The role of stakeholders to support implementation of modern agricultural programs

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Abstract. The Ministry of Agriculture has implemented the Modern Agriculture Program since 2016 by distributing agricultural machinery to farmers, in order to improve Indonesian agriculture which is characterized by small scale, low productivity, low labor productivity, and national production that is not self-sufficient. The objective of this research is to analyze the role of stakeholders to support the implementation of the programs. South Sulawesi was chosen purposively as the research location. The interviewees are service institutions from central to regional, key informants, farmer groups, extension agents, agricultural machinery service providers, and individual farmers. The analysis used was stakeholder analysis. The results showed that the main actors in the Modern Agricultural Program were machinery operators and UPJA administrators. The beneficiaries of Modern Agricultural services are mainly the share and tenant farmers. The machinery operators have the strongest position. In terms of the external network, the machinery operators and “area brokers” are the most important parties and determine the operation of the machinery. In order for the Modern Agriculture Program to provide positive benefits to all parties, it is necessary to strive for a system of work with fair profit sharing and to provide wider opportunities for businessmen to take part in the program.

1. Introduction

Indonesian agriculture is characterized by small scale farming, low productivity, low labor productivity, and national production that is not self-sufficient [1]. Therefore, the Ministry of Agriculture has a mission to realize modern agriculture by providing agricultural machinery assistance to farmers, namely rice transplanters, tractors, and combine harvesters. All machines are given to farmer organizations (farmer groups, farmer group associations, or agricultural machinery service providers (usaha jasa alsintan/UPJA). According to the guidebook for implementing Modern Agriculture Pilot activities [2], this program is a farming activity carried out through the application of agricultural mechanization starting from land preparation, planting seeds, to harvesting, with a service coverage of at least 100 ha. The aim of this program is to increase land productivity, production, and reduce losses during the farming process until harvest and post-harvest. A piloted project approach can be an effective platform for wider communication and dissemination [3].

Farmer organizations are the main actors expected in this program. Organizing farmers formally is the main strategy for farmer empowerment actors in Indonesia, where all program participants are required to work in groups. However, several studies have shown that it is not easy to build farmer organizations so that program implementation is less effective [4,5]. Likewise, the effectiveness of modern agriculture programs depends on the many actors, both individuals and groups, that support or
hinder operations. This program is not only about buying and distributing agricultural machines, but also related to the technical aspects and the capacity of the farmer organizations that run it.

This research aims to study the role of stakeholders in the use of agricultural machinery in the Modern Agriculture program, as well as how to optimize the role of farmers and their organizations in the future. This study explores the participation, influence, interests, and relationship patterns of stakeholders involved in the development of modern agricultural programs. From this research, it is hoped that it will be obtained how to improve the management of the implementation of modern agricultural programs so that they are effective.

2. Materials and methods
The research was conducted in Soppeng and Sidrap Regencies, South Sulawesi Province as one of location of the Modern Agriculture Pilot program implemented by the Ministry of Agriculture since 2016. Observations and interviews were conducted in 2017. The main data collected is qualitative data from 55 resource persons of interviewees; they are local governments staffs, extension workers, village officials, leaders and administrators of farmer organizations (UPJA, Gapoktan and Farmer Groups), farmer leader, farmers, farm laborers, traders, private agricultural machinery service providers, as well as agricultural machinery brokers. The types of machines studied are focused on three machines that are relatively new, namely 4-wheeled tractor, rice transplanter, and rice combine harvester.

Stakeholder analysis is used to understand how to optimize agricultural machinery operations so that they are not under capacity and are able to meet the needs of local farmers. Stakeholder analysis may be used to identify and assess the priorities, needs, goals, and requirements of key people (actors) that may significantly influence the success of agricultural research and extension programs [6]. Stakeholder analysis is useful in identifying the community or community groups that are most affected by a development activity [7], as well as determining the priority of community groups that are prioritized, including strategies to reduce the negative impacts of program implementation. Stakeholder perceptions need to be considered in integrating the roles and duties of stakeholders. These perceptions can be in the form of views on policies, programs, activities, and promotional efforts carried out by external parties [8]. Stakeholder analysis can become a tool for optimizing the use of participatory approaches in agricultural research [9]. The description of this stakeholder analysis is divided into three parts, namely identifying stakeholders to determine their position, level of involvement and influence, as well as a matrix of stakeholder positions and formulation of institutional solutions in the future.

3. Results and discussion
3.1. Types and positions of stakeholders in modern agriculture pilot programs
Field data found that actors related to program activities were primary and secondary stakeholders. Primary stakeholders are parties who feel the direct or indirect impact of the program, while secondary stakeholders are parties who act on behalf of primary stakeholders.

The position of stakeholders in this program is measured by their involvement in the operation of agricultural machinery. The success of program activities is highly dependent on the surrounding actors or stakeholders. There are many actors in program, with diverse roles and issues (Table 1). The use of machines that have developed apart from tractors is the combine harvester. The operation of the Modern Agriculture Program assistance machine has not been used optimally. For combine harvester equipment, there is competition with private entrepreneurs who are already very developed. There is a problem where UPJA has an understanding that machines should only be used in groups, is afraid of being damaged, and is difficult to account for to the Department of Agriculture.
Table 1. Types of actors, position, roles and problems in the implementation of modern agriculture program in South Sulawesi, 2017.

| Actor                                      | Position | Role                                                                 | Problems                                                                                           |
|--------------------------------------------|----------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| 1. Gapoktan Manager                        | Primary  | The management does not give UPJA the freedom to operate the machine, they are afraid it will be damaged responsible for optimizing the use of machines | Lack of support for marketing machines outside the village, so that the tractor and combine harvester are idle (under capacity). |
| 2. UPJA management                         | Primary  | Have no role in the submission and operation of the machine, because it is directly personal to the operator | Lack of freedom in machine operation because it is prevented by Gapoktan administrators, has not developed the network to outside the region. |
| 3. Farmer group management                 | Secondary| The owner of the rice field that is rented or shared by the farmer   | Lacks strength and interest in modern agriculture                                                  |
| 4. Machine operators                       | Primary  | Responsible for machine operation and maintenance                    | Do not have sufficient technical skills, especially in seeding for rice transplanters             |
| 5. Mechanical technician                   | Primary  | No special technician, done by operator.                             | There is no technician for the four wheel tractor, the tractor is damaged, the company cannot be contacted |
| 6. Combine harvester service entrepreneur  | Primary  | Become a business competitor, in collaboration with a “launcher” (broker area). | Competing with a pattern that has not been agreed upon, potentially harming each other             |
| 7. Land owner                              | Secondary|                                                                         |                                                                                                   |
| 8. Share and tenant farmer                 | Secondary| As a beneficiary of agricultural machinery services                   | Get higher yields and lower costs                                                                   |
| 9. Harvest worker                          | Secondary| Members of the harvesting team belonging to grain traders             | Lost job opportunities                                                                             |
| 10. Direct planting workers                | Primary  | Tabela machines are favored by farmers because they are cheap and fast | Become a competitor in rice transplanter operations                                                |
| 11. Local agricultural office              | Secondary| Distribute machines to UPJA                                           | Weak control over the use of the machine                                                            |
| 12. Extension worker                        | Secondary| Assist management and administration                                  | Lack of mechanical technical skills                                                                  |
| 13. Grain traders                          | Secondary| Buying farmer's grain.                                                | Don't have a drying machine, so you have to buy cheap grain                                        |
| 14. “Peluncur” (area broker)               | Primary  | Having power in a rice field area to manage the operation of the combine harvester machine | High wages, uncontrolled, informal actors                                                           |

3.2. Level of power, interest, and risk of stakeholders

By using stakeholder analysis, measurements are made of three aspects, namely the power, interests, and risks to stakeholders. Power in this study is a combination of the number of resources owned and their ability to mobilize and use them. Also the ability to implement programs and activities, including monitoring the decisions made and facilitating the implementation of activities as well as handling their negative impacts. Furthermore, "interest" relates among others to expectations, needs, potential benefits, acquisition of resources, obtaining benefits, and commitments; as well as potential conflicts and inconsistencies with activities. The level of interest and interest is the potential that will determine the actions of stakeholders. Finally, the level of "risk" in the form of losses (negative) or otherwise benefits (positive) that have been and will potentially be experienced by stakeholders on the existence and activities of Modern Agriculture. This is important to assess how to respond and at the same time anticipate what must be done in the future because it will be able to act as a supporter or as an obstacle.
The use of agricultural machinery at the research site which is far more developed than tractors is the combine harvester. In Soppeng Regency in general, the use of CH has been around for a long time and farmers have really felt the advantages of this tool, namely that it works faster, is cleaner, and has lower wages. In general, the operation of agricultural machinery from the government has not been optimal. For combine harvester equipment, there is competition with private entrepreneurs who are already very developed.

The role of stakeholders in the program is as the main actor, namely agricultural machine operators and UPJA. The duties of suppliers of raw materials and services are combine harvester workers and mechanical technicians. From the side of the beneficiary or consumer, as the beneficiaries/services of modern agriculture, the main ones are the beneficiary farmers and tenants, so that farmers have the most interest and also get the greatest benefit. In the outer circle, are the local agriculture office and extension extension workers. They do not have high power in the operational stages of the Modern Agriculture Program, although they play a role in the selection of activity locations.

3.3. One, stakeholder power level
Each stakeholder has a certain power in the Modern Agriculture Program at the research location. This power is owned as a combination of the amount of resources owned and their ability to mobilize and use them, including monitoring the decisions made and facilitating the implementation of activities as well as handling their negative impacts. In terms of respondents' knowledge of the concepts, objectives and work systems of modern agriculture, only government staff and UPJA managers have high knowledge. Others have only heard of this program at a glance. However, overall, no one really understands what and how this program is. Most of the understanding of the Modern Agriculture Program is on the use of modern machines in farming.

In terms of the type, amount, and value of the resources owned by the interviewees, where agricultural machinery operators have the most powerful and central position. They master the operation of the equipment, and determine which farmers will be served with administrative, technical and economic considerations. In terms of network owned, agricultural machine operators and area brokers are the most important actors. Only the operators have an outgoing network, and it really determines how the tool operates. Area brokers in the village called “Penjuru” have the power to determine whose equipment can operate. For this, the area broker earns a fairly large amount of fees.

The level of power is also related to the legal status of stakeholders, although it is not always equal. In the non-formal group, for example, they are a group of planting workers and harvest workers. At the beginning of Modern Agriculture activities, there were objections from this group of workers, because it risked reducing their employment opportunities. Of those classified as formal groups and legal entities are Gapoktan and Farmers’ Groups, as well as government agencies. The level of power of these actors over the activities of the Modern Agriculture Program is not equal, because in its operation it has been handed over to farmers and their organizations. The local agricultural office and its staff have little power in the operations of the Modern Agriculture Program on the ground.

Next, in terms of resources owned by each stakeholder, there is a large variation. The degree of resources is the accumulation of financial ability, mastery of technology, networks, mastery of information, and political support. The actors with the strongest degree of power is the operator of agricultural machinery, followed by area brokers. Actors’ attitudes or positions in viewing Modern Agriculture program activities can be grouped into refusing, neutral, and supportive attitudes. The attitude of refusing frontally was not found, even among farm workers whose job opportunities were threatened. The same applies to private tractor owners whose business opportunities are rivaled by tractors from program assistance.
3.4. Two, level of needness and interest of stakeholders

All stakeholders have different degrees of interest, depending on the position and potential benefits or impact of risks from this activity. Interest is essentially seen from how the expectations, needs, potential benefits, resource acquisition, benefit acquisition, and commitment from stakeholders. In addition, the potential for conflict and incompatibility with activities will also determine the level of interest and interest. In turn, the level of interest and interest is the potential that will determine the actions of stakeholders.

The form of stakeholder interest in modern agricultural activities is related to economic benefits, either because it reduces costs or has the potential for greater income and profits. The use of a 4-wheel tractor, for example, is very attractive to all people, because it is able to work faster, better, and also at low cost. The level of stakeholder interest is also related to how the motivation, plans and direction of stakeholders’ business development in the context of modern agricultural programs. For entrepreneurs of agricultural machinery, especially tractors and combine harvesters, the presence of agricultural machinery from the program with lower rental costs is a rival that needs to be considered.

Stakeholders’ expectations for modern agriculture that rely on machines from upstream to downstream agribusiness can be said to be quite large. Many actors have high hopes for income generation, economic development, and business expansion. The presence of a rice transplanter is an opportunity for the development of the nursery business, although it has not yet been realized. Many actors have a great need for this Modern Agriculture activity, including from the government, because it will be able to increase the planting index and planting area. By considering the many variables above, the level of interest and interest of stakeholders in modern agricultural programs and activities is spread between not interested, less interested, quite interested, and very interested.

3.5. Three, level of risk of negative impact or benefit

The level of negative impact or benefits of stakeholders on the existence and program of Modern Agriculture is important to assess how to respond and at the same time anticipate what must be done by UPJA as the main manager of the program, because it will be able to act as a supporter or vice versa as an obstacle. Although the program has not been running for long, the benefits that have been obtained are quite visible. The benefit for farmers is the lower cost of farming, especially the use of a combine harvester which can reduce costs by half compared to harvesting with a thresher.

The negative impact encountered is the decrease in job opportunities for harvest workers. Meanwhile, the direct positive impact was only felt by UPJA with the increase in human resource capacity due to training for machine technicians and tool operators. In addition, UPJA has also experienced a strengthening of capital, increased income, and network expansion. The indirect impact is felt by the local agricultural office.

3.6. Stakeholder position matrix and solution strategy

This matrix is important information to describe the current condition and what actions should be taken in the future. The matrix consists of a quadrant with two axes. There are three forms of crossed matrices, namely between the level of power and interest, the level of power and risk, and between the level of interest and risk. This matrix is a tool in stakeholder analysis, which crosses three dimensions, namely the level of power, interest, and risk owned by the stakeholders.

In terms of the level of power and interest, the stakeholders who have the highest level of power and interest are machine operators, UPJA and area broker. From this condition, the solution and strategy that must be carried out in the future is to draw up an agreement and work contract between UPJA and the operator, so that the operator's authority is not too dominant. UPJA management needs to establish cooperation with managers of private agricultural machines, so as to avoid unfair competition. On the other hand, those with low power and low interest are the farmer groups and land owners. For them, it is necessary to develop continuous communication, so that it can generate interest in the activities of the Modern Agriculture Program.
Two, for the matrix between the level of power and risk, stakeholders who have a high level of power but obtain positive benefits need to be maintained so that they remain actively involved. They are tenant farmers, harvesting farmers, area brokers, UPJA and machine operators. Meanwhile, the stakeholders who get the most adverse impacts need to strengthen their position in the configuration of the Modern Agriculture Program activity structure, so that the potential adverse impacts can be suppressed. They are harvest workers who were eliminated by the combine harvester.

Three, for the matrix between the level of interest and the risk of being affected, where most of the stakeholders are in a high interest position, but the risk spreads from negative to positive. Solutions and strategies that must be carried out for all stakeholders in accordance with their respective positions. In essence, in the future, a system that is fair should be pursued but provides opportunities for all parties to obtain positive benefits. For a more equitable system, it is necessary to strengthen its position in the configuration of the program activity structure, so that potential adverse impacts can be minimized. The use of machines needs to consider this, so that the negative impact does not worsen the condition of the stakeholders in this quadrant. There are several things that can be done to streamline the role of stakeholders, such as timely consultation [10,11]. Research in Malta, mentions the importance of policies, resource management, technology absorption, and knowledge translation for effective interventions [12], as well as the closeness between actors and models of farmer access to resources and agricultural governance that is more equitable and profitable [13].

4. Conclusions
The results of the analysis show that the main stakeholders in the Modern Agriculture Program are agricultural machine operators and UPJA, while the largest beneficiaries are harvesters and tenant farmers. In the outer circle, there are local government office and extension workers. Agricultural machine operators have the most powerful central position, and together with the area broker are the most important actors and determine the operation of agricultural machines. The attitude of refusing frontally was not found, either among farm laborers (direct planting worker and harvest worker) whose job opportunities were threatened and private tractor entrepreneurs. The negative impact that occurs is the reduced job opportunities for harvest workers.

References
[1] The Organisation for Economic Co-Operation And Development 2013 OECD Review of Agricultural Policies: Indonesia 2012 (Paris: OECD Publishing) https://doi.org/10.1787/9789264179011-en
[2] Direktorat Jenderal Prasarana dan Sarana Pertanian 2015 Buku petunjuk pelaksanaan kegiatan Pertanian Modern (Jakarta: Kementerian Pertanian)
[3] Aart HFM, Humphreys J and Le Gall A 2014 Viewpoint: effective stakeholder communication in agriculture: together we stand, divided we fall! J.Agric.Sci. 152:65–70. doi: 10.1017/S0021859614000276
[4] Stockbridge M, Andrew D, Jonathan K, Jamie M and Poole N 2003 Farmer organizations for market access: an international review www.dfid.gov.uk/r4d/Pdf/Outputs/R8275_040518_IntRev_FO_MktAccs.Pdf.14 November 2011
[5] Hellin J, Lundy M, and Meijer M 2007 Farmer organization, collective action and market access in Meso-America Capri Working Paper 67 (Washington: International Food Policy Research Institute)
[6] Dubey SK 2014 Stakeholder analysis as extension research tool J. of Food Legumes 27 238-45
[7] Race D and Millar J 2006 Training manual: social and community dimensions of ACIAR projects (Canberra: Australian Center for International Agricultural Research)
[8] Feldman RS 1996 Understanding psychology Boston (Washington: McGraw Hill)
[9] Neef A and Neubert D 2011 Stakeholder participation in agricultural research projects: a conceptual framework for reflection and decision-making Agric Hum Values 28 179-94
[10] Santoso H B and Delima R 2017 Stakeholder definition for Indonesian Integrated Agriculture Information System (IAIS) IOP Conf. Ser. Mater. Sci. Eng. 185 012014

[11] Jumiati, Ali M S S, Fahmid I M and Mahyuddin 2018 Stakeholder analysis in the management of irrigation in Kampili area IOP Conf. Ser.: Earth Environ. Sci. 157 012069

[12] Agostinoa D D, Borgb M, Hallet S H, Sakrabani R S, Thompson A, Papadimitriou L and Knox JW 2020 Multi-stakeholder analysis to improve agricultural water management policy and practice in Malta Agricultural water management 229 https://doi.org/10.1016/j.agwat.2019.105920

[13] Rahayu S, Waridin, Santoso PB and Mafruhah I 2019 Stakeholder role in improving agribusiness efficiency and food security in developing countries International J. of Economics and Bus. Administration (IJEBA) 4 464-70