between farmer groups and other supporting institutions to develop a farming system and rice crop institutions in a region. The study aims to solve the problems faced by rice farmers in Rawa Medang village, West Tanjung Jabung Regency, by facilitating the adoption of sustainable rice farming system technology through institutional cooperation. The methodology used in this study applies the Participatory Research Appraisal (PRA) method, to explore the problems faced by rice farmers. Alternative interventions include the formation of several farmer groups or Gapoktan, named Joint Enterprises, a short discussion about the rice farming system, looking at the urgent needs of farmer groups, and connecting them with supporting institutions. Based on the PRA results, the problems prioritized are (1) Rice stem disease by Blas, (2) The presence of snail pests, (3) Seedlings, (4) Capital, (5) Subsidized fertilizer, (6) Meetings between groups, and (7) Technical guidance for rice plants. The novelty of this study is that it introduces a new framework of institutional engineering analysis supporting rice farming technology, based on the FSA (Farming System Analysis) concept. The study also provides empirical evidence of the effectiveness of the relationship approach in improving the productivity and profitability of rice farming in the region. The study contributes to the literature on agricultural development and innovation by highlighting the role of institutional cooperation in enhancing the adoption of sustainable rice farming system technology.

Keywords: Agroecosystem, Institutional, Rice Plants

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### INTRODUCTION

The role of financing institutions for farmers is very important, because many financing institutions support farming activities. In terms of agricultural development, Indonesia is a country where the majority of the population earns their living as farmers, and one of the provinces where most of the population are farmers is Jambi province. The agricultural sector in Jambi Province includes the plantation sub-sector, food crops and horticulture, and fisheries. The Food and Horticulture sub-sector is widely cultivated in Jambi Province, especially the Tanjung Jabung Barat Regency, Jambi (Anonymous, 2015).

Institutions and farmers are a structure that cannot be separated. All food crop, vegetable/fruit farming carried out from the past until now is related to institutions, both farmer institutions, government and private institutions. The West Tanjung Jabung Regency area, especially Rawa Medang Village, is one of the rice planting centers in the irrigated land agroecosystem which is usually called technical irrigation land. This rice plant is very suitable to be cultivated in this area, especially Rawa



Medang Village, Batang Asam District, West Tanjung Jabung Regency. In the Rawa Medang Village area, it is one of the rice producing centers which is usually called an Agroecosystem which is suitable for rice plants, especially as it is supported by technical irrigation land. In this area it could be said that almost all of the rice fields can be used for rice cultivation so that production is greater compared to other areas.

In Rawa Medang Village, Batang Asam District, West Tanjung Jabung Regency, there are several institutions that were previously called KUD, now changed to Gapoktan Usaha Bersama which is a financing institution that can support farming activities for agricultural products, one example of which is rice/vegetables/fruit. Rural financing institutions sometimes do not develop well due to too much interference which tends to be excessive from the government bureaucratic system.

This action, in fact, has paralyzed some of the local institutions that have been developing and playing a role in society in equalizing income, including agricultural financing institutions (Sudaryanto and Syukur, 2000). The weak role of agricultural financing institutions has the consequence of increasingly limited farmers' access to financing sources (Syukur et al., 2003). In Batang Asam District, there are two types of financing institutions, namely formal financing institutions and informal financing institutions.

In the operation of rice/vegetable/fruit farming, not all farmers have sufficient capital. As a result of this problem, there is a need for the role of financing institutions that can help farmers in improving their farming businesses. From the above background, problems can be formulated, namely what is the role of supporting institutions in rice/vegetable/fruit farming activities, especially rice plants which are usually called rice on technically irrigated land, as well as what are the strategies for developing rice/vegetable/fruit farming (Nurmanaf et al., 2006).

Based on the results of previous research, the empowered institution is the "Joint Enterprise" farmer group, Rawa Medang Village, Batang Asam District, West Tanjung Jabung Regency." From the survey results, information was obtained that there are several factors that influence the productivity of rice plants, such as: (1) income level, workers aim to earn income to support themselves and their families properly, (2) social security which is something that can increase income, (3) capital, (4) subsidized fertilizer, (5) meetings between groups are not optimal. and (6) technical guidance for food crops needs to be further improved. Workforce motivation needs to be encouraged to be more enthusiastic in carrying out work, thereby causing a decrease in productivity. Apart from the problems mentioned above, it is also influenced by weather or climate, some rice farming businesses still use local seeds, there are still no scheduled meetings with group members so that the activity implementation schedule is less simultaneous and can lead to increased production and productivity of rice plants, in addition to the presence of snail pests at the time. certain diseases, and other diseases that can damage the community's rice plants (results of interviews with the Village Head, group leaders and several members of farmer groups, and Field Officers (PPL).

The gap research of this study is that there is a lack of literature on the relationship approach between farmer groups and other supporting institutions in developing a farming system and rice crop institutions in a region. Most previous studies have focused on the technical aspects of rice farming, such as the use of inputs, irrigation, pest management, and yield. However, there is a need to explore the social and institutional aspects of rice farming, such as the cooperation, communication, and coordination among the actors involved in the rice value chain. The relationship approach can help to address the problems faced by rice farmers, such as the lack of access to information, technology, capital, and markets, by facilitating the adoption of sustainable rice farming system technology through institutional cooperation.

Thus, the aim of the research is to find effective interventions and increase empowerment, as well as institutional cooperation to ensure the adoption of sustainable rice farming system technology. The aim of finding effective treatment/interventions and increase empowerment, as well as institutional cooperation to ensure the adoption of rice farming system technology sustainable (Anonymous, 2012).

## RESEARCH METHOD

The institutions referred to in the research include village officials, farmer groups, traditional institutions and government agencies. Meanwhile, institutions include the norms and behavior of farmers that apply in the local area, for example the rules that regulate between patrons and clients. In

accordance with the research objectives, the following stages will be carried out: (1) applying the Participatory Research Appraisal (PRA) method to explore the problems faced by farmers, (2) after the problems are arranged based on priorities, joint trials are carried out with farmers according to the farmers' abilities, (3) study the policies operationalized by relevant institutions, and (4) contact relevant institutions to raise problems faced by farmers.

Based on identification, farmers' technology needs include (1) Snail pests, (2), Diseases of rice stems, (3) Often late arrival of seeds/not in accordance with farmers' planting schedules, (4) meetings between groups. and (5) technical guidance for rice plants on a regular basis. The variables observed are (1) problems and challenges of farmer groups, (2) alternative problem solving by farmer groups, (3) frequency and topics of meetings between farmer groups and related institutions, (4) forms of cooperation with related institutions, (5) action programs that are accepted and rejected, and (6) the success of the action program.

The institutional diagram shows the views of community members about local institutions and organizations, including how the relationship between each institution and organization affects people's lives in rural areas. The diagram is shown with circles of different sizes indicating the importance of an institution in rural areas. Linkages between institutions are indicated by whether there is contact or cooperation in decision making or whether there is dual membership. Touching circles indicate there is a relationship or information is conveyed between institutions/organizations, whereas if there is overlap it means there is cooperation and linkage or multiple membership in decision making (Shawki, B.C. 1999, Jhon Dixon. A.G. 2001 and Umarjono, 1992).

## RESULTS AND DISCUSSION

### *Characteristics of the Paal Merah District Area, Jambi City*

Geographical location.

Paal Merah is a sub-district in the Jambi City area, Jambi province, Indonesia. Data from the Ministry of Home Affairs in population records shows that the population of this sub-district as of mid-2021 is 107,950 people with a density of 4,268 people/km<sup>2</sup>. [2] Sultah Thaha Syaifuddin Airport is in this sub-district.

1. Eka Jaya
2. South Rim
3. Red Paal
4. Payo Selincah
5. Gutter Daffodils
6. Red Paal
7. Payo Selincah
8. Talang Bakung

### Demographics

The population of Jambi city is diverse, especially ethnicity and religion. The Jambi tribe is the original population and the majority in Jambi and is spread throughout all sub-districts. There are also other immigrant tribes such as Javanese, Batak, Minangkabau, Chinese, Bugis, Banjar, and others. Meanwhile, in terms of religion, the majority in this sub-district adhere to Islam. The percentage of population according to religion adhered to in Alam Barajo sub-district is Islam at 86.32%, then Christianity at 9.92% in detail, Protestants at 7.89% and Catholics at 2.03%. Others are Buddhist, namely 3.65%, Hindu 0.06% and Confucian 0.05%.



Figure 1. Regional distribution

### ***Institutional Profile at the Research Location***

Farmer groups as farmer institutions in rural areas basically function as a forum for cooperation and learning classes, while those related to the management of production units are not yet functioning as they should. Mekar Sari Farming Group, Paal Merah Village, Paal Merah District, Jambi City, Jambi Province. This farmer group varies, including beginner classes, intermediate classes and advanced classes. The activities of the farmer groups that have been formed are still lacking, because the frequency of farmer group deliberations/meetings is still low.

The village unit cooperative (KUD) has now changed to a farmer group association (Gapoktan) according to its function as a servant of the farming community in providing agricultural inputs and savings and loans which has a great influence on the community within the village/sub-district circle. The existing existence is the Community Empowerment Institution (LPM) which functions as a place for group discussions and does not have the same function as KUD. Thus, this LPM should be used to serve the needs of the community/farmers as a means of supporting the rural economy. The community/farmers also perceive the existence of agricultural input kiosks that provide production facilities as a means of obtaining quality seeds and fertilizer. The obstacles faced by farmers are the influence of weather or climate which influences the growth of their rice farming business, lack of capital to buy their daily needs, and conditions like this are obstacles in overcoming farmers' capital, especially farming credit facilities. It is felt that the educational institutions available in this sub-district play a very big role, such as: 1 kindergarten (TK), 1 elementary school (SD), 2 mosques, 1 madrasa, 1 prayer room, 1 Islamic boarding school, and public markets. The availability of 1 mosque and prayer room plays a very big role for Muslims as a means of carrying out their worship.

### ***Institutional Engineering***

Institutional engineering is an effort that must be made in order to form an organization that suits the needs of farmers in implementing their farming system. The important thing is the functioning of the organization, so that its existence and benefits can be felt by each farmer member in accordance with the goals and expectations of its members. Thus, institutional engineering is building physical and non-physical aspects of institutions supporting agricultural development in rural areas. The relationships between institutions in this sub-district are depicted in the following Venn diagram (Figure 2).

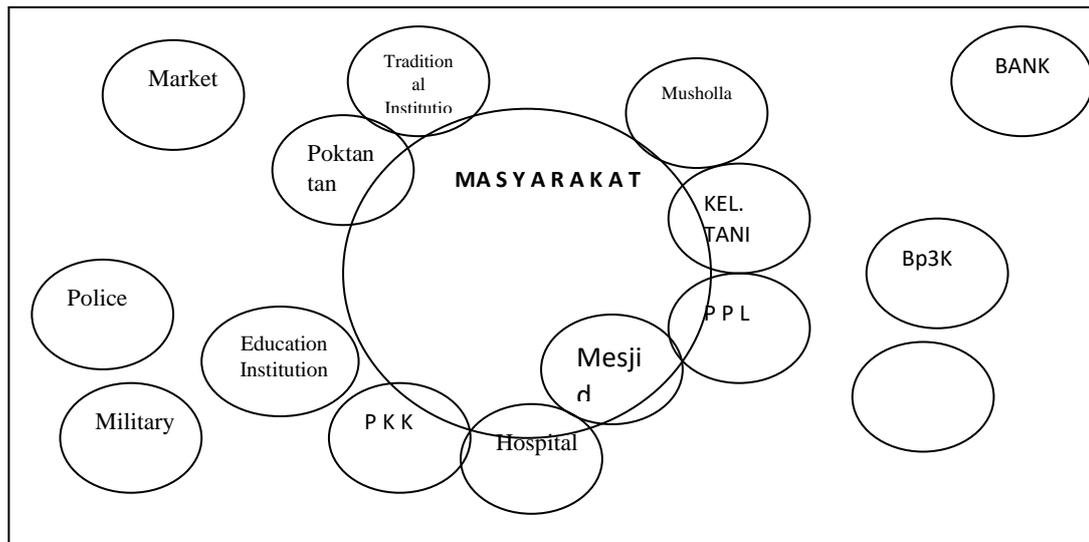


Figure 2. Venn diagram of relationships between institutions

### Problems and Solving Strategies

From the results of the Participatory Rural Appraisal (PRA) carried out, various problems faced by local communities were identified which greatly affected their sources of income. Sources of income for the local community are from vegetable farming, oil palm gardening, rice cultivation, secondary crops, horticulture, as well as raising other free-range chickens. From the results of discussions held with vegetable farmers, it was found that there are still some farmers who have not planted other crops such as these vegetables even though this crop is part of their income apart from other food crops, meaning that there are still some who have not yet united in planting other alternative crops simultaneously. unless there is seed assistance from the local government at the farmer level. On the other hand, it is still found: there is still a lack of cohesiveness among group members, there has been no assistance with superior seeds in the last year, except for assistance from local agencies. Other agencies thus influence productivity and also marketing. The main problems as discussed previously faced by the community/farmers are snail pests, rice stem rot disease caused by blast, and lack of capital (Table 1).

Table 1. Several problems in rice farming in Rawa Medang Village, Batang Asam District, West Tanjab Regency

Problem	Kelompok				Total	Priority
	I	II	III	IV		
Caterpillar pests	2	3	3	2	10	II
Certified superior seeds	3	4	3	3	13	I
Leaf curl disease	2	2	3	3	10	II
Capital	2	2	3	2	9	III
Subsidized fertilizer	2	2	1	2	7	IV
Group meetings	2	1	1	1	5	V
Technical guidance	2	1	1	1	5	V

Information: I = very important, II = important, III = quite important, IV = somewhat important, V = less

Of the seven problems that have been identified, priorities can be prioritized (1) Availability of certified seeds, (2) Stem rot disease caused by blast, (3) Still lack of capital for farmers, (4) Getting subsidized fertilizer, (5) Inter-group meetings are still ongoing. lacking, and (7) Technical guidance for farmers. The problems found in rice plants are that obtaining quality seeds is still lacking, the level of application of other technological guidance. In addition, farmers have not carried out much sanitation of existing rice plants. Therefore, it is recommended that relevant research institutions introduce technology that can overcome the problems mentioned above.



Apart from planting rice, he also held discussions with farmers regarding the issue of water sources, especially in their well-organized rice fields. What is often found in farming is maintenance that is in accordance with technical instructions and has regular irrigation channels so that it can influence increased production. Most of the farmers have awareness arose to care for existing rice plants. Apart from that, farmers have also held many discussions with field officers as companions who are almost present at their locations every day. In addition, the presence of the Agricultural Research and Development Agency, in this case the Agricultural Technology Assessment Center (BPTP), will be able to help again in terms of technology, both providing quality seeds and overall agricultural innovation technology. In terms of marketing, provision also needs to be improved because it has an impact on results, even though the technological results implemented must be supported by the existence of an adequate market (Aima, 2002, Bambang Irawa et al, 2005).

Policy Implications: 1) Vegetable farming in sub-districts should be further improved, both in terms of the production process (land processing, planting, maintenance and harvest) and also marketing to increase or increase the amount of production and income of rice farmers in general; 2) Support from the Government to rice farmers or assistance in the form of seeds so that people can be helped more in cultivating rice plants; 3) The extension program regarding pests and diseases for farmers must be improved, and even needs to be accompanied by other programs in order to further improve the institutions of rice farmers; 4) Business partnerships between industry/exporters and farmers/farmer groups need to be grown and improved. The expected business partnership is a professional partnership that is mutually beneficial and not limited to just marketing the results but includes technical cultivation and quality improvement.

The novelty of this research is that it introduces a new framework of institutional engineering analysis supporting rice farming technology, based on the FSA (Farming System Analysis) concept. The research also provides empirical evidence of the effectiveness of the relationship approach in improving the productivity and profitability of rice farming in the region. The research contributes to the literature on agricultural development and innovation by highlighting the role of institutional cooperation in enhancing the adoption of sustainable rice farming system technology. The limitation of this research is that it only focuses on one region and one type of crop, and it does not measure the long-term impact of the interventions. Future research may extend the scope and duration of the study to other regions and crops, and evaluate the outcomes of the relationship approach in terms of environmental, social, and economic sustainability.

## CONCLUSION

Based on the PRA results, there are problems faced by farmers in Rawa Medang Village, Batang Asam District, West Tanjab Regency based on priority, namely: (1) The presence of snail pests, (2) Certified superior seeds, (3) Stem rot disease, (4), capital, (5) subsidized fertilizer, (6) meetings between groups are not optimal. and (7) technical guidance for duku plants, climate factors that can influence the productivity of rice farming. Institutional innovation is very necessary to improve all institutions. All components involved in rice farming activities can function well. The farmer group in Rawa Medang Village, Batang Asamr District, West Tanjab Regency in implementing the Farming System Analysis (FSA) innovation was very responsive as seen from direct meetings and interviews carried out during PRA activities both as a group and individually. The farmer's decision to run a rice farming business can be made with integrity both by the farmer himself and the relevant agencies.

## REFERENCES

- Anonimous. (2014). Monografi desa Rawa Medang Kecamatan Batang Asam Provinsi Jambi.
- Anonimous. (2009). Rencana Kegiatan Penyuluh Desa (RKPD). Badan Pelaksana Penyuluhan Pertanian Perikanan dan Kehutanan (BP4K). Desa Makmur Jaya, Kecamatan Betra, Kabupaten Tanjung Jabung Barat.
- Anggraini, A. (2016). Pendampingan koordinasi, bimbingan dan dukungan teknologi UPSUS Daging, TSP, TTP, dan Komoditas Utama Kementan, Laporan kegiatan RDHP tahun 2016.
- Anonim. (2018). Programa Penyuluhan Pertanian Wilayah Kerja UPTD Jambi Selatan, 2019. Dinas Pertanian dan Ketahanan Pangan, Tanjung Jabung Barat.



- Anwar, A. (2006). *Suatu Arah Tentang Analisis Institusi Sistem Kontrak Pertanian Wilayah Perdesaan*. Suatu Petunjuk Bagi Keperluan Penelitian Bisnis di Wilayah Perdesaan (Tidak Dipublikasikan). Program Studi Perencanaan Pembangunan Wilayah dan Perdesaan. Institut Pertanian Bogor, Bogor.
- Arifin, B. (2003). *Analisis Ekonomi Pertanian Indonesia*. Kompas Media Nusantara. Jakarta.
- Bambang, I, *et al.* (2005). Petunjuk Teknis PRA. Program Rintisan dan Akselerasi Pemasaryakatan Inovasi Teknologi Pertanian. Badan Litbang Pertanian. Departemen Pertanian.
- Badan Litbang Pertanian. (2015). Pedoman Umum Pengembangan Taman Sains dan Teknologi Pertanian TSTP). Badan Litbang Peternakan, Kementerian Pertanian.
- Badan Pusat Statistik. (2018). Badan Pusat Statistik Provinsi Jambi.
- Syukur, M., Sugiarto, S., Hendiarto, H., & Wiryono, B. (2003). Analisis Rekayasa Kelembagaan Pembiayaan Pertanian. Laporan Akhir. Pusat Penelitian dan Pengembangan Soisial Ekonomi Pertanian. Badan Penelitian dan Pengembangan Pertanian. Bogor
- Budiharsono, S. (2001). *Teknik Analisis Wilayah Pesisir dan Lautan (Cetakan Pertama)*. PT. Pradnya Paramita. Jakarta.
- Dewan Kakao Indonesia, menyongsong pemberlakuan peraturan Menteri Pertanian, No.67/Permentan/OT.140/5/2014 tentang Persyaratan Mutu dan Pemasaran Biji Kakao, disampaikan pada Lokakarya, 27-28 Mei 2015, Suraqbaya.
- Dinas Perkebunan Provinsi Jambi, (2015). Peluang Investasi Komoditas Utama Perkebunan. Investment Opportunity of Estate Crops Main Communities.
- Dinas Kehutanan dan Perkebunan Kabupaten Muaro Jambi (2011). Manual Perbenihan menyongsong Komoditas Kakao.
- Direktorat Jenderal Perkebunan. (2012). Petunjuk Teknis Budidaya Kakao Rakyat
- Direktorat Jenderal Perkebunan. (1995). Kakao
- Direktorat Jenderal Perkebunan, Road Map Komoditi Kakao 2005-2025-2006
- Pusat Penelitian Kopi dan Kakao Indonesia (2004). Panduan Lengkap Budiday Kakao
- Dewanti, R & Sihombing, G. (2012). *Analisis Penapatan Usaha Peternakan Ayam Buras*.
- Djaenudi, D., Sulaeman, Y., & Abdurachman, A. (2002). Pendekatan Pewilayahan Komoditas Pertanian Menurut Pado-Agroklimat di Kawasan Timur Indonesia. *Jurnal Litbang Pertanian*, 21(1).
- Dinas Pertanian Provinsi Jambi. (2015). Sasaran Produksi Tanaman Pangan Tahun 2015
- E. Gumbira-Said, A. Harizt Intan. (2004). *Manajemen Agribisnis*. Penerbit Ghalia Indonesia. Jakarta.
- Kusnadi, U., Prasetyo, L. H., Sinurat, A. P., Hamid, H., Masbulan, E., Purba, P., Hasinah, H., & Priyanti, A. (2001). *Pengembangan Kelembagaan Bagi Stabilisasi Usaha ayam Ras Rakyat serta Fasilitas Kemitraan Yang Lestari*. Laporan Penelitian. Badan Penelitian dan Pengembangan Pertanian. Pusat Penelitian Peternakan. Bogor.
- Semiaji, S. (2011). Strategi Pembangunan Masyarakat Melalui PelibatanPartisipasi Masyarakat Dalam Pembangunan. Bunga Rampai Administrasi Publik. Lembaga Administrasi Negara. Jakarta.
- Suharyon, S., Susilawati, A., & Wahyudi, E. (2016). Analisis Rekayasa Kelembagaan Penunjang Teknologi Usahatani Padi Lahan Sub Optimal Desa Karya Bakti Kecamatan Rantau Rasau Kabupaten Tanjung Jabung Timur Jambi. *Proseding Seminar Nasional Inovasi Teknologi Pertanian*, 20 Juli 2016. Banjar Baru.
- Soepadi, S. (2005). *Pembangunan Pertanian dan Perekonomian Pedesaan Melalui Kemitraan Usaha Berwawasan Agribisnis*. ICASERD Working Paper No. 60.
- Suratiyah, K. (2015). Ilmu Usahatani. Penerbit Swadaya, Jakarta.