Agricultural development: poverty, conflict and strategic programs in country border

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Abstract. Study on agriculture resource development and poverty in the country border regions were rarely found. This paper investigates the strategic program in increasing agricultural production for poverty alleviation of smallholders and reducing agriculture resource conflict, by employing Interpretative Structural Modeling. The results show that, strengthening institutional management of agriculture local resource potential should be more focused on institutions in the border regions (districts level) to avoid resource conflict in agriculture. Among the 10 strategic programs was revealed, there are three programs to encourage agricultural development and help poverty reduction in borders region. They are (1) the application of primary product processing techniques (for the farmers), (2) secondary product processing techniques for downstream (for industries), and (3) price policy improvement in borders local market (for the government). These three programs are the driving force for agricultural development in help rural poverty alleviation. In addition, local community needs more social supports and public services improvement in the border region.

1. Introduction
It is important to note that the linkages between agriculture resource, poverty and conflict become crucial issues in the country border regions. This will affect various aspect of development process, including food security, peace and social safety for the community. They need social supports [1] for continuing livelihood [2]. Efforts to maintain food security have many challenges, including how to balance environmental ecology and socio-economic aspects of rural/agricultural society [3,4]. One example of a research case from Pulubuhu [5] that explained women's strategies in dealing with agrarian land conflicts. The results showed that women farmers in the face of the conflict took the strategy of joining men in fighting for their land rights. This strategy has advanced women and made women stronger and more confident. The value of intelligence and brave affect women farmers in determining strategy [5] as a crucial part in agricultural development towards global food security and conflict resolution mechanism [6] among economic and ecological functions [7] and country border is no exception.
In the country border, climate change is also a challenge for agricultural development as a source of income for villagers, including environmental awareness. Human lifestyles that don't pay attention to environment will be a problem in the future. Cleanliness and concern for the environment can be started from the family environment (healthy life another words). A study conducted on communication carried out at the family level of community awareness that shows the influence and significance of family communication strategies together at the level of community awareness. Significant and positive test results affect family communication strategies and the level of community awareness [8]. This is also in line with the opinion of Arsyad [9] that the better public health services (as important needs for country border services) will also affect household income of farmers in the region though indirectly. These evidences above lead us to argue that socio-economic determinants, political ecology, conflict resolution are important pillar in keeping agriculture resource sustainability.

It needs a basic strategy for agricultural/rural development in the globalizing era, based on the socio-economic characteristics of rural agriculture in the borders. For this purpose, we shall consider: firstly, the changes in the international environment to which rural agricultural communities have to face; secondly, the peculiarity of agriculture which is a given condition directly affecting the agricultural development process in globalizing economy; thirdly, the strategic framework for rural agricultural development in the globalizing environment; and lastly, the roles of rural studies for agricultural development in the globalizing era [10]. At the same time, in the border region, the technology and know-how that farm households in the region have acquired in regard to the mainstay agriculture are essential resources for the region. Since the mainstay agriculture has been established by years of accumulation, no region can be vitalized if it is weak. The mainstay agriculture is, though often inconspicuous, the most important and basic production system for the region. Therefore, the most important step for the development of regional agriculture is to foster the sustainable development of the mainstay agriculture [10] and country border as a part of this peculiarities.

In addition to fertilizer management, water management models are also very important for agricultural commodity in border region. Water management as an alternative method to increase its productivity by harvesting rainwater on the hilly cocoa farm area and distributing the water based on the gravity law. Rainwater can be optimally utilized as a source of farm water to overcome the lack of water during the dry season [11]. Sustainable agriculture becomes a crucial issue in economic development (the importance of sustainable agriculture for global development) [12]. In order to improve agricultural efficiency and productivity growth, agricultural activities should follow technological developments in industrial times 4.0. The movement of information becomes an important aspect for farmers. For example, research on developing an app in the efficiency of rural farming communities. Proven this app helps farmers in determining fixed costs and variable agriculture, getting market price information [13]. Benefits from the right technology to improve efficiency and grow agricultural productivity especially in the country border regions. This shows that the availability of agricultural resources, conflict resolution and technology tends to be important (interest in speaking) related to sustainable development in the country border, followed by the topic of agriculture institutional. This paper investigates the strategic program in increasing agricultural production for poverty alleviation of smallholders and reducing agriculture resource conflict in the border region.

2. Analysis
The research was conducted in three Indonesian country borders (three provinces). They are Indonesia-Papua New Guinea, Indonesia-Timor Leste and Indonesia-Malaysia. The data obtained were analyzed using Interpretative Structural Modeling [14], to analyze data or information about sub-elements as a strategic program in efforts to increase agricultural production. ISM analysis is carried out with the main stages as follows: (i) Develop a structural self-interaction matrix (SSIM) using the results of a questionnaire tabulation; (ii) Arranging the reachability matrix table, by replacing the symbols V, A, X, O in the questionnaire with numbers 1 and 0; (iii) Develop a Power-Dependent Matrix Driver (DP-D) consisting of four quadrants; (iv) Develop a structural model (level) of each
element. Based on the Power Driver Dependent Matrix, the interests of each sub-element can be determined, through four positions as follows: (i) Autonomous position, indicating that the sub-elements in this position are not related to the program, or the relationship is very small; (ii) The dependent position, indicates that the sub-elements in this position are not free, meaning that all depend on the action of other sub-elements. Therefore, the sub-elements in this position are not important in relation to the program; (iii) Linkage position shows that the sub-elements in this position are very important and must be studied carefully because of the relationship with other sub-elements is not stable. Every action on a sub-element will have an impact on this sub-element and the feedback of its influence can magnify and/or cause new impacts and/or problems. In other words, every action on the sub-element will produce success, on the contrary, the weak attention to this sub-element will cause failure; (iv) Independent position, indicating that the sub-elements in this position are free variables, that is a large driver power, besides the dependence on other sub-elements is small [15].

3. Agriculture Resource Conflict and Strategic Programs
The results of the Interpretative Structural Modeling (ISM) analysis show that the 14 sub-elements intended are distributed in three sectors, namely: (1) 4 sub-elements are in an independent position, (2) six sub-elements in the linkage position, and (3) four sub-element in the dependent position. The position of each of these sub-elements shows the priority order of how much the driving power of each sub-element (program) is to reduce poverty, especially in border regions. The results show that of the 14 programs analyzed, only 10 sub-elements as a strategic program have a great driving power towards poverty reduction and agriculture resource conflict alleviation for cocoa smallholders. The 10 programs are intended, six strategic programs are in an independent position, and four other strategic programs are in the linkage position (Figure 1). This analysis maps the strategic program of poverty reduction in the border region in four position categories (Independent, Linkage, Dependent, Autonomous). However, we will not explain the last categories in this paper.

![Figure 1. Strategic Program for Agricultural Development in Border Regions [15].](image)

It was found that four strategic programs that are in an independent position (Figure 1). Of the four strategic programs in the position, three of them are strategic programs: (1) for the government, it needs to do application of price policies, (2) for the farmers, it indicate the application of primary product processing techniques (fermentation), and (3) for the industry, it needs to support secondary product processing techniques (by-products, intermediate products, and final products). All three have a large driving power (average DP = 1.00). The results identified that, these three programs are the key in reducing rural poverty, especially in border regions. Another indication of these three programs can be stated that, as long as the three are still running optimally, production will continue to increase and
ensure the welfare of farmers, even rural communities in general. Farmers will be motivated to do farming if the market prices remain stable and profitable. This secondary product processing technique was revealed as a strategic program (DP = 1.00 and D = 0.50 in our calculation). This program is a strategic program that is expected to encourage smallholders income in the border regions. Secondary product processing can be distinguished by-products, intermediate products, and final products. Cocoa product processing that can increase farmers’ income includes (1) processing pulp (slime) into nata, and (2) processing pulp into juice, jelly ice and the other possible products. Therefore, the role of institutions must be maximized to support institutional strengthening through multi-sectoral and multi-functional coordination between institutions, expected to be able to bring border area out of backwardness, conflict and rural-agricultural poverty based on indicators of infrastructure and socio-economic welfare.

4. Conclusion
Strengthening institutional management of agriculture local resource potential should be more focused on institutions in the border regions (districts level) to avoid resource conflict in agriculture. Community needs more social supports and public services improvement in the border region. Among the 10 strategic programs was revealed, there are three programs to encourage agricultural development and help poverty reduction in borders region. They are (1) the application of primary product processing techniques (for the farmers), (2) secondary product processing techniques for downstream (for industries), and (3) price policy improvement in borders local market (for the government). These three programs are the driving force for agricultural development in help rural poverty alleviation in the border.

Acknowledgment
Authors like to thanks Professor Philipus Betaubun (President, Universitas Musamus for his help to overcome technical problems in the field (Indonesia-Papua New Guinea border). Our sincere thanks to Dean of Faculty of Agriculture, Universitas Borneo Tarakan and team for their support in discussing preliminary research findings on the Indonesia-Malaysia border, particularly trade transmission in the region. To Dr. Damianus Adar, Dean of the Faculty of Agriculture, Nusa Cendana University, thanks for all valuable discussions (Indonesia-Timor Leste border) at the Indonesian Society for Agricultural Economics (PERHEPI) Conference.

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