

# Developing agribusiness for meeting demand of quality foods during and post Covid-19 pandemic

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# Developing Agribusiness for Meeting Demand of Quality Foods During and Post Covid-19 Pandemic

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**Abstract.** Covid-19 Pandemic has negatively impacted several aspects the life of people and businesses. Agribusiness is no exception in receiving impact of the pandemic. For further sustainable development, agribusiness needs to redirect its activities to provide products in line with market demand. The objectives of this paper are to describe the current conditions of agribusiness implementation, and to prescribe what needs to be carried out by and in agribusiness for meeting products, particularly quality foods, that are currently and in futures demanded in people efforts to survive from the attack and sickness of Covid-19 and carry on the living of the people. Data for this study are obtained from secondary and primary sources, capitalizing available data from others and author own research and extension activities, especially in Lombok Island. The study concluded that the implementation of agribusiness system and its subsystems in Lombok Island has not been operating in its full potentials, and therefore some activities are recommended to be done to improve the conditions of the agribusiness itself, as well as to fill in the demand for quality foods for consumers, who are in the needs of protection and curing from diseases caused by Covid-19.

## INTRODUCTION

The pandemic of Covid-19 has devastated impact on several aspects of people life and then people businesses. There has been lots of sickness and deaths caused by the virus. Up until 14 September 2021 total accidents from corona virus was 4,651,266 deaths and 226,038,266 cases in the world, while the Indonesia's cases was 139,165 deaths and 4,170,088 cases [1]. The whole world is in pain, under which almost all resources in countries have been decreasing for handling the corona and its impact [see for example, 2]. Businesses have been severely down, losses have been nearly all places and all types of businesses [see for examples, 3, 4].

In addition to lock down, businesses were also collapsed for other but related reasons [3, 2, 4, 5]. These were included as lack of business workers and lack of consumers with sufficient income for buying products and services. The accumulated consequence of the pandemic is slowing down or even closing of businesses. Agricultural businesses have also been impacted negatively. Lack of workers and other agricultural inputs impeded the agricultural activities. This in turn causes agricultural production decreases, the products scarce, and the product prices increase high. The price increase follows price theory in which price of products and services will increase those products and services are less available while their demand are constant or increase [6, 7, 8]. People severe more now than before the pandemic, from the scarcity of needed foods [9].

In the business of agriculture has been traditional. It means that the practice of agriculture has been with planting the same crops from year to year, such as happened in agricultural production of North Lombok [10, 11, 12, 13, 14]. These should be changed to adapt to new conditions.

In relation to corona pandemic, people need crops (foods) that protect the people and cure the sickness. The supply of foods (crops) needs to be matched up with its current and future demand. This is the way to bring the businesses competitive and sustainable as they have more demand of products from consumers, who are willing to pay for the right products [15, 16, 17]. Furthermore, consumers require foods of high quality. Quality foods are expected to have better impact on healthiness of the people, some people called this as food of recommended and good, or Halal and Tayyiban [18, 19, 20]. Demand for products or services increases in line with the increase of quality of products or services [21, 22, 7, 23].

The objectives of this paper are to describe the current conditions of agribusiness implementation, and to prescribe what needs to be carried out by and in agribusiness for meeting products, particularly quality foods, that are currently and in futures demanded in people efforts to survive from the attack and sickness of Covid-19 and carry on the living of the people. This study is expected to bring benefits as to recommending crops for health as well crops of high economic value.

## MATERIAL AND METHODS

This study takes place in dryland areas of North Lombok Regency, Indonesia. The case of North Lombok is taken for the description of current system of agribusiness, from which synthesis is made with the needs for crops (foods) during and post corona pandemic, as well as the needs for the agricultural producers to benefit from the newly rise demand for foods. The study in essence applied qualitative method [24, 25, 26, 27], in particular in comparing the current practices of agribusiness in the area with the current and future needs of foods (crops), and then coming up with the prescription or recommendation on what agricultural producers should be farming.

Data for this study were obtained from secondary sources, such as literatures and research reports. Data for the description of current agribusiness practice in the area were taken from authors own research reports on dryland areas of North Lombok [28] and from on agritourism development area in North Lombok [29]. Authors describe these two research reports briefly here on sampling of farmer respondents. The number of respondents on farming system in dryland areas of North Lombok, consisted of 30 dryland rice farmers and 30 corn farmers, with any accompanying crops were also recorded in the interviews [28]. Data from agritourism development areas were recorded from 17 farmers involved in the development of the agritourism areas [29]. These data were completed with data from literatures, with special focus on types of crops against corona and types of crops that are potential to be developed in dryland areas of North Lombok.

Data were analyzed in descriptively refs, making use cross tables, in adapting the current agribusiness practices with the needs of crops (foods) for surviving against corona now and in the future. In particular, this is carried out by matching up the crops that have been grown successfully in the region with potential crops needed for self-guarding against corona, and the matching up was based on similar 'looks' of the crops. Results of analysis are reported in the next section.

## RESULT AND DISCUSSION

This section presents agro climate of North Lombok Regency, together with the description of farming system and agribusiness system applied the farmers in the regency. This followed by crops or foods that have potential to protecting people against coronavirus, and then they are recommended to be farmed. Final part of this section provides recommendations for what needs to be done as the follow up from the result of crop selection.

### Farming System in Dryland Areas of North Lombok

North Lombok is located in Northern parts of Lombok Island, surrounding by beaches in North and Mountains in the South. North Lombok districts are on 5 – 10 meter above sea level. North Lombok Regency has tropical climate with temperature minimum of 21°C in April and the maximum of 33°C in August. Rains starts normally in October and ends in May. An annual rainfall was about 1,300 mm and 100 days. Average humidity is about 80 %, average sunlight is about 75% [10]. These data inform kinds of crops that can be grown in the area and facilitate understandings for the current practices by farmers in the area.

Farming system adopted by farmers in dryland areas of North Lombok was reported in more details in Sjah et al. [28]. Authors briefly restated the farming system for readers of this paper. Farmers grow seasonal crops and perennial crops in the dryland areas of North Lombok. The list of seasonal crops grown in the rainy season, from the



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most to less number, showing the order of importance crops, are com, rice (of dryland type), peanut, long bean, chili, tomato, and cassava. Dominant reasons for growing crops identified as economic reasons, such as better income, and the farmers are behaving rational, that is, to gain most from their sacrifice [30, 31]. The growing system of the crops are in multiple cropping system, with some are grown with clear borders (specific farms) and some with unclear borders (mixed farms). The first two mentioned crops, i.e. corn and rice, were grown by portions of farmers without combination with other crops, a term called mono cropping system [32, 33], who also names the specific and mixed farms. The application of multiple cropping systems by farmers is a strategy for reducing risk in farming [30, 34, 35, 36], as in other businesses that do diversified businesses [15, 16, 37]. The risk in dryland farming sources mainly from lack of water. In whatever farming system of seasonal crops, there are generally perennial crops in the dykes and even some inside the paddocks. Therefore, the farming system in all actually becomes multiple cropping systems.

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Perennial crops in the multiple cropping systems are coconut, mango, custard apple, sapodilla, banana, papaya, and wood trees. These perennial crops are planted in separated distant. The regulated distant plantings are meant by farmers to provide spaces between the trees and the canopies as well as for growing the seasonal crops. While the perennial crops are grown and produce in whole year round or several years, the seasonal crops are in the rainy seasons, making use of the available water. Farmers generate income in longer period from the perennial crops than seasonal crops, albeit incomplete calculation between the two kinds of crops.

### 5 The Practice Agribusiness System in Dryland Areas of North Lombok

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There five subsystems in the systems of agribusiness, , i.e. the sub systems of agricultural input, farm, agroindustry, marketing, and supporting service [38, 39, 40]. All of these subsystems requires to be implemented in integrated way in order to have high positive impact [39, 40]. There should exist collaboration and connection among the sub systems. In other senses, this means that running agribusiness must be good as possible in in each of the five sub systems and in a whole system [41]. This paper aims to identify foods or crops that are suitable for defending against corona or even curing the sickness caused by it, both of already existed or will be newly introduced. The newly targeted crops need to be compared with crops that have already exited in the area, as the indication of their suitability with the conditions of the locations. Therefore, the focus of this agribusiness system will be on the subsystem of farm. However, the conditions or the current practices in their other sub systems of agribusiness will need to be identified too, and from this improvement can be recommended, for the purpose of producing quality foods or crops, in the other section.

The more detailed practices of agribusiness in the dryland of North Lombok can be seen in Zainuri et al. [29]. The weaknesses in the practices of agribusiness are briefly described here for each subsystem of agribusiness system. The weaknesses in the sub system of input are in the applications of seeds, organic fertilizers, and irrigation water. Some farmers apply non quality seeds, rather they used their own production of previous year or accessed from their neighbors. It is reported that quality seeds will produce better than non-quality seeds. There is lack of organic fertilizers. Water for irrigation is not applicable for most of the year around since the land relies on rainfalls. The farmers apply much chemical fertilizers. Organic fertilizers appear to give low short-term production, but good for long-term production as it maintains healthiness of soil [42, 43, 44]. Farms consisted of seasonal and perennial crops, as reported in the previous section. The weaknesses in the subsystem agroindustry are that there is mostly none of processing activity to the farm products. Almost all farm products are sold or consumed in fresh, therefore farmers do not get added value from their products. This is followed in the sub system of marketing by which farmers sell products on production locations or on farms, even some products are sold before harvest. It appears there exists information asymmetry in the marketing of farm product, putting farmers in low bargaining position to traders or buyers of the products. The final sub system of supporting appears to be good but can be intensified more than now, for example, in providing information on market and other technical aspects for farm products. As a whole system (the agribusiness system), there is a weak link amongst the subsystems of agribusiness. Examples include of planning production without a sufficient analysis of market for the products. In general farmers plant crops, then produce and sell to market, as oppose strategy for producing and marketing products initiated by market demand, as recommended by several literatures for better chance of success for businesses [see for instance 45, 46].

## **Crops for Protecting Against Corona and are Adaptable to North Lombok**

Until recently, cure for sickness by corona has not been discovered [47]. However, corona is a virus, and frequently called as coronavirus. It spreads now from human to human therefore a human needs to avoid contact with other humans [47]. Health protocols have been recommended, including washing hands with flowing water (or using sanitizer), maintaining distance with others (including avoiding gathering), and wearing masks. Some other recommendations are to have sufficient rest, sleep, sunlight contact, and physical exercises [48].

One of important recommendations for fighting against corona is by improving immunity of the people [49, 48]. It is even stated that immunity is the only sustainable way to survive from corona pandemic [50]. The people are required to be stronger than the corona virus, and leave the corona dies by itself in its periodical life cycle. Immunity of people can be improved, among others, by consuming certain foods [51, 52, 49, 48, 50]. There are numerous foods (crops) that are recommended to be consumed for fighting against corona (Table 1).

There are 28 kinds of foods (crops) identified as having potential to protect human against corona virus, through improving immunity of the human. These foods (crops) improve immunity as they contain vitamins, minerals, and the sorts of [51, 52, 49, 48, 50]. The list could be more than 28, as authors do not list foods or crops that are mentioned by literatures but 'unknown to' or 'not familiar by' authors. The unknown foods or crops are excluded for enabling comparison with the foods or crops from within the location of study (North Lombok). The literatures mentioned the foods or crops in specific naming, such as mostly listed in Table 1, while other mentioned them in more general, such as beans, grains, vegetables, fruits, and oranges. All of these general foods (crops) consisted of several types (varieties). They can possibly be called as in the same class, which are identified from their appearance. Also, possible that some of these foods or crops are meant to include some of the specific mentioning of the foods (crops) on the list (Table 1) or those mentioned by literatures but unknown to this paper authors. Therefore, some of these foods (crops) are possibly overlapped amongst the list but also compensate the foods or crops excluded from the list.

### **Recommended Crops for Agriculture of North Lombok**

All the 28 foods (crops) that are recommended for protecting people from corona through the immune body system are recommended to be grown in North Lombok. All these recommended crops are adaptable to the farming conditions of the crops. This is friendly indicated by having already grown successfully in the region, either identified from the survey of authors [29, 28], or from the government of North Lombok [10]. Amongst the recommended foods (crops), two crops were not currently grown in North Lombok, i.e., sweet corn and garlic. Authors have opinion that these two crops can grow in the locations since they have similarity with other crops that are already existed in the region. Sweet corn is similar to corn (possibly they are in the same class). Similarly, garlic is similar with onion and shallot, which have successfully grown in North Lombok.

In addition to suitability of the crops to the agronomic requirements in region and the crop potential to fighting coronavirus, the recommendation to grow the crop crops is also grounded on economic value of the crops that they can generate income for the crop growers, proven from farmers' willingness to grow the crops. Farmers in North Lombok are rational and motivated by the incentives gains from their activities, as also the case for other community groups of business activities [53, 54, 55].

Some of already existed crops in North Lombok are not included in the list of recommended grown crops. These included chilies, custard apple, sapodilla, galanga, durian, jackfruit, grape, mangosteen, salaca, coffee, and cocoa. However, farmers can still grow them since these crops have their own market with high economic value. Farmers may also have their our reasons for growing crops, either economic or non-economic one [30, 34]. Amongst these non-recommended crops, durian, coffee, and cocoa, are the main crops in North Lombok [10].

To summarize, the recommended crops to be grown in North Lombok for the purpose of self-guarding against coronavirus and for the purpose of increasing farmer income in this pandemic times and then after are: corn, sweet corn, rice, red rice, peanut, beans (several types), tomato, cassava, coconut, mango, banana, papaya, shallot, pepper, water spinach, cucumber, cabbage, melons, eggplant, ginger, turmeric, oranges (several types), avocado, guava, garlic, grains (several types), vegetables (several types), and fruits (several types).

**TABLE 1.** Recommended crops for improving human immunity against corona and adaptable to North Lombok

Kind of Crop	Existed in North Lombok	Has Potential Against Corona	Recommended to be Grown
Corn	V [10, 28]	V [50,51]	V
Sweet corn		V [48,49]	V
Rice	V [10,28]	V [49]	V
Red rice		V [48, 49,50]	V
Peanut	V [10,28]	V [48]	V
Beans (several types)	V [10,28]	V [48,49,51]	V
Chili	V [10,28]		
Tomato	V [10,28]	V [49]	V
Cassava	V [10,28]	V [50,51]	V
Coconut	V [10,28]	V [50]	V
Mango	V [10,29]	V [49]	V
Custard apple	V [29]		
Sapodilla	V [29]		
Banana	V [10,29]	V [50]	V
Papaya	V [10,29]	V [49]	V
Shallot	V [10]	V [50]	V
Pepper	V [10]	V [49,50]	V
Water spinach	V [10]	V [48]	V
Cucumber	V [10]	V [49]	V
Cabbage	V [10]	V [49]	V
Melons	V [10]	V [49]	V
Egg plant	V [10]	V [49]	V
Ginger	V [10]	V [50,52]	V
Galanga	V [10]		
Tumeric	V [10]	V [50,52]	V
Durian	V [10]		
Oranges (several types)	V [10]	V [48,49,50,52]	V
Jack fruit	V [10]		
Avocado	V [10]	V [48,49,50]	V
Grape	V [10]		
Guava	V [10]	V [50]	V
Mangosteen	V [10]		
Salaca	V [10]		
Coffee	V [10]		
Cocoa	V [10]		
Garlic		V [50]	V
Grains (several types)	V [10]	V [48]	V
Vegetables (several types)	V [10]	V [48,51]	V
Fruits (several types)	V [10]	V [49,51]	V
Total	36	28	28

Note: V=Yes

### Required Actions to Follow-up from Crop Selection

Following up from the crop selection, additional actions need to be brought up, in order to get the most from the selected crops. These include actions to produce quality foods (from the crops) and to build capacity for the farmers and other related stakeholders.

Producing quality foods needs to implement agribusiness approach with all the five subsystems of the agribusiness system. It is also meant that all of the weaknesses identified in the current practice of agribusiness in North Lombok, are required to be overcome and the practice be improved. Brief recommendations for running the



businesses of the selected crops in North Lombok include improving input application, farming activities, processing, marketing, and support for the whole of the other four sub systems. Input application needs to improve in the uses of organic fertilizers and high-quality seeds. Improving farming activities is the areas of scheduling of farming by type, location, and amount. In particular to scheduling of farming or production is by application growth regulators (hormones), such as one that has been successfully applied for mango production in out of normal season [56]. Food processing is required to be done, to enable additional value for the products [57, 38, 58, 59]. This is followed by improving (intensifying and expanding) marketing for higher utility products in terms of form, time, location, and possession [60, 61, 62]. Finally, in the support sub system there needs to connect among the subsystem of agribusiness, particularly to match up the needs at the downstream to the provisions in the upstream. In this sense, the supporting system should enable the flows information and funding, in addition to the flow of products. In this way, the overall operation of agribusiness becomes more efficient, effective and generates more benefits for all involved parties (actors), as prescribed in supply chain principles [63, 64, 65, 66].

Capacity of farmer producers, other related stakeholders also need improvement. Each of recommended improvement in the sub systems of agribusiness requires improvement in the capacity of farmers and others related stakeholders. Farmers need to do better than now in input application and farming activities. Farmers together with processors of foods need to have capacity of processing and then marketing of the products. Farmers, processors, and traders of products need to be equipped with more capacity than currently, to enable managing and expanding markets for better value of products to other locations and times. All these knowledge and skills are required to be transferred to related stakeholders through capacity building or extension activities. It is expected that the government of North Lombok or other levels to get involved for helping their people and advancing the region.

## CONCLUSION

There are several selected crops to be grown in North Lombok for the purpose of self-guarding against coronavirus and for the purpose of increasing farmer income in these pandemic times and then after. These crops suit the condition of North Lombok and produced foods that are considered to have potential to improve immunity of the people and therefore protect people from coronavirus attacks in the corona times and afterwards. These crops then will have increase demand in this time and in future, hence will have good market, leading to high income for agricultural producers. The actions to follow-up from this crop selection, include practicing better farming than now, making connection activities in agribusiness approach by integrating the agribusiness sub system from up to down streams. Capacities of farmer producers and other related stakeholders need improvement.

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