DEVELOPING NEW AGRICULTURAL INDUSTRIES IN INDONESIA: INSIGHT FROM AUSTRALIA'S EXPERIENCE

(MENGEMBANGKAN INDUSTRI PERTANIAN BARU DI INDONESIA: WAWASAN DARI PENGALAMAN AUSTRALIA)

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ABSTRACT

The aim of the research was to develop a basis for formulating strategies to develop new agricultural industries in Indonesia. The research showed that, to develop new agricultural industries, Indonesia which has more potential natural resources should be able to improve its competitiveness by seriously supporting research and innovation, from upstream to downstream. Recommended strategies for the Indonesian Government to develop new agricultural industry were: (1) establish research and innovation especially in agricultural development as national priority program; (2) support the program, through coordination and cooperation amongst research institutions and intensive communication amongst them to develop an integrated research, (3) provide guidance about facts and problems in new industries; (4) provide commercialization of research outcomes in agricultural sector.

Keywords : new agricultural industry, government initiative, competitiveness, innovation

ABSTRAK

Tujuan dari penelitian ini adalah untuk mengembangkan dasar guna merumuskan strategi dalam mengembangkan industri pertanian baru di Indonesia. Penelitian menunjukkan bahwa, untuk mengembangkan industri pertanian baru, Indonesia yang memiliki sumber daya alam yang lebih potensial harus dapat meningkatkan daya saingnya dengan serius untuk mendukung penelitian dan inovasi, dari hulu ke hilir. Strategi yang direkomendasikan bagi pemerintah Indonesia untuk mengembangkan industri pertanian baru adalah: (1) membangun penelitian dan inovasi terutama dalam pengembangan pertanian sebagai program prioritas nasional; (2) mendukung program, melalui koordinasi dan kerja sama antar lembaga penelitian dan komunikasi intensif di antara mereka untuk mengembangkan penelitian terpadu, (3) memberikan panduan tentang fakta dan masalah di industri baru; (4) menyediakan komersialisasi hasil penelitian di sektor pertanian.

Kata kunci : industri pertanian baru, inisiatif pemerintah, daya saing, inovasi

INTRODUCTION

Globalization, as an impact of technological change in communication and transportation methods, increases competition amongst countries throughout the world, including competition in agricultural markets. One way to enhance competitiveness in the agricultural sector is by developing new agricultural industries (Knight 2015). Adenle et al (2017) also suggest that a country will have a positive and long-term outcome and well being, financially as well as socially, by developing new agricultural industries. The empirical experience of some developed countries such as the USA, Canada, Norway, Australia, and the Netherlands shows that as industrialized countries, they still consider agriculture as an important sector (Arnold 2003; Metcalfe and Ramlogan 2005; Byun et al 2017). In addition, Hekkert et al. (2007) suggest that in developed countries, more than fifty percent of their economic growth "can be attributed to productivity gains" that occur from innovation, and technological change is essential to long-term economic growth.

Research conducted by Syam and Ma'arif (2014) shows that the agricultural industry in Indonesia contributes to value-added production by about 20.7%, to working force absorption by approximately 30.8%, and to raw material absorption by as much as 89.9% of total industries. With an increasing population leading to increased demand for agricultural products while supply remains relatively constant, the agricultural market will become more competitive. In terms of international relationships, the role of agricultural products may shift from tradeable goods to diplomatic goods for political objectives, which in previous instances has lead to food being used as a weapon in trade wars by developed countries to suppress weaker countries (Saefuddin & Dahuri 2003). Therefore, development of the agricultural sector by encouraging new agricultural industries to strengthen competitiveness is indeed becoming a necessity for a country's development, especially in countries like Indonesia that have abundant natural resources such as plants, animals, water and land.

There are numerous challenges the Indonesian agricultural sector must face in the 21st century. The largest of these challenges is the need to adjust to increased demand for higher quality, larger quantities, standardized production, environmental awareness and practice, continuity, and on-time delivery of products. To resolve these problems, a fundamental change in national agricultural policies from within Indonesia is required, whether conceptually or operationally (Saefuddin & Dahuri 2003). This research would,

therefore, present some ideas and suggestions based on Australia's experience in developing its agricultural sector.

METHODOLOGY

This research used a qualitative approach in line with the qualitative philosophy of inquiry, designed to inductively build rather than to test hypotheses, concepts and theories. Instead, the aim of the research was to gain understanding and insight with no involvement. The method was considered appropriate for this research because it allows us to define the topic more broadly by taking into account contextual issues and relying on multiple sources of evidence (Yin 2011). The methodology of this study is reflected in the framework described in Figure 1.

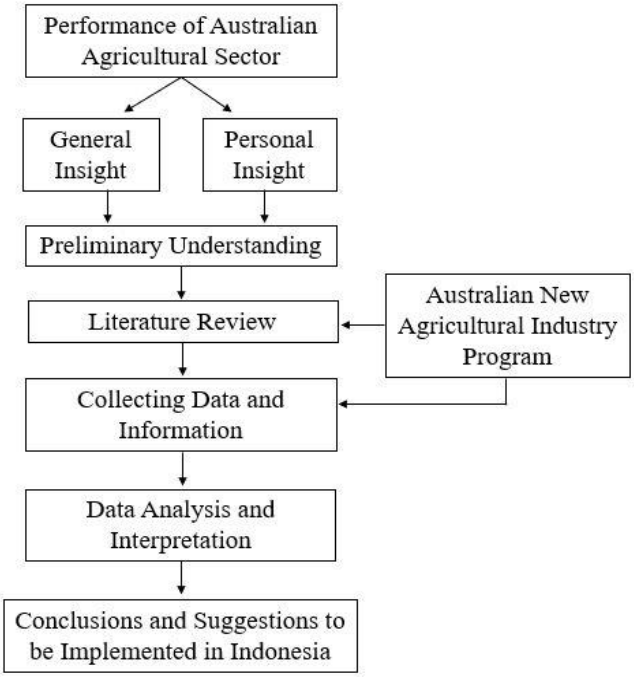

Figure 1. Research Methodology Framework

It was reasonable in this study to examine the case of Australia and Indonesia to satisfy the replication logic of the deductive approach. More precisely the reasons for the selection of these two countries include: (a) Traditionally both countries are strong resource-based economies, however, in the last few years both of them are making significant efforts in moving towards a knowledge economy; (b) In recent years, both countries introduced a new national innovation system to support innovation activities systematically; (c) Australia is a developed economy with a much smaller population, and produces higher socioeconomic performance; in contrast Indonesia is an emerging

economy with a large population, and produces lower socioeconomic performance; (d) The lessons in success and failure learned from these countries could inspire other developed and emerging economies with similar characteristics.

Data analysis conducted as follows: firstly, new agricultural development programs and their impact on agricultural sector enhancement in Australia were analyzed. The advantages of the programs for the stakeholders in the agricultural industry in Australia were collected in this step. Secondly, this research described the characteristics of the agricultural sector in Indonesia and its role in Indonesian national development. It also briefly described the role of government policies in developing the agricultural industry. Finally, after comparing the results of these analyses, the researcher examined the possible strengths and weaknesses of applying the Australian programs in Indonesia and presented some suggestions.

RESULTS AND DISCUSSION

Definition of New Agricultural Industry

In this research, the term new agricultural industry refers to the development of 'new crops'. The definition of 'new crop' can be viewed from the producers' point of view, the consumers' point of view, or both (Wood et al 1994). Given the definitions suggested by some authors and the relative nature of the definition of a new crop, this research, therefore, defines new agricultural industry as innovative agricultural business activities starting from pre-farm activities, on-farm, processing, distribution, to retailing, involving new crops that can be defined as: 1) New to a country or region, although it is possibly not new in other country regions, 2) New variety, 3) New to be commercialized and 4) New utilization of existing crop/plant products.

Additionally, since the agricultural sector is not just about crops but also involves services and process, innovations to develop this sector can be classified into the following categories (Adenle et al 2017) :

1. The service and process are new to the world. They are the first of their kind and create entirely new markets.
2. The service and process are new to a country. They may not be new to the global market but are new to a country market and to the firm. They allow a firm to bring a new product, service or process to a country's market for the first time.
3. The service and process are new to the firm. They may also be a relatively new product, service, or process to the marketplace.
4. The innovation offers improved performance or greater perceived products, services or processes.

5. The innovations offer efficiency by reducing costs, intended to take the place of existing services and processes yielding similar benefits at a lower cost.

The Australian Programs

Developing a new agricultural industry is not merely about product development itself. There are sequential activities involved in the sector, from upstream to downstream, from pre-farm, on-farm, processing, and distribution, to retailing. These activities are linked to each other and interdependent. The success of these activities that lead to high levels of competitiveness is also influenced by internal and external factors such as skill and knowledge of human resources involved in the industry, tax regulations, infrastructure, and others (Australian Government 2014).

The programs launched by Federal and State Government to encourage new agricultural industry can be classified into pre-farm, on-farm, distribution and transportation, marketing, infrastructure, skill and knowledge, and regulation (Australian Government 2015). Additionally, this research classifies the programs into two types, Financial Assistance and Technical Assistance (the latter including Administrative and Advisory Assistance). It is important to note that this research does not cover all the programs launched by the Australian Government, due to the time limitations within which it was completed. Nevertheless, it is hoped that it will be able to deliver a general understanding of Australian Government programs.

Tables 1 and 2 summarized the programs categorized into eight fields of support and two types of support /assistance. These are further summarized in Figure 2 which shows the number of programs launched by the Federal and State Governments. It can be seen that the focus of the Australian Government programs is in three areas: assistance in marketing and commercialization of new ideas and products; research and development including new ideas stimulation; and skills and knowledge of human resource development.

The initiative is then implemented together with five related departments: (1) Department of Education, Science and Training, (2) Department of Communication, Information Technology and the Arts, (3) Department of Agriculture, Fisheries and Forestry, (4) Department of Industry, Tourism and Resources, and (5) Department of Health and Ageing. The total funds allocated for this initiative areAUD 5.3 billion over the period 2011 – 2014. This allocation adds AUD 3 billion in the previous three years budget started in 2011. Together with other science and innovation programs, Australian Government has invested around AUD 52 billion in key areas (The Australian Federal Government 2014).

Table 1. Australian Federal Government Programs

Department/State/Program	Field of Support*							
	1	2	3	4	5	6	7	8
FEDERAL GOVERNMENT:								
1. Department of Agriculture, Fisheries and Forestry								
▪ NIDP- Pilot Commercialisation Project					**F-T**			
▪ NIDP – In-Market Experience Scholarship					**F**	**F**		
▪ Plant Breeder's Right Program	**T**							**T**
▪ AAA Farm Growth through Export Growth					**F-T**			
▪ AAA Young People in Rural Industries						**T**		
▪ AAA Farm Innovation Program					**F-T**			
▪ FarmBis						**F-T**		
▪ Market Development/Trade					**T**	**T**		
▪ Food Chain Program				**F**				
▪ Food Innovation Grants			**F**	**F**	**F**			**F**
2. Department of Industry, Tourism and Resources								
▪ COMET Program					**F**			
▪ R&D Start							**F**	**F**
▪ R&D Tax Concession							**F**	**F**
▪ National Innovation Awareness Strategy					**F**	**F**		**F**
▪ Small Business Assistance Program						**F-T**		
▪ Commercial Ready Program					**F**			**F**
▪ Innovation Access Program – Industry								**F**
▪ Competitive Pre-Seed Fund Program					**F**			
3. Department of Communications, Information, Technology and the Arts								
▪ Secure Freight Program				**F-T**				
▪ Optimizing the Grain Supply Chain				**F-T**				
4. Department of Education, Science and Training								
▪ National Innovation Awareness Strategy					**F**	**F**		**F**
▪ Innovation Access Program – Science & Technology							**T**	**F-T**
▪ Cooperative Research Centres Program					**F**			
5. Rural Industry Research and Development Corporation								
▪ New Plant Products Research Program	**F**	**F**	**F**	**F**	**F**			**F**
▪ New Animals Products Research Program	**F**	**F**	**F**	**F**	**F**			**F**
▪ Asian Food Research Program	**F**	**F**	**F**	**F**	**F**			**F**
▪ Rare Natural Fibres Research Program	**F**	**F**	**F**	**F**	**F**			**F**

Notes : **[1]**: Pre-Farm; **[2]**: On-Farm; **[3]**: Production & Processing; **[4]**: Distribution and Infrastructure;**[5]**: Marketing and commercialization; **[6]**: Human Resources; **[7]**: Regulations, including taxes;**[8]**: R&D; **[F]**:Financial Assistance; **[T]**:Technical, Administrative and Advisory Services

Table 2. Australian State Government Programs

Department/State/Program	Field of Support*							
	1	2	3	4	5	6	7	8
STATE GOVERNMENT:								
1. Northern Territory								
1.1. Department of Business, Industry and Research Development								
▪ Horticultural Program		**T**						
▪ Industry Development Support Program			**F**	**F**	**F**	**F**		
▪ FarmBis						**F-T**		
2. Queensland								
2.1. Department of Primary Industries and Fisheries								
▪ Smart Idea Awards								**F**
▪ Rural Industry and Business Services					**T**			**T**
▪ FarmBis						**F-T**		
3. Victoria								
3.1. Department of Natural Resources and Environment								
▪ New and Emerging Industries Program		**T**	**T**		**T**			
3.2. Department of Innovation, Industry and RegionalDevelopment								
▪ Food Victoria Program					**T**			
▪ The Regional Infrastructure Development Fund				**F-T**				
▪ Young Farmers Finance Scheme	**F**	**F**	**F**					
▪ Agribusiness Initiative					**T**			
▪ FarmBis						**F-T**		
4. New South Wales								
4.1. Department of States and Regional Development								
▪ Agribusiness Alternative Program			**T**		**T**			
4.2. New South Wales Agriculture								
▪ Citrus Industry Development		**T**	**T**					**F**
4.3. Rural Assistance Authority								
▪ FarmBis						**F-T**		
5. South Australia								
5.1. Department of Primary Industries and Resources								
▪ Innovation Industry						**T**		**F-T**
▪ Industry Development			**T**	**T**	**T**			
▪ FarmBis						**F-T**		
6. Tasmania								
6.1. Department of Primary Industries, Water and Environment								
▪ FarmBis						**F-T**		
6.2. Department of Economic Development								
▪ New Market Access Program					**F-T**			
▪ Innovation Programs	**F**	**F**	**F**	**F**	**F**			
7. Western Australia								
7.1. Centre for New Industry Development								
▪ New Industries Program	**T**	**T**	**T**	**T**	**T**			

Notes : **[1]**: Pre-Farm; **[2]**: On-Farm; **[3]**: Production & Processing; **[4]**: Distribution and Infrastructure;**[5]**: Marketing and commercialization; **[6]**: Human Resources; **[7]**: Regulations, including taxes; **[8]**: R&D; **[F]**:Financial Assistance; **[T]**:Technical, Administrative and Advisory Services

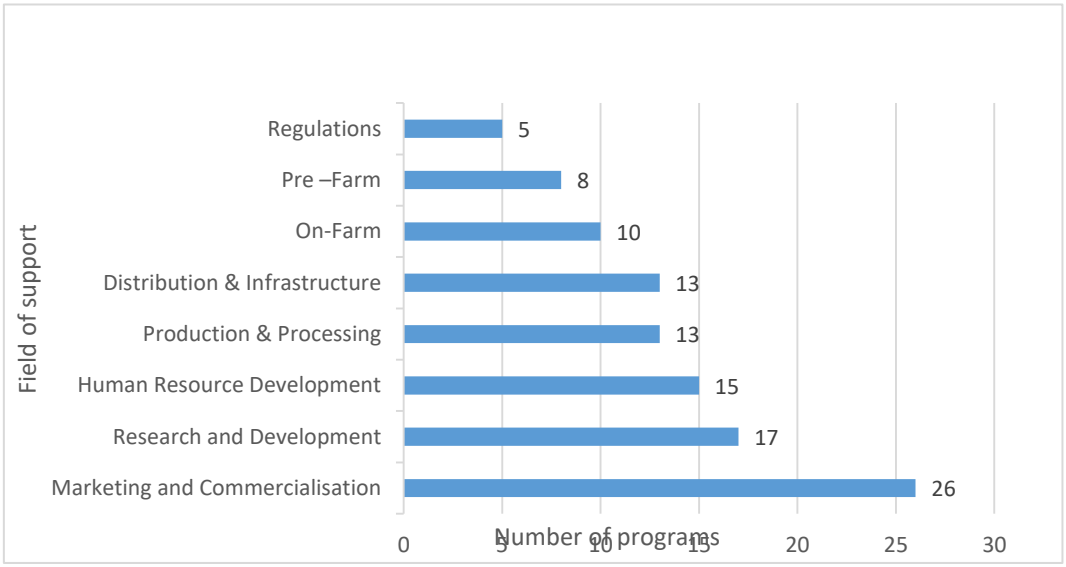

Figure 2. Combined Number of Programs Launched by Australian Federal and State Governments

Lessons for Indonesia

Economic growth is driven by new technologies and its applications (Mandel 2004), and new technologies are driven by innovations, and the foundation of innovation is the learning process (Arranz and de Arroyabe 2009). When a country has a low level of technological growth and a lack of innovation, it has slow growth in the economy (Mandel 2004). In order to be able to perform innovative activities, efforts to improve the science and technology ability of the community are necessary by enhancing the community's learning capacity. Thus, the flow of information and knowledge from the source of science and technology to the community should be facilitated (Arrow 1962, Lundvall 1985, Dosi 1994 as cited in Pantjadarma 2000).

Innovation is the process of making changes to a product or system that adds value. It is the transformation of new ideas into commercial products or services. It includes element of entrepreneurship and commercialization in all business sectors. It also adds value to manufacturing and industrial processes, improves the delivery of services and creates new jobs. The introduction and commercialization of new products involve substantial risk-taking and need hard work in research, innovation, and application. In this stage, research and development are important, whether in the introduction of new enterprises or in the continuance and periodic improvement of emerging enterprises' productivity.

The Australian Government has a strong political will and commitment to supporting agricultural sector development by launching a national initiative focused on innovation. The initiative offers some programs based on three key elements of innovation: human

resources, research and innovation activities, and commercialization.

Given the programs launched by the Australian Government, there were some lessons that can be taken by Indonesia. The first was, that the Australian Government realizes that the economic, social and environmental well-being of Australia was strengthened by an understanding of innovation and its importance. An understanding of innovation supports sound business decision making and attracts people into innovative businesses and entrepreneurial careers. In addition, innovation, through the development of commercial products, processes and services, is a key driver of productivity, international competitiveness and economic growth.

Therefore, the programs launched are focused on innovation and are well integrated and coordinated, from upstream to downstream, by considering comprehensively the three key elements of innovation, i.e.: research and development (R&D), commercialization of research results and new ideas, and human resource skill retainment and development. The programs also link researchers with industry to focus R&D efforts towards utilization and commercialization. The programs allow researchers and innovators to implement and use their research and innovation outcomes commercially.

The second point was that the programs were launched nationally and administered by involving some related departments. By involving these departments to carry out national programs, overlapping programs can be minimized. Thirdly, the Australian Government had a commitment to encourage an innovation boost that leads to new agricultural development by providing appropriate funds and delivering support to commercialize the results.

Generally, innovation in developing new agricultural industry can be classified into the following categories: 1) The products are newly commercialized, 2) The products are a new utilization of existing crop/plant products, 3) The agricultural products, services and processes are new to the world, 4) The product is new variety, and services and processes are the first of their kind and create entirely new markets, 5) The agricultural products, services and processes are new to a country. They may be not new to the global market but are new to a country's market and to the firm. They allow a firm to bring a new product, service or process to a country's market for the first time, 6) The service and process are new to the firm. They may also be a relatively new product, service, or process to the marketplace, 7) The innovation offers improved performance or greater perceived products, services or processes, and 8) The innovations offer efficiency by reducing cost. The innovations are intended to take the place of existing services and processes yielding similar benefits and performance at lower cost.

Nevertheless, there are some factors that must be considered by

the Indonesian Government in adopting Australian programs :

1. Cultural Background

   Developing qualified human resources is a long process. It cannot be achieved instantly and requires appropriately structured planning. In addition, in developing human resources, knowledge about cultural background is necessary. Indonesia is a plural country with a range of different ethnic and cultural backgrounds. Therefore, it will be more effective if the human resource development of a region considers regional cultures. Subsistence culture should be adjusted to a market-oriented culture. The cultural myth such as 'how can I sell what I have' should be altered to 'what can I provide for the market'.

2. Crops and Land Availability

   As a tropical country, Indonesia has the potential for specific agricultural crops, fruits and vegetables. Amongst them is a lot of products that have not been developed for global markets such as snake fruit, mangosteen, rambutan, hog plum, etc. The challenge is how to make such products more competitive in the global market. On the other hand, the productive land availability is limited. The land-man ratio in Indonesia, a critical indicator of national food sustainability, is only 362 meter square per capita (Sumarno 2004).This figure is the lowest in the world. As land is the base for agricultural activities, the challenge for developing new agricultural industry in Indonesia is how to improve productivity by considering ecological factors.

3. Conflicts of Interest

   Developing new crops needs a long period is highly risky, and mostly the benefits accumulate to persons other than those making the initial investment, thus, it is less attractive for private investment. Since in general new crop development is beneficial for the nation, public resources need support. However, public resources are usually allocated to areas where there are special interests with forceful representation, and new crop development is not one of those areas (Jollif 1996). In addition, hurdles to policy development include the nature of the policy development process, traditional myths, special interests that compete with public interests for resources, and organizational cultures in the public-funded research institutions (Jollif 1996). Therefore, it is necessary for the Indonesian government to allocate funds for such work wisely.

Finally, based on Australia's experience in developing new agriculture industry, the study highlights the role each Indonesian

ministry could play across different government agencies to facilitate successful agribusiness development in Indonesia as stated in Table 3.

Table 3. The recommended strategies for Indonesian government agencies in new agricultural industry development

Government agencies	Possible role in new agricultural industry development
Ministry of Agriculture	1. Intensify efforts to develop an integrative and functional framework in various aspects of the agribusiness sector 2. Provide special farming training courses and extension services 3. Create an effective strategy for the adoption and distribution of improved technologies 4. Oversee and coordinate state agriculture ministry's to adequately support and prioritize agribusiness development 5. Identify constraints and risks to agribusiness development, and team up with the appropriate ministries to seek a long-lasting solution 6. Support land acquisition and land governance that encourage agribusiness development 7. Develop and coordinate an effective marketing strategy with the Ministry of Trade and industry
Ministry of Trade and industry	1. Improve bargaining power in international trade negotiations 2. Stand to gain from bilateral partnerships through the best negotiation that is transparent and that favors national interest 3. Coordinate data management systems with the National Statistics Office on the formal and informal sector by targeting small-medium producers and enterprises 4. Promote an open trade policy for the regional and international integration of agribusiness 5. Encourage local private sector and foreign sector partnership to enhance agribusiness development
Ministry of Finance	1. Champion and finance agribusiness industry 2. Encourage private agribusiness investment funds 3. Coordinate and increase access to loans with the low-interest rate from commercial banks 4. Set up and monitor the performance of micro-credit and micro-finance 5. Channel financial resources towards agribusiness-supporting infrastructure with an international project lending institution
Ministry of Science and Technology	1. Champion research and development (R&D) in agricultural technology 2. Intensify R&D in high yielding varieties and enrichment of germplasm banks in partnership with the Ministry of Agriculture and the United Nations of Food and Agriculture Organizations (FAO)

Government agencies	Possible role in new agricultural industry development
	3. Promote appropriate indigenous technologies with the great potential for agribusiness and agricultural development (e.g., processing, storage) 4. Coordinate and facilitate technology transfer 5. Coordinate and support R&D and capacity building across research institutes and universities at the national, regional and international levels
Ministry of Energy and Mineral Resources	1. Increase consistent provision of grid power that targets rural poor 2. Establish open and transparent market conditions in partnership with the independent power producers or private sector 3. Champion and encourage best available technologies in grid balancing and renewable energy integration (e.g. Solar, wind and hydropower)
Ministry of Environment	1. Champion and develop sustainability best practices across agribusiness sectors 2. Promote sustainable use of land, water, energy, forest, and other key natural resources 3. Establish and implement environmental policy guidelines for regulating pollution 4. Promote renewable energy policy for the overall energy mix that could help reduce greenhouse gases emissions
Ministry of Transportation	1. Increase the participation of the private sector in solving crucial infrastructure problems including roads, water and railways 2. Coordinate and maintain effective logistics management of transport system 3. Support and encourage the location of cultivating/processing plants to facilitate easy transportation
National Government	1. Create and implement policies targeting export-led industrialization with a focus on agribusiness development 2. Emphasize the importance of private and public institution partnerships across all sectors of the economy 3. Review existing agribusiness policies and scale up to meet the current demands and implement appropriately 4. Champion the provision of essential infrastructures such as roads, railways, electricity and water supply, and telecommunication system to attract foreign investors 5. Provide funding through appropriate channels to local and state governments and set up targets 6. Improve trade policy, tariff system and other regulatory frameworks that target export trade 7. Invest in education and training, primary education and health

Government agencies	Possible role in new agricultural industry development
Provincial government	1. Build a strong relationship with all the relevant ministries, creating an information platform for fostering agribusiness development 2. Identify specific areas that need attention and strengthen the communication between the local and national government 3. Should play a more active role in land procurement/utilization by agribusiness industries through transparent and effective legislation
Regency/City government	1. Encourage active participation of the rural community in agribusiness development 2. Identify the role of local enterprises in agribusiness development 3. Prioritize needs and communicate through the leaders to ensure inclusive decision-making at the national level

CONCLUSIONS

1. Innovation is the key to economic growth and development. Learning from Australia's experience, Indonesia which has more potential natural resources should be able to improve its competitiveness by seriously encouraging, supporting and assisting research and innovation activities, from upstream to downstream. The need is to encourage public interest and assist in commercializing the outcomes.
2. Important factors that must be considered by the Indonesian Government in adopting Australian programs were: 1) Cultural background, 2) Crops and land availability, 3) Conflicts of interest.
3. Some strategies recommended for the Indonesian Government to develop the new agricultural industry through research and innovation activities were:
   - Put research and innovation especially in agricultural development as a national priority program to promote the public interest by providing incentives, grants and awards for innovative products, processes or services. This can also be done by incorporating them into the curriculum for elementary and secondary school.
   - To support the program, the existing research institutions whether those are incorporated in departments, research Ministries, or regional institutions, should improve coordination and cooperation. There should be an intensive communication amongst them in order to develop an integrated research and innovation system. In addition, public-funded institutions may

provide training and development of skills and the ability to conduct research.

- Provide guidance or information about factual topics and problems in society. This will lead to problem-solving research and innovations.
- The Government should provide assistance to commercialize research and innovations outcomes, especially in the agricultural sector by establishing a 'bridge' program that links researchers and research users.

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