Institution role in enhances dry land rice production

Y Pujiharti1*, J Barus2, Endriani2 and E Novitasari2
1Center for Research and Development of Food Crops, Bogor, Indonesia.
2Lampung Assessment Institute for Agriculture Technology, Bandar Lampung, Indonesia.

E-mail: *yulia.r2160@gmail.com

Abstract. The research objectives are to describe economic social condition of dry land rice farmer and role of institutions related to dry land rice farming. This research was conducted in a dry land of Bandar Sribhawono Subdistrict, East Lampung Regency, Lampung Province-Indonesia. The location selection was done purposive random sampling with the assumption that the location has ever been implemented "Largo Super" Program. Respondents were random sampling as many as 68 respondents who came from 4 villages. Data collection usage the method of direct interviews with selected farmers use a questionnaire. Secondary data were obtained from the Central Bureau of Statistics (BPS) of East Lampung Regency and Lampung Province. The result indicates that the institution's role related to dry land rice farm are farmer group and extension institute. Role of farmers group that is felt by a member of the farmer group namely to provide production means. That role can be more optimized to engage youth farmers to act as extensions. The extensions role is very difficult to increase because an extensions area that is their responsibility cover 2-3 villages. In 2018, the income of the dry land rice farm is below the poverty line.

1. Introduction
Dryland is an agro-ecosystem of land resources that have great potential for the development of agriculture, both food crops, horticulture (vegetables and fruits), as well as perennial / plantation crops. Dryland is a land that has never been flooded and can use for agricultural businesses with water sources from rainwater [1]. Food crops that have planted on dryland are maize, cassava, dry land rice, beans, and so on. So that dry land rice can grow optimally in acid soil and provide maximum results, it requires ameliorant input in the form of lime, organic matter, and NPK inorganic fertilizer. Dryland rice cultivation is recommended at slopes below 15% and requires the action of adequate conservation [2].

In addition to the above technology, increasing production can also be done by enhancement the role of institutions. The process of transformation from traditional agriculture to resilient agriculture requires counselling so that agricultural extension plays a significant role in increasing agricultural production in Indonesia. The extension can change the attitudes, behaviour, knowledge, and skills of farmers and their families. The implementation of the agriculture extension will run well if there is a common perception between extension, farmers, and stakeholders [3]. The magnitude of the role of the extension in agricultural development in general, especially in increasing yield of shows the existence of extensions role is needed. But the institution development of extension has always...
experienced ups and downs dynamically. At present, the extension institute is re-integrated into the technical institute.

Besides the extension agency, farmer institutions also need joint attention. The farmer groups should place as a means for realizing the hopes, desires, and fulfilment of the farmer's needs [4]. The farmer organization expected can give a contribution real and effective in increasing the independence and dignity of farmers. According to [5], the performance of farmer groups is a barometer of the success of channelling technological innovation from research institutions to farmers. If rice production technology has taught in extension can be applied by farmers, rice production will increase. If the extension factor increases by 1%, it will increase rice farming production by 0.5% [3].

Based on the description, it was necessary to study the socio-economic conditions of the people on whether the farmer institutional had played an active role. This problem is not many researched yet, so this study aims to describe the economic-social condition of a dry land rice farmer and institutions' role related to dry land rice farming. In the end, involved institutions' role in implement technology innovation can be more optimized so the rice production can increase.

2. Methods

2.1. Methods
The research was carried out in Bandar Sribhawono Subdistrict, East Lampung Regency, Lampung Province-Indonesia. The location was selected purposive random sampling with the assumption this has ever been implemented the super gogo array (furthe called “Largo Super”) Program. Respondents were determined as sample random as many as 68 respondents consisting of farmers who came from 4 villages (Sripendowo, Srimenanti, Bandar Agung, and Sadar Sriwijaya). Respondents from each village ranged from 15-18 respondents, consisted of farmers that ever and never participated in Largo Super program. Data collection using the method of direct interviews with selected farmers use a questionnaire that had prepared. Data collected were age, family size, education, the reason come in farmer group members, and the reason an extension is needed, fertilizers, pesticides, fertilizer prices, pesticide prices, and labour costs, production, rice prices. Secondary data were obtained from East Lampung Regency and Lampung Province of the Central Bureau of Statistics (BPS).

2.2. Data analysis
The data obtained then is be tabulated and analysed descriptively and analysis of financially for both Largo Super and Non-Largo Super Innovation. The Financial analysis involved revenue, cost, R/C, an income of farmer (profits). Farmer profit is the difference between total revenue and total cost [6,7], that calculated by using the equation:

\[ \Pi = TR - TC \]  \hspace{1cm} (1)

\[ TR = Y \cdot Py \]  \hspace{1cm} (2)

\[ TC = \sum Xi \cdot Pi \]  \hspace{1cm} (3)

Where \( \Pi \) is profit (income) both of Largo super or Non-Largo Super rice farming, \( TR \) is total revenue of rice farming of Largo Super or Non-Largo Super, and \( TC \) is total cost of rice farming of Largo Super or Non-Largo Super. \( Y \) is yield of rice of Largo Super or Non-Largo Super, \( Py \) is price of rice, \( Xi \) is using factor i, \( Pi \) is price of factor i.

The ratio of revenue and cost used to know the efficiency level of rice farming of Largo Super. If \( R/C \) was > 1, so rice farming of Largo Super can be developed [8]. If \( R/C \) was < 1, so rice farming of Largo Super was not developing, and if \( R/C = 1 \), so the farming activity achieves up to breaks even point. Furthermore, the income of dry land rice farmers will compare with the wages/salaries of informal workers and the poverty line in East Lampung Regency.
3. Results and discussion

3.1. Characteristic of respondents

The survey results in 4 villages showed that the farmers' age was between 24 - 67 years old, with an average age of 47.45 years for farmers who have ever participated in the Largo Super Innovation Program, and 44.36 for has never participated in the Largo Super Innovations Program (Table 1). It shows that there are some respondents/farmers who are no longer productive. According to [9], the labour of active age is 14 - 64 years. At this age usually have high work morale so they can develop their farming. The result indicates that the institution's role related to upland rice farm are farmer group and extension institute. The Roles of the farmers' group that is felt by a member to provide production means. That role can be more optimized to engage youth farmers to act as extensions. The extensions role has very difficult to increase because an extensions area that is their responsibility covers 2-3 villages. The youth farmer in each group is 7% – 13%. In 2018, the income of the upland rice farm is below the poverty line.

Table 1. Farmer characteristic in Sribhawono Sub District, East Lampung Regency, on 2019

| Have ever participated in the Largo Super Innovations Program | Land (ha) | Has never been participated in the Largo Super Innovations Program |
|-------------------------------------------------------------|-----------|---------------------------------------------------------------|
| Age (years) | Education (years) | Family size (Person) | Own | Rent |
| Average     | 47.45       | 9.34             | 3.93 | 0.73 | 0.13 |
| St. Dev     | 9.84        | 2.66             | 1.03 | 0.78 | 0.26 |
| Maximum     | 67.00       | 16.00            | 5.00 | 4.00 | 1.00 |
| Minimum     | 24.00       | 6.00             | 1.00 | 0.00 | 0.00 |
| Age (years) | Education (years) | Family size (Person) | Own | Rent |
| Average     | 44.36       | 9.10             | 3.67 | 0.76 | 0.03 |
| St. Dev     | 10.08       | 3.33             | 0.95 | 0.76 | 0.11 |
| Maximum     | 69.00       | 16.00            | 6.00 | 5.00 | 0.50 |
| Minimum     | 2400        | 0.00             | 1.00 | 0.00 | 0.00 |

When grouped into youth category, namely 16-30 years (Law 40 Chapter 1 article 1 clause 1 About the Youth), only is 6.67% and 13.16% youth farmer respectively for farmers who have ever and never participated in the Largo Super innovation program. Many farmers aged were 46 - 60 years (46.67%) and 31 - 45 years (42.11%) sequent for farmers who have ever and never been participated in the Largo Super Innovation Program (Table 2).

The farmer education is a most junior high school (9 years on average), both for farmers who have ever and never participated in the Largo Super Innovation Program, besides there are also those with higher education / S1 (Table 1).

The average number of family members is 3.93 and 3.67 sequent for the group who have ever and never participated in the Largo Super Innovation Program. Many family members' can be used as an encouragement to work for sufficient the needs of their family. The farmer family member in the sribhawono sub-district is greater than the family size in the Lampung Timur Regency of value 3.66 [10]. The more family members, the greater the necessities of family life. The condition encourages farmers more active in farming activities for increasing income, and the welfare of farmers and all family members can be fulfilled [11].
Table 2. The age group of the farmer in the survey location

| The age group | Have Ever participated in the Largo Super Innovation Program (%) | Has never been participated in the Largo Super Innovation Program (%) | The naming |
|---------------|---------------------------------------------------------------|-------------------------------------------------|------------|
| <31           | 6.67                                                          | 13.16                                           | Farmer youth |
| 31-45         | 40.00                                                         | 42.11                                           | Old pra farmer |
| 46-60         | 46.67                                                         | 39.47                                           | Old farmer |
| >60           | 6.67                                                          | 5.26                                            | Elderly farmer |

The farmers who have ever and never been participated in the Innovations of Largo Super program are 86%, 95.24% respectively of farmers are the landowners and farm on their land, with average land ownership are each 0.73 ha and 0.76 ha.

3.2. Financial analysis

The dry land rice productivity of farmers who have ever and never participated in the Largo Super Innovation Program is as much as 3603 kg / ha, and 4671 kg / ha GKP (Harvested Dry Grain) respectively. The high yield obtained by farmers who have never participated in the Largo Super Innovation Program because of the fertilizer used higher. Besides, in their location, the level of birds attacked was very low. Meanwhile, farmers' rice plants that have ever participated in the Largo Super Innovation Program are attacked by bird pests that are difficult to control, that the population reaches thousands.

The results of the financial analysis of dry land rice farming (Table 3) show that dry land rice farming that was conducted the two groups of farmers (have ever and have never participated in the Largo Super program) are financially feasible. It's indicated by the R / C > 1, which is 1.14, and 1.26 respectively. The dry land rice farming revenue for farmers who have never participated in the Largo Super program is greater than farmers who have ever participated in the Largo Super program.

Revenue for farmers who have ever and never been participated in the Largo Super program are IDR 14,624,127 ha / season, and IDR 18,032,300 / ha / season respectively. The revenue of farmers who have never been participated in the Largo Super program is higher because selling price of rice high. The profit received farmers who have ever and never participated in the Largo Super program is each IDR 1,831,468 per season or IDR 457,867 per month and IDR 3,721,103 per season or IDR 9307,276 per month.

Table 3. The financial analysis of dry land rice farming

| The description                      | Farmers have ever participated in the Innovation Program of Largo Super | Farmers have never been participated in the Largo Super Innovation Program |
|--------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|
| Total of production cost (IDR / ha)  | 12,792,658                                                           | 14,311,197                                                              |
| Production (kg / ha)                 | 3,603                                                                | 4,268                                                                   |
| Rice price (IDR / kg)                | 4,059                                                                | 4,225                                                                   |
| Revenue (IDR / ha)                   | 14,624,127                                                           | 18,032,300                                                              |
| Net Profit (IDR / ha)                | 1,831,468                                                            | 3,721,103                                                               |
| R / C ratio                          | 1.14                                                                 | 1.26                                                                    |

Compared with the average salary of informal workers in agriculture, in East Lampung Regency in 2018 (Table 4), both the income of farmers who have ever and never been participated in the Largo Super Innovation Program is lower than the salary of informal workers. By family size are each 3.93, and 3.67, thus income per capita for farmers who have ever and never participated in the Largo Super
Innovation are 116,506 IDR / capita / month, and 253,481 IDR/capita/month. That indicates that both farmers have ever and never participated in the Largo Super Innovation Program are in the poverty family category. Although this condition does not occur every season, this can be one of the reasons for the lack of interest in the youth generation to work in agriculture, especially as farmers. This matter supported by research [12] explained that the main factor causes the youth generation are not interested in occupation in agriculture that is the income factor. To be able to live in prosperity, dry land rice farmers must have other sources of income that can come from labour, farm other commodities, livestock, or trading businesses. For that role of stakeholders are needed to guide the farmer together so the farmer's income can enhance.

Table 4. Dryland rice farmer income

| No | Variable | Ever participated in the Largo Super Innovation Program Value (IDR / month) | Has never been taken part in the Largo Super Innovation Program Value (IDR / month) |
|----|----------|-------------------------------------------------|-------------------------------------------------------------------|
| 1. | Farmer income (IDR / month) | 457,867 | 930,276 |
| 2. | Average Wage/Salary of Informal Employee (IDR / month) in 2018 | 974,321 | 974,321 |
| 3. | Poverty Line (IDR / capita / month) in 2018 | 352,173 | 352,173 |

3.3. Role of farmers group
In the surveyed villages, there are farmer groups and farmer group associations (Gapoktan) in each village. All respondents are members of farmer groups, and each farmer has a different reason for being a member of a farmer group (Table 5). They need to become members of farmer groups because through the groups' easier to obtain production means, agricultural information such as new technologies to increase yields, prices, and government programs. These two reasons are the most reasons given by respondents of 30.12% and 34.94%.

Table 5. The reason for farmers to be become a member of farmer group

| Reason | Ever participated Innovations of Largo Super (%) | Has never been participated Innovations of Largo Super (%) | The number (%) |
|--------|-------------------------------------------------|-------------------------------------------------|----------------|
| Easy to get production means | 12.05 | 18.07 | 30.12 |
| Easy getting agricultural information | 15.66 | 19.28 | 34.94 |
| Exchange experiences and add insights | 7.23 | 6.02 | 13.25 |
| Getting guidance and government assistance | 4.82 | 0.00 | 4.82 |
| Improves harmony | 3.61 | 4.82 | 8.43 |
| Easier managing | 1.20 | 0.00 | 1.20 |
| Easy to coordination | 1.20 | 1.20 | 2.41 |
| Go along with friends | 1.20 | 0.00 | 1.20 |
| To increase of agriculture yields | 0.00 | 2.41 | 2.41 |
| Giving no reason | 0.00 | 1.20 | 1.20 |

The role of farmer groups in providing production facilities for members' needs has been feeling by group members. That knew from matter was reviewed in the answers of all respondents (100%) who said the group played an active role in the procurement of production inputs. While for purchasing production yield, all respondents (100%) said the group did not play an active role. The farmers sell
rice to local traders. That role of farmer groups can be more optimized through to engage youth farmers to act as extensions. So that government should be motivating and assistance them to become farmer extensions. The duty of farmer extensions is helping, assisting farmers, and conveying technology to the farmer.

In carrying out its function, farmers institutional, in collaboration with extensions. The extension plays a role in conveying technology, especially new technology toward farmers, the ends their agricultural yields can increase. According to [3], the extension plays a role as a connector that delivers innovations of research results to farmers so that farming can be more advanced. In addition to, the extension plays a role in delivery the aspirations of farmers to researchers and the government (stakeholders). Based on this description, it can be reducing those farmer institutions, namely the farmer group, and union of farmer groups, have an important role in increasing agricultural yields.

### 3.4. Role of extension institutions

Apart from farmer institutions, another institution that also plays a role in increasing production is extension institutions. The part of this extension institution is very expected by farmers because, with extension, they can increase knowledge about agriculture, especially new technology, and farmers who gave this statement of 46.48%. Another reason given (26.76%) was through the extension of agricultural production can be enhanced (Table 6).

#### Table 6. The farmers reasons need extension

| Statement                                | Ever participated Innovations of Largo Super (%) | Has never been participated Innovations of Largo Super (%) | The number (%) |
|------------------------------------------|-----------------------------------------------|----------------------------------------------------------|----------------|
| Add knowledge about agriculture          | 18.31                                         | 28.17                                                   | 46.48          |
| Enhancement and quality improvement of plant yield | 9.86                                           | 16.90                                                   | 26.76          |
| Adding experience and insights           | 4.23                                          | 7.04                                                    | 11.27          |
| Helping overcome obstacle                | 7.04                                          | 0                                                       | 7.04           |
| The farmer needs guidance                | 2.82                                          | 0                                                       | 2.82           |
| Helping farmer to get government assistance | 1.41                                         | 0                                                       | 1.41           |
| To encourage farmer                      | 1.41                                          | 0                                                       | 1.41           |
| Capability of farmer still limited        | 1.41                                          | 0                                                       | 1.41           |
| Giving no reason                         | 0                                             | 1.41                                                    | 1.41           |

The farmers very need extensions, but the number of extensions workers in the Sribhawono Sub District is limited. This problem can be overcome by enhancing the capacity of the group by including youth farmers as instructors, which is called farmer-to-farmer extensions. Youth farmer that chosen has technic skill.

New knowledge obtained through by training, group meeting, and plot demonstration. In one planting season, group members can participate in coaching 1-3 times. Through training, farmers' knowledge in farming increases [14]. Specific to dryland rice training at the survey location, it is not all respondents received dryland rice cultivation training. Respondents who received training on dryland rice were 86% of the number of respondents. Respondents who plant dryland rice have attended dryland rice cultivation training (planting, and controlling pests and diseases) 1-3 times in one growing season.

The role of extension is felt by farmers to be very important because apart from conveying technology to farmers, extensions assist and helping farmers in compiling the Definitive of Farmers
Group Needs Plan (RDKK). Production means that is provided by farmer groups to include inorganic fertilizers, seeds, and pesticides.

4. Conclusions
There are two farmers' institutions in each village in Sribhawono Sub District, namely farmer groups and farmer group Associations. Role of farmers group that is felt by a member of the farmer group, namely to provide production means. That role can be more optimized to engage youth farmers to act as extensions. Another institution that the duty of an enhances yield plant is the Extension institution. The extensions capacity is very hard to increase because an extensions area that is their responsibility cover 2-3 villages.

Farmers are still dominancy by an old farmer with a junior high school level (9 years). The average family size still covered is 3 - 4 people. The income of dry land rice farmers in 2018 is below the poverty line.

References
[1] Pujiharti Y 2007 Model pengelolaan lahan kering berkelanjutan pada sistem agribisnis tanaman pangan [Sustainable dry land management model on food crops agribusiness system] [doctoral dissertation] (Bogor, Indonesia: Institut Pertanian Bogor)
[2] ICRR [Indonesia Centre of Rice Research] 2016 Pengelolaan lahan kering secara intensif dan bijaksana [Intensive and wise management of dry land] retrieved from http://bbpadi.litbang.pertanian.go.id/index.php/info-berita/berita/pengelolaan-lahan-kering-sekara-intensif-dan-bijaksana.
[3] Sundari, Abdul H A Y and Nurliza 2015 Peran penyuluh pertanian terhadap peningkatan produksi usahatani di Kabupaten Pontianak [The role of agricultural extension agents in increasing farm production in Pontianak Regency] Jurnal Social Economic of Agriculture 4 1 April 2015 pp 26-31
[4] Anantanyu S 2011 Kelembagaan Petani: Peran dan strategi pengembangan kapasitasnya [Farmer Institution: Role and capacity building strategy] SEPA 7(2) pp 102-9.
[5] Nuryanti S and Swastika D K S 2011 Peran kelompok tani dalam penerapan teknologi pertanian [Role of farmers’ groups in agricultural technology adoption] Forum Penelitian Agro Ekonomi 29(2) pp 115-128.
[6] Soekartawi 1999 Agribisnis, teori dan aplikasinya [Agribusiness, its theory and application] 1th Ed 5th print (Jakarta, Indonesia: PT Raja Grafindo Persada)
[7] Girei A A, I S Usman and E G Onuk 2016 Profitability investigation of rice production in fufore local government area of Adamawa State Nigeria European Journal of Academic Essays 3 3 pp 137-140
[8] Hanafie R 2010 Pengantar Ekonomi Pertanian [Agricultural Economics] (Yogyakarta, Indonesia: Andi Offset)
[9] Daniel G H 1939 Labour Migration and Age-Composition The Sociological Review 31 3 281-308
[10] Badan Pusat Statistik Lampung Timur [Statistics of Lampung Timur Regency] 2019 Kabupaten Lampung Timur dalam Angka 2019 [Lampung Timur Regency in Figures 2019] (Sukadana, Indonesia: CV Jaya Wijaya) p 367
[11] Hermanto 1996 Ilmu Usahatani [farming Science] (Jakarta, Indonesia: PT Swadaya)
[12] Arvianti E Y, Asnah and A Prasetyo 2015 Minat pemuda tani terhadap transformasi sektor pertanian di Kabupaten Ponorogo [Youth farmer interest in transformation agricultural sector in Ponorogo Regency] Buana Sains 15(2) p 181-8.
[13] Badan Pusat Statistik Provinsi Lampung [Statistics of Lampung Province] 2019 Provinsi Lampung dalam Angka 2019 [Lampung Province in Figures 2019] (Bandar Lampung, Indonesia: CV Jaya Wijaya) p 417
[14] Imran A N, Muannahia and Bibiana R W G 2019 Metode penyuluhan pertanian dalam rangka meningkatkan pengetahuan dan keterampilan petani (Studi kasus di Kecamatan Maros Baru
Kabupaten Maros) [Agricultural Extention Method for Improving Knowledge and Farmers Skills (Case Studi in New District Maros, District Maros)] AGRISEP 18 2 pp 289-304 DOI: 10.31186/jagrisep.18.2.289-304