

The Development of Agrotechnopark Model Based on Modern Villages

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Abstract

Agrotechnopark is an area for implementing various types of technology in agriculture, animal husbandry, fisheries, and product processing (postharvest), which has been reviewed by multiple governments and private research institutions and functions as a training ground and center for technology transfer to the broader community. Implementing the Agricultural Technology Park (ATP) uses socio-cultural, ecological, and economic approaches. A comprehensive understanding of community needs will be obtained through a socio-cultural system, which will become input for the company. At the same time, the environmental system will identify the potential basis of local resource excellence as a reference for community development activities. Furthermore, the economic approach is developing productive business units to increase people's income while paying attention to market demand. South Konawe Regency is one of the autonomous regions in Southeast Sulawesi, which is supported by its potential resources. The position of the South Konawe Regency area is very strategic, a southern cross-section of the Southeast Sulawesi peninsula that connects several Regencies/Cities in Southeast Sulawesi with prototypes of coastal and inland villages. One is Atari Jaya Village because it has a heterogeneous population composition, and most of the Javanese Transmigration community is reasonably competent in agricultural development. Because of this, socio-culturally and economically, this village grows and develops and is dynamic by carrying out the diffusion of technology in various fields supporting Agrotechnopark, such as the development of Integrated Farming (Multiple cropping) and integrated farming (Mixed culture) of plantation crops and plantations. Atari Jaya Village is also a central area for the development of Agropolitan both food crops, as well as plantation and horticultural crops on a national scale and a People's Plantation Centre worthy of being an Agricultural Technology Park Area (ATP) in South Konawe Regency, Southeast Sulawesi Province. Development of the Agricultural Technology Park Area (ATP) to become a center for Agribusiness and Agro-fruit tourism as a basic framework for community and regional economic growth towards Konsel Hebat Regency. Atari Jaya Village was realized as an independent village, a pilot Agrotechnopark village in South Konawe Regency, and a service center for upstream and downstream Agribusiness trade in Agrofruit and plantations.

Keywords: Model, Agrotechnopark, Independent Village

INTRODUCTION

Agrotechnopark is an area for implementing various types of technology in agriculture, animal husbandry, fisheries, and product processing, which has been studied by various government and private research institutions to be applied on an economic scale which functions as a training ground and center for technology transfer to the broader community. The general strategies used in developing technoparks are integration, business approach, sustainability, community empowerment, and utilization of science and technology (Ministry of Research and Technology, 2009).

An Agricultural Technology Park is an area on a farmer's land that is a vehicle for implementing site-specific applicable innovations that mature from upstream to downstream by involving relevant stakeholders. The Agricultural Technology Park (ATP) is a vehicle for applying direct technological Innovation in community-owned agricultural land, with intensive assistance from researchers so that farmers can skillfully use modern technology. The innovations implemented and developed by the researchers are adapted to the region's needs, namely only those specific to a location, have real/high economic potential, and are based on the selected agrosystems. Its application is carried out through demonstration plots or pilot areas, counseling, and training to farmers and stakeholders in the regions so that technological innovations can be quickly adopted.

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The development of agricultural innovations still emphasizes the spiritual aspect of science. Innovations. Networks. In the process of developing ASP and ATP, this spirit needs to be continued with Corporation Enterprise in two development directions, namely to the right, Corporation Enterprise for Agro Industry (research corporations for agroindustry), and to the left, namely Corporation Enterprise for Rural Development (Corporations for Rural Development). results of research and engineering for rural development). The aspects referred to need to be realized in a simple and integrated manner in terms of complicated and soft technology.

The success of ATP in disseminating agricultural technological innovations to the community also depends on the involvement of the Regional Government at both the provincial and district levels in distributing various resources for agricultural development in their area. The development of this technology-based area is relied upon as the driving force for regional development. It is expected to be a center and driver of economic growth for the surrounding region and to be able to compete at home and abroad.

Agricultural Technology Park is an area on farmer's land that is a vehicle for implementing site-specific practical innovations on a development scale and upstream-downstream agribusiness perspective by involving relevant stakeholders. Its activities include applying pre-production technology, production, pre-harvest, postharvest, product processing, and marketing, as well as a vehicle for training and business incubation for agribusiness actors.

At the Central level, with coordination by the National Innovation Center, BPPT, LIPI, Balitbangtan, and Universities, conducting research and development in the agricultural sector from all aspects, from upstream to downstream. The activity's result is an innovation ready to be tested and distributed to the appropriate Science Parks.

At the Agro Science Park level, these innovations are subject to site-specific tests and adaptation tests that look at all aspects, be they social, economic, cultural, or other aspects. These innovations are distributed to the Techno Park level

for results that match the needs.

Innovations resulting from adaptation tests and site specifics are implemented economically at the Agro Techno Park level. This result is a show window to the final target users/stakeholders. The ATP process of technology dissemination is carried out through various channels, both directly through training and mentoring and through publication in multiple types of media, both print and electronic.

The TTP development mission is to empower and improve the welfare of society and the environment, characterized by guaranteed health, education, culture, religion, and the environment. The strategy used in TTP is integrated community development by synergizing nature, society, and Innovation, implementing an integrated farming system. Meanwhile, in accelerating the process of Application, adoption, and mastication, as well as increasing the added value of creation, involves four components of agricultural development actors, namely academics (Academicians), private (Business), community (Community), and government (Government) groups.

Implementing the Agricultural Technology Park (TTP) uses socio-cultural, ecological, and economic approaches. A comprehensive understanding of community needs will be obtained through a socio-cultural approach, which will become input for the company. Meanwhile, through an environmental approach, the potential basis for local resource excellence will be known as a reference for community development activities. Furthermore, an economic approach is developing productive business units to increase citizens' income while paying attention to market demand.

The development of ATP outside the region needs to be carried out to accelerate the expansion of the process of adopting the application of agricultural innovations. Furthermore, it is the responsibility of the local and regional governments to continue to assist Balitbangtan through BPTP.

The success of several technoparks at Stanford America has encouraged entrepreneurs to develop technoparks characterized by their names (Hoxa, 2014). For example, science technopark Russia, Korea (Daejeon et al.) and, ATP Thailand (Chiang Mai) and, China (Zongguanchun Science), Japan (Tsukuba et al.). Furthermore, ATP is

designed with multi-discipline (Palang et al., 2000) and will increase the global competitiveness index of a nation (Umirzakov, 2007).

Based on the literature review and the results of previous research, the conceptual model developed in this activity is described as follows:

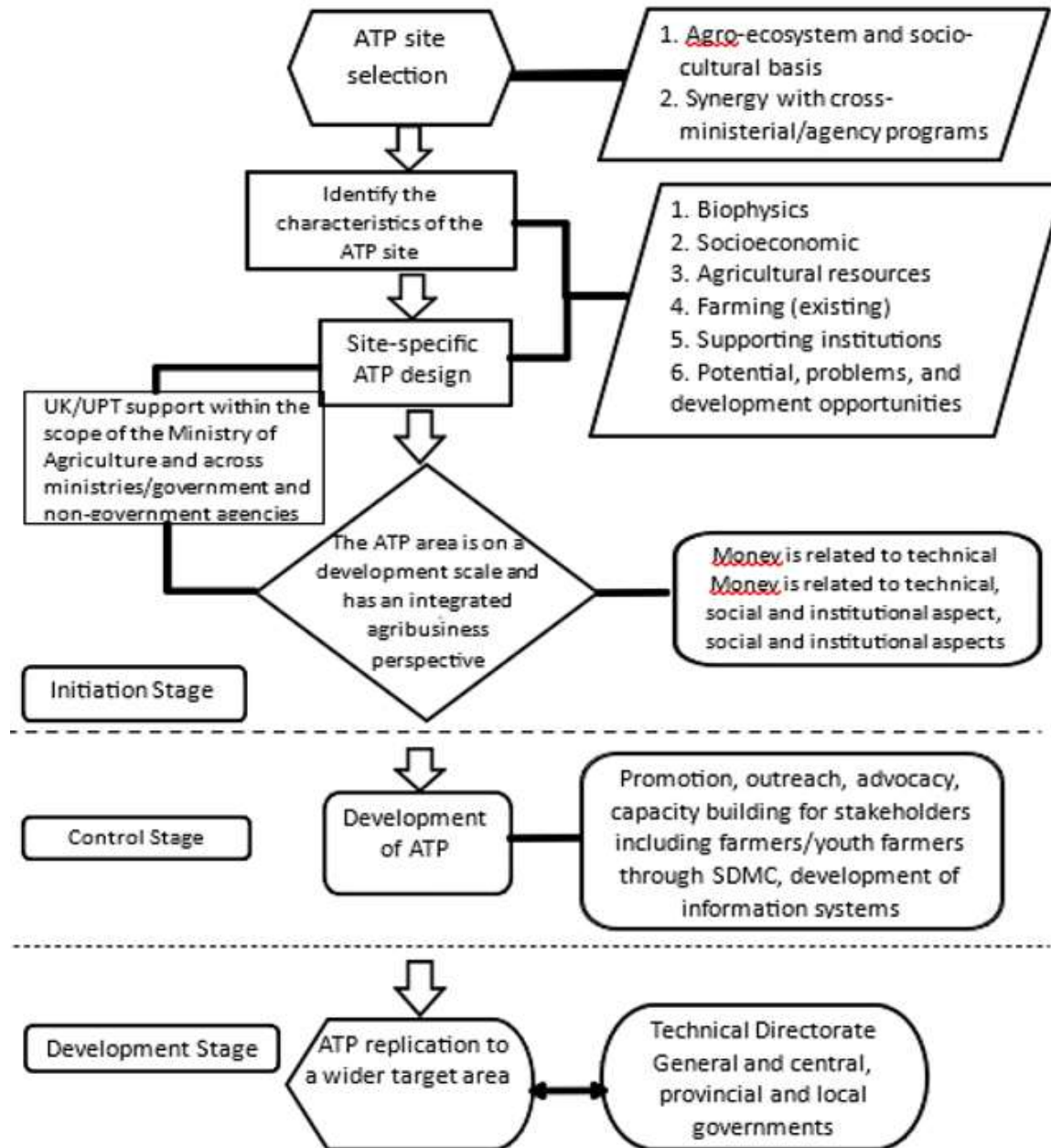


Figure 1. Diagram of the ATP program implementation stages.

RESEARCH METHODS

Location and Time

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The location determination was based on the direction of the regional development master plan for South Konawe Regency in Branding development, namely the Development of Agropolitan areas with an Independent Integrated Area (KTM) development system. One of the Agropolitan-based integrated Mandiri area directives is Lalembuu District. Therefore, the location for implementing TIP-based growth area development is in Lalembuu District, South Konawe Regency, Southeast Sulawesi Province. The distance from the center of the provincial capital of Southeast Sulawesi, namely Kendari City, is approximately 130 km, with a land vehicle travel time of about 2.5 hours. Implementation of socialization and coordination activities for phase I begins in May – December 2022.

Method of collecting data

The data collection method implemented consists of the following:

Coordinate with the regional government regarding this study.

Data collection through PRA (baseline survey) regarding potentials, problems, and identification of technology farmers need. Five villages will be selected to be surveyed and mapped. Village selection was based on several criteria, including a) being an underdeveloped village, b) representing regional characteristics (e.g., lowlands, highlands, and coasts), Out of 5 villages, one village would be re-selected as a pilot, and then it would become an agro-techno area park. The selection of these villages was based on the results of a PRA survey, which saw the condition of villages that were left behind but had agricultural, Livestock, and fisheries potential that needed to be optimally empowered.

Focus Group Discussion with the community and community leaders to find out the needs and problems in determining the technology and empowerment activities needed.

Transfer of agricultural technology through Training and Technical Guidance and empowering farmers in selected village locations.

Develop an action plan for the development of the agro technopark model according to the process of accelerating Technology Transfer developed by the community in the second and third years)

Data Analysis

The data obtained were analyzed descriptively and qualitatively with the following stages:

Inventory and identification

Baseline data on agricultural development in Atary Jaya Village, Lalembuu District, South Konawe Regency. At this stage, an inventory of the types of commodities that are the livelihoods of the people that support the economic system and people's welfare in the study area is carried out. Then, identify the availability and application of technology farmers use in developing agricultural commodities to trigger change towards a developed village (Modern Village of Change) for family welfare and economic growth in the study area.

Analysis and Synthesis

The description of the area and the results of identifying agricultural potential in the village of Atary Jaya are analyzed using Agroecotechnology to support the sustainability of the Agroteknopark program. This stage used three analytical tools: (a) Analysis of the supporting capacity of community and government decision-making, such as land resources, management, climate, organization, and institutions and capital. (b). Analysis of the type of technology applied, such as adaptation technology, agricultural cultivation technology, and postharvest handling technology. (c). Economic analysis includes costs, income, and investment patterns related to the Agroteknopark program. (d). Performance analysis and synthesis of renewable technologies to support agricultural technology parks in the study area.

RESULTS AND DISCUSSION

Preliminary Research

Description of the ATP Development Region

Lalembuu District is a border area of the Swamp Aopa Watumohai National Plant Area, which borders Bombana and East Kolaka Regencies. Lalembuu District is plain with an area of 204.80 km or 4.54 percent of the land area of South Konawe Regency. Lalembuu District has 19 village areas, with the most prominent village being Mondoke Village, with an area of 40.58 km² or 19.81 percent of the area of Lalembuu District. The most miniature village is Moreo/Monapa Village, with an area of 1.54 km or 0.75 percent of the area of Lalembuu District.

For a height above sea level of approximately 300 m above sea level, the village farthest from the surface is Putoho village. In contrast, the villages closest to the sea are Kapuwila Village, Puurema Subur, Mandoke, Moreo, Tomleleu, Padaleu, and Lalo Uwesamba. The temperature conditions for the Lalembuu District area are generally the same as for other sub-districts: an average temperature of 28°C with an air humidity of 83 percent.

Access from the sub-district, regency, and provincial capital to all villages in the Lalembuu sub-district is easy because of a strategic geographical position passed by the Kendari Bombana axis provincial road, and all villages can be passed by four-wheeled or two-wheeled vehicles.

One of the 19 strategic villages with market access in Lalembuu District is Atari Jaya village, which is the program's target location. The village of Lalembuu Jaya is opposite the Kendari-Bombana axis road. Moreover, it is a connecting road to the village of Atari Jaya. The village of Lalembuu Jaya is a smallholder plantation area that tends to become land use or former shifting cultivation. The village of Atari Jaya tends to have access to regional growth, which is different from the village of Lalaembuu Jaya because it is located in the district's capital. So, Lalembuu village becomes the interline area of Atari Jaya village or the capital of the Lalembuu sub-district. Atari Jaya village is a national chili development center area. Because of that, Atari Jaya Village was chosen as an example in the Agro Techno Park Development program. This village is located approximately 40 KM from the capital city of South Konawe Regency or approximately 0.5 KM from the capital city of Lalembuu District. Atari Jaya Village is mainly inhabited by Javanese, Bugis, West Nusa Tenggara (Lombok), and Muna tribes who have lived and settled for a long time.

A description of land use and the area of Atari Jaya Village reaching 720 Ha can be presented in the following table: (a). Residential land, 20. ha, (b) Plantation land and food agriculture, 270 ha; (c) rice fields, 338.75 ha; (d) Village office area, 0.5 ha; (e) other public infrastructure, 3.5 ha; (f) Protected Forest Areas and others 87.25 ha. (District of Konsel in Figures, 2017).

Based on Village Government Administration Data, the population of Atari Jaya Village is recorded as 379 families or 1,318 people spread across four hamlets. The total population of Atari Jaya Village is 1,318 people, comprising 638 men and 680 women. From the results of the PKD secondary data survey compared with village administration data, there may be differences caused by the shift of domicile of some residents to look for work in other areas and the presence of newcomers who have yet to be identified as residents.

Description of the ATP Resource Potential

Potential resources in Atari Jaya Village, district Lalembuu, consist of human and natural resources. The potential resources identified are as follows:

- Availability of productive age workforce to oversee village development;
- High motivation from most of the community and youth farmers;
- The community can manage agricultural, plantation, and fishery businesses;
- The desire of the community to try is relatively high;
- Agricultural land plantations that are still productive;
- The vast expanse of paddy fields with a relatively good level of productivity;
- Opportunities for Productive Economic Businesses to open are tremendous, so they have the potential for the formation and development of BUMDES;
- Agricultural business development market opportunities are pretty promising;
- Availability of clean water infrastructure;
- There are productive economic business groups that have developed in the village;

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Availability of infrastructure supporting education and health

Access to the provincial capital is easy and affordable as a target for marketing community business products.

Problems with the ATP Model and Constraints

The results of the interviews and FGD (Focus Group Discussion) in Atari Jaya Village revealed several problems, namely:

During the rainy season, it is prone to erosion, which can damage the road body and cause potholes/mud along the road that can threaten the community both between hamlets and towards the community's agricultural business land;

In the dry season, the discharge of clean water sources decreases, resulting in services in each hamlet is not optimal and the threat of drought, which has implications for the level of productivity of community agricultural land will decrease;

The condition of road infrastructure (village roads, hamlet roads, farm roads, and production roads) is inadequate so that it can hinder community activities in accessing these roads;

The low income of farmers, especially in agriculture;

Decreased productivity of paddy fields, cocoa, and oranges as mainstay commodities

Lack of market information and fluctuating prices;

Lack of understanding of integrated farming

Lack of understanding of livestock maintenance

The potential for education and tourism has not been appropriately managed;

There is still a lack of supporting capacity for community interest in creating alternative businesses that can support community income, and the lack of availability of modern equipment to support community economic efforts has resulted in low levels of community income;

There still needs to be a forum for the village economy to provide access to business capital and management of productive economic activities worthy of development.

Design Model Agrotechno Park.

The design of the Master plan in the activity of preparing the Agro techno park area is intended to show the mechanism of the government and community work programs in building Atari Jaya Village as an Independent Agricultural Technology Park area towards an advanced village and a Great Counsel regionally and nationally. In the first year, it established a preparatory village for the Arotechnopark area with indicators of integrated agricultural centers, economic growth, and community services.

ATP Area Development Design and Spatial Policy

The designation of Atari Jaya Village, Lalembuu District, Konawe Selatan Regency, as the Agro Techno Park Development Area in 2017 is by regional spatial planning directives. According to the map of the development area of the growth area of Lalembuu District, since the first period of regional autonomy, Konawe Selatan District has been designated as an Agropolitan area. In the local community's economic development, this area has succeeded in achieving a national cocoa and orange plantation production center area according to the 2014 Regional Regulation. Then, in 2016, the Lalembuu District area was re-designated as a National Chili Development area. This achievement makes the spirit of experts in tertiary institutions carry out research and village development towards a developed village with the Great Council.

Based on the general description of the area and resources in Lalembuu District, showing the potential for utilization and development of the regional economy by the natural resources it has, South Konawe Regency is one of the core strengths of the regional economy, which so far has only been managed on a regional scale, even though agriculture, in this case, agribusiness has prospects and be able to compete on a national and international scale. Therefore, comprehensive spatial planning is needed to develop strategic sectors such as agriculture. The elements of guidance and assistance in developing an Agricultural Technology Park (Agrotechnopark) are very much needed, considering that the flow of technology that will be introduced is responded to by very diverse farmers.

An Agricultural Technology Park is an area on a farmer's land that is a vehicle for implementing site-specific practical innovations on a development scale and with an upstream agribusiness perspective involving relevant stakeholders. Its activities include the application of pre-production, production, pre-harvest, postharvest technology, product processing, and marketing, as well as a vehicle for training and business incubation for agribusiness actors (can be seen in the master plan image on page attachment 1).

Technological Intervention in the Agroteknopark Area

Agroteknopark is an area that is professionally managed to improve the welfare of farmers through the creation and improvement of ecosystems that support Innovation to increase the competitiveness of farming businesses, industries, and institutions under their auspices. An area to facilitate the acceleration of technology transfer produced by government research and development institutions, universities, and the private sector, which is also a pilot model for integrated biological cycle agriculture (bio-cyclo farming).

In essence, integrated agricultural production utilizes all energy potential to be harvested in a balanced way. For the utilization process to occur effectively and efficiently, integrated agrarian production should be located in an area. This area should have a crop production sector, Livestock, and fisheries. These sectors will result in the area having a complete ecosystem, and all production components will not become waste because other components will be utilized. Besides that, there will be an increase in production yields and a reduction in production costs to achieve production effectiveness and efficiency.

The most effective and efficient food providers, cycles, and balances of nutrients and energy forming an ecosystem will occur in an integrated agricultural system. Deductively integrated agriculture will increase the effectiveness and efficiency of production through increased production yields and reduced production costs. Moreover, empirically integrated farming is the best form of agriculture because almost every component is well-spent. In integrated farming, farmers have multiple sources of income in crop diversification and polyculture. A farmer can grow rice, raise goats or chickens, and grow vegetables. The by-product of Livestock is manure, which can be used as fertilizer, so farmers do not need to buy fertilizer anymore. It is one way to reduce dependency on external inputs. In addition, agricultural waste can be utilized by processing it into biomass.

Another benefit of integrated farming is that it reduces the need for waste collection services by developing more self-sufficient local community structures. Develop alternative energy solutions that include biogas energy for household or agricultural needs, even for agro-industrial purposes. In addition, integrated farming of fish, Livestock, and crops will help improve the supply of fertilizers and feed. The higher market value of fish as feed and food has increased incomes substantially. Technically, this vital addition of the second nutrient cycle from fish waste has benefited from increased integration processes and markedly improved many smallholder farmers' lives.

Intervention in the Field of Food Crops

The paddy fields in Atari Jaya Village cover an area of 338.75 Ha., with the potential for rice and corn crops. Self-sufficiency for five commodities was proclaimed during the SBY Administration (United Indonesia Cabinet I and II). Through the National Rice Production Increase Program (P2BN) and the Integrated Crop Management Field School (SL-PTT), rice self-sufficiency was achieved again in 2009, likewise for corn self-sufficiency. Meanwhile, for the other three commodities, sugar, soybeans, and beef, self-sufficiency remained the goal until the MNH era ended.

During the Jokowi-Jusuf Kalla era, they were also determined to realize food sovereignty by carrying out the Nawa Cita Working Cabinet. Food sovereignty is translated as the ability to meet food needs from domestic production, regulate food policies independently, and protect and prosper farmers as the main actors in the food agribusiness business. Agricultural development 2014 - 2019 has been directed to set targets:

1. Achieving self-sufficiency in rice, corn, and soybeans and increasing sugar and meat production
2. Increasing food diversification

3. Increasing value-added commodities and being competitive in meeting export markets and import substitution
4. Provision of raw materials for bio-industry and bio-energy
5. Increase in the income of farming families
6. Good accountability for the performance of government officials

Technological intervention for food crops in Atari Jaya Village is through rice and corn farming development in rotation on one land. It aims to take advantage of bero land after planting rice. As is well known, in Atari Jaya Village, farmers plant rice 2 (two) times a year, and in anticipation of problems with water demand during the dry season, farmers plant Corn on land previously planted with rice. The introduction of technology when farmers plant rice is through the Mina Padi cropping pattern, where at the rice planting location, farmers also raise Livestock whose manure can function as fertilizer for rice plants. Besides, the straw from rice harvest can be used as fodder and plant compost.

Animal Husbandry Intervention

In the livestock sector, livestock technology intervention in the form of biogas is an attempt to produce biogas through an anaerobic fermentation reaction from organic matter. The fermentation is expected to produce biogas, which predominantly contains methane gas that can be burned. Organic materials commonly used as raw materials for biogas production are livestock waste, both ruminants such as cows, buffaloes, and goats, and non-ruminant Livestock such as chickens and horses, and originates from urban organic waste, crop residues, and even human feces. All of them can be used as raw materials for biogas production. Utilizing raw biogas materials in an area depends on the area's potential.

In terms of biogas technology, more engineering is done on the digester. This is because the state of the digester determines the key to the success of biogas technology. In addition, the cost of building biogas depends on the cost of the digester because the cost of building the digester determines 90-100% of the cost. The currently available digester technologies can be made from walls, plastic, fiber, and drums. Digester technology has even been developed by utilizing membranes to purify the methane gas produced to increase the calorific value. Each digester has advantages and disadvantages and can be designed according to individual needs. The primary considerations in developing digester technology are determined by cost, expected biogas production, availability of raw materials, and for what purpose. If the consideration is low cost and for cooking purposes for 1 (one) household, a plastic or fiber digester is usually used. If the need is more significant, then it is recommended to use a digester from the wall, but with the consequence that the cost is more expensive and requires more raw materials.

The potential utilization of biogas is generally used as an alternative fuel source. This fuel can be used as a source of fire for cooking purposes and for generators (generator sets/power plants). Various generators are available, ranging in capacity from 450 to 4500 watts, depending on the need and supply of biogas. Even in developed countries, environmentally friendly car prototypes have been developed using biogas fuel. This study will determine how much potential biogas production can be used for electrical energy and fuel. The factors that determine biogas production and its utilization are the capacity of the digester, the biogas feedstock used, and the design of the digester. Differences in capacity, raw materials, and engineering design cause biogas production to differ. Therefore, several digester models and sources of biogas raw materials will be measured about gas production, which can be utilized for electricity and fuel energy.

Biogas technology can be adopted by society and is determined by many factors. One of them is public knowledge about the technology. Knowledge plays a vital role in changing people's attitudes and behavior. Excellent and correct knowledge of something will change a person's attitude and behavior toward an object or technology. Conversely, insufficient or inadequate knowledge of something can cause the person's attitude and behavior to be wrong, too, so he will not adopt it. This study will reveal to what extent the community knows about biogas technology. The public knowledge that will be disclosed includes knowledge of the biogas technology itself, its short and long-term benefits, and its potential use. In terms of technology, the knowledge

that will be disclosed includes the economic value to be received, complexity, community needs, and suitability with the conditions of society.

Horticultural Field Intervention

Horticultural crops widely cultivated by farmers in Atari Jaya Village are chili plants until the village is included in the national chili program. Most of the chili production produced by farmers in Atari Jaya Village is carried out in a partnership pattern, namely the Indofood company. Where the company provides production facilities, and farmers carry out cultivation. The choice of this village as a partner for the Indofood company is because the quality of the chilies produced by the farmers meets the standards; besides that, the chili production directed by the farmers can meet the company's needs.

Abundant chili production can result in lower selling prices. It can only be purchased partially by Indofood companies, so technological intervention is needed to handle and process chili products into shredded chilies and delicious chili sauce. Which in turn can increase the income of chili farmers. Horticultural technology intervention is the introduction of High-Quality Varieties (VUB) of chilies. Display of vegetable viticulture at the ATP location, the introduction of postharvest technology for chili processing with benefits which include:

- Increased planting area and dry production
- Adoption of chili cultivation technology using VUB
- Adoption of viticulture varieties in ATP locations
- The adoption of postharvest processing of chilies.

Plantation Sector Intervention

The plantation crops in Atari Jaya Village are deep coconut and cocoa. Cashew and Orange: The area of plantation/agriculture land in Atari Jaya Village is 270 Ha. The technology that can be applied to plantation crops is the improvement of intercropping and Alley cropping cultivation technology as well as Agroforestry and even the application of integrated farming technology with Livestock (Agropasture). Besides that, there is the application of postharvest technology such as deep coconut is the utilization of coconuts, starting from the meat, which is made into copra, coconut water as nata de coco, liquid fertilizer, and vegetable pesticides, as well as leaves and fronds which can be used as an additional source of income by creating a handicraft industry. Cocoa plant waste can be introduced with cattle or goats and even with technology for handling livestock waste, and plant stems in bio-fermentation and biogas.

Institutional Sector Intervention

Two interventions on the institutional aspects of Agrotechnopark, namely:

- Institutional aspects (values, norms, rules, ethics, etc.);
- Organizational aspects (authority, membership, structure, roles, authority).

Models of institutional support in the form of assistance (technical assistance, funding, training), facilities (creating the capacity of local institutions, identifying needs and problems), promotion (reorientation and strengthening), and learning processes (mutual learning from planning to development evaluation).

- The model of developing the capacity of rural human resources in the form of training. Motivation and leadership.
- Institutional capacity-strengthening models include cooperation, catalytic approaches, and the development of alternative institutions/organizations.

Intervention in the institutional field is institutional development for ATP management, which includes agricultural machinery management institutions, crop management institutions, facility and infrastructure management institutions, postharvest institutions, and ATP product marketing management institutions, with benefits that include:

- Formed an association of rice and Corn, cocoa, and coconut seed growers,
- Guaranteed selling prices for rice, Corn, and chili seeds during the main harvest,
- Strengthening the marketing system

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The technological interventions for food crops, animal husbandry, horticulture, plantations, and institutions, and technological innovation activities that can be implemented in Atari Jaya Village can be formulated, including:

1. Technological innovations use superior seeds, the jajar legowo planting system, and machine tools / agricultural mechanization.
2. Utilization of waste for animal feed, bioenergy, and biofertilizer.
3. Postharvest is applied to increase the economic value of the product.
4. Maintenance of Livestock based on agricultural waste.
5. Bioethanol is based on cellulose and lignocellulose from agricultural waste.

Optimizing Resource Utilization (Empowerment & Training)

The term Agrotechno park, which is socialized with the development of agricultural science and technology at the level of perception of farmers, has been known for a long time. However, if it is included in the category of agricultural technology park, it still needs understanding and input from the university. So, the agricultural technology park includes the development of agricultural science and skills. Farmers rely on the skills and experience they do but are rarely sustainable and sporadic. For example, farmers have raised the village's name in the national citrus area, the national cocoa movement. However, now that the program is starting to fade, it is unsustainable.

For this reason, to the problems and needs of the community, the socialization of the Agro Techno Park program is carried out through community empowerment and training. Farmer training activities are intended to carry out technology diffusion related to farmers' needs for agricultural technology. Some of the materials needed by the community and farmers in Atari Jaya village according to the needs of farmers include:

Integrated farming pattern planning:

Based on the regional development plan, Atarai Jaya village is a center for developing cocoa, paddy rice, and chili commodities, which are the leading commodities. However, the cropping pattern for this commodity is still monoculture, so the productivity still needs to improve, especially since the cocoa seedlings come from varieties attacked by the Cocoa Bud Borer (CPB) from North Kolaka. The current monoculture cropping pattern shows an unstable agricultural environment and symptoms of a dangerous spiral (Harper et al., 1992; Fielda, 2016)

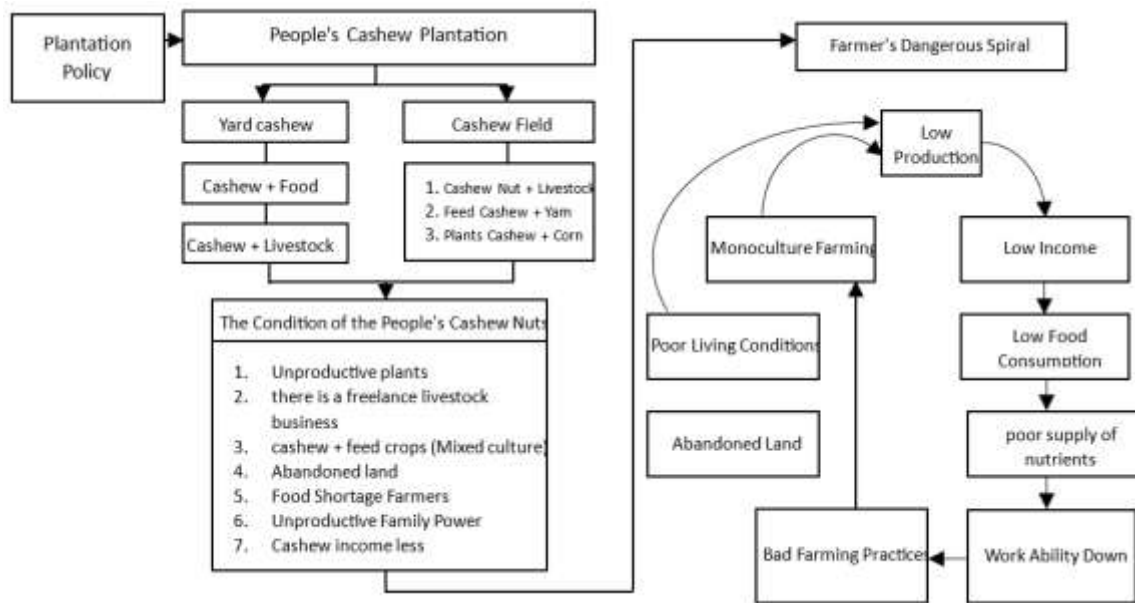


Figure 2. Diagnosis of dangerous spiral circles cashew/Coconut/Coconut monoculture farming is a poverty trap.

The dangerous spiral circle that has wrapped around cashew farmers in a broad spectrum and at a particular time seems to be a symptom of a poverty trap and is a new challenge in the development of Agrotechnopark (Poverty et al., 2001; Fielda, 2016)

Efforts to solve the problem of the Dangerous Spiral Circle that structurally entangles farmers with indications of poverty require technological Innovation that encourages the transformation of integrated farming in the study area with the farming pattern of Cocoa/Coconut/Cashew, rice, Livestock, and fisheries as follows;

Poverty Traps a transformation mechanism that can decompose LSB problems into welfare traps through technology diversification. Technological diversification in agricultural development can be distinguished into three prototypes (1). diversification of horizontally integrated farming technology, (2) verified vertical technology (coordination and integration), (3) diversification of regional farming technology (vertical contract). Technological Innovation in integrated farming diversification will produce three prototypes of product engineering, research, and mindset engineering for farmers through education and training.

The nine prototypes of integrated farming technology engineering are the integration of the triangulation function of the farming system with agro-technopreneurs Innovation, which will have social, economic, cultural, and environmental impacts on achieving farmer welfare (welfare traps). Mathematically, the formulation of social welfare development is a function of wise management of natural resources (SDA) by improving the quality of human resources (HR) through the application of technology and community empowerment ($KS = f(SDA.SDM^{T.Pem})$ Supari, 2001; La Panga, 2016). Wise management of natural resources is shown through integrated farming technology. The technological spectrum of integrated farming diversification for cashew/cocoa/coconut farmers, secondary food crops, and animal husbandry and fisheries (Mina-paddy), ponds and ponds developed in the South Konawe district can be described as follows:

The effort to overcome this problem is to implement an integrated farming pattern that creates efficient land use, increasing land productivity. Income also increased. The intervention of bioremediation technology, adaptive peripheric, and competitive autotrophic is a science park concept in integrated farming towards an agricultural technology park, which is described as follows:

1. Integrated farming system (Rice et al./Palawija, Cattle & fisheries);

Rice has long been cultivated in the form of rice field farming as a leading commodity in the village of Atari Jaya with technical irrigation of the Aroraya Dam. However, due to symptoms of global climate change, the water discharge of all rivers has decreased and even dried up. Because of that, paddy rice is cultivated integrated by sowing muzair fish and patchouli, known as minapadi.

2. Institutional Strengthening of Agrotechnopark through Agribusiness Pillars

The crucial pillars of Agribusiness are farming, production facilities, postharvest processing, marketing, and other partner institutions. The role of farmer groups is vital in realizing the Agroteknopark program. Actors at the lower level are farmers and their groups, even farmer groups (Gapoktan). Farmers can also become managers in integrated farming management and distribute their produce in local and inter-island markets as processors, business people, and entrepreneurs (Entrepreneurship).

3. Agribusiness Partnership in the Agrotechnopark Model in the following Scheme:

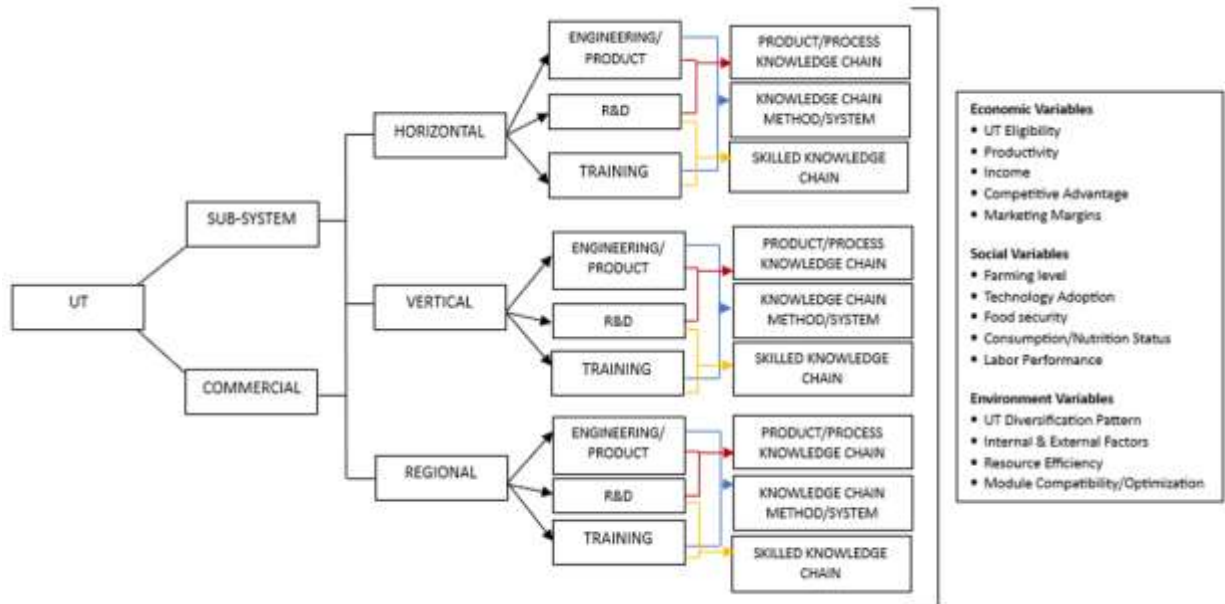


Figure 3. Agribusiness partnership model in sustainable advanced village-based Agrotechnopark through the Pentha Hellyx approach

Organic waste management: Like stover for cocoa plants, orange grass is processed for organic fertilizer, and coconut water and animal/cow manure can be used as a source of organic fertilizer.

5. postharvest and marketing systems for agricultural products. Postharvest handling and agricultural and plantation products that can support the Agrotechnopark area can be described as a Prototype of Multiple Product diversification Firm/Agroindustry for cashew nut plantation products

So, the production of the logs is still stored in the farmer's house warehouse, so it is suspected that the cashew product is still available, as stated in the cashew plantation statistical data, because the export of the logs is limited. Farmers have made product diversification efforts using simple kacip technology.

CONCLUSION

Atari Jaya Village as a center area for the development of Agropolitan both food crops, as well as plantation crops and horticulture on a national scale and becoming a Center for People's Livestock, as well as inland fisheries, is eligible to become an Agricultural Technology Park Area (Agro et al.) in South Konawe Regency, Southeast Sulawesi Province.

The heterogeneous composition of the population of Atari Jaya village and the majority of the Javanese transmigrant community are pretty competent in agricultural and agribusiness development and the diffusion of technological innovations in various fields supporting Agrotechnopark, such as the development of

Integrated Farming (Multiple cropping) and integrated farming (Mixed culture) of plantation crops and livestock/fisheries, as well as processing technology for the results.

Development of the Agricultural Technology Park (ATP) area to become a center for agribusiness and agro-fruit tourism as a basic framework for the economic growth of the Atari Jaya Mandiri Village community and regional economic growth towards the Great Konsel Regency.

Establish Atari Jaya Village as a pilot for developing the Agrotechnopark Model in South Konawe Regency and a trading service center for upstream-downstream agro-fruit and livestock agribusiness.

SUGGESTIONS/RECOMMENDATIONS

To realize the ATP Program, it is recommended that a Government Policy be integrated with universities regarding establishing Agro-techno park areas per the Regional Medium-Term Development Plan (RPJMD).

Regulations for the Management and Improvement of the Status of Atari Jaya Village to Develop the Agro Techno Park Area into an Independent Village of Agricultural Technology Parks Towards Great Councils through the Ministry of Village and Ministry of Forestry and Environment Programs.

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