

Assessment on the use and availability of rice certified seeds in Bone regency, South Sulawesi province

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Abstract. Use of certified seeds is necessary in rice farming system to ensure high production and productivity. In South Sulawesi, as one of the main center of Rice in Indonesia, increase in the regional harvest areas and land productivity was not followed by significant increase in rice productivity. Seeds policy implemented by the government not only covers the technology applied in the seeds production but also quality insurance, availability and its distribution system. Despite these efforts, use of certified seeds in the field by farmers are still limited, therefore a survey was conducted to study the use and availability of rice certified seeds in Bone regency. Farmer groups in 9 districts were sampled to obtained data concerned to the use and availability of rice seeds including type, planting season, cropping pattern and availability at planting. Results show that the use of certified seeds in Bone regency were relatively high, however level of seeds supply was low or delayed at time of planting. To overcome the problem of seed supply, most farmers used its own seeds from previous harvest. Some suggestions to resolve this condition are discussed.

1. Introduction

South Sulawesi is one of the largest rice production centers in eastern Indonesia. The availability of new superior rice varieties that have been released has been considerable, but rice seed breeding efforts to support seed availability are still very limited, especially in rice production centers. To overcome these problems, development activities through seed breeding these high yielding seeds is very necessary to support the availability of the superior varieties seeds.

Currently, rice productivity in South Sulawesi only reaches an average of 4.7 tons Ha⁻¹. However, from 2013-2015 the development of harvested area and land productivity for rice increased by 2% and 10.98% respectively [1]. There is a trend of increasing production every year, but the trend is not significant compared to the productivity capabilities of plants. One of the factors causing low productivity of rice in South Sulawesi is the inadequate application of farming technology (cultivation). In addition, there are social factors and land cultivation conditions that also become an obstacle in the effort to increase rice production.

To overcome these challenges, the government provides assistance in the form of production facilities, including subsidized rice seeds through the budget allocated by DIPA Directorate General of Food Crops, Provincial Work Unit, and some Regency / Municipal Work Unit in 2017. In line with the stabilization of food self-sufficiency program, the use of quality seeds is very important to note in increasing the production and productivity of food. This is because seed has a strategic role as a means of bringing new technology, in the form of excellence of varieties with various specifications of



excellence; high yield, pest resistance, early age to improve the crop index, the superiority of crop yield to suit the consumer's taste.

One of the factors causing the low level of availability of quality seeds is the level of awareness of farmers to use high quality seeds is still very low. In general, farmers only set aside part of the harvest to be used as seed for the next planting season. Hence, the seed used are not in guaranteed quality. This is because farmers cannot afford to buy seeds that are considered expensive and there is a decrease of farmers' trust in certified seed quality, where there is no match between the content of the labels and the reality in the field [2, 3].

Provision of quality seeds through seed revitalization program is expected to support the achievement of four successful agricultural development as has been proclaimed by the government. Germination program not only involves the application of technology in its propagation activities, but also includes quality assurance, availability and distribution system. According to Andri [4], the successful provision of quality seeds cannot be separated from the four seeding subsystems are: 1) research, breeding and release of varieties; 2) production and distribution; 3) quality control and seed certification; and 4) supporting facilities and infrastructure such as institutional and infrastructure.

Some problems in distributing quality seeds are availability, price, quality, and quantity of seed. The availability of quality seeds with sufficient quantities, timely, and easily obtained by farmers plays an important role in improving food productivity. The continued availability of superior seeds is inseparable from the role of seed breeders, resulting in continuous continuity between sustainable seed producers which are essential in the sequence of seed formation and development of a variety.

Therefore it is necessary to prepare a survey to see the fulfillment of seed needs at the farm level and accuracy of its availability.

2. Methodology

Research conducted was a survey study covering 9 districts in Bone Regency, South Sulawesi Province *i.e.* Barebbo, Amali, Lappariaja, Sibulue, Mare, Bengo, Ponre, Taneriatang, China, and Awangpone. Selection of the sub-district is based on the development of rice areas that represent the western, southern, northern and central regions Bone district. Data used in this study were primary and secondary data. Primary data were collected through interviews to farmers, extension workers, seed distributors, traders, farmer groups, seed producers / seed companies, and related Local Government Work Units (Bappeda, Dinas Pertanian and related agencies and stake holders) to the provision of superior seeds. Secondary data owned by districts as the study areas were also collected, such as the extent of rice cultivation, the need for superior rice seeds, the realization of the crops and the availability of seeds for each growing season. Data on use and availability of seeds were collected from farmers during Planting Season (PS) I and II of 2016 and PS I of 2017. Availability of superior seeds is assessed in terms of the types of superior seeds developed, planting time, planting patterns, availability of seeds at planting and seed sources.

Some indicators of this research include information obtained about the use of high yielding varieties of rice and the level of seed availability at planting in Bone District. The collected data is tabulated and analyzed using qualitative and quantitative descriptive analysis.

3. Results and discussion

3.1. Farm management

Astronomically Bone Regency lies in the position of 4°13' - 5°6' South Latitude and between 119°42' - 120°30' East Longitude. Its location that close to the equator makes the Regency Bone has tropical climate. Throughout 2014, air humidity ranges from 77 to 86% with air temperature of 24.4 °C - 27.6 °C [5].

The comparison of both farmer group status is dominated by non-breeder farmers (89.18%) (table 1) and only about 11.82% of the respondent farmers are breeder farmers. Table 1 shows that in conducting farming, most farmers in Bone District have a high dependence on external supply of seeds

due to the low number of farmers who have the authority to produce and distribute certified quality seeds.

Table 1. Respondent farmers status in Bone Regency

Farmer status	N	(%)
Breeder	33	11.82
Non-breeder	272	89.18
Total	305	100

Source: primary data, 2017

Based on interviews with breeders, the lack of breeder farmers in Bone Regency is based on the marketing constraints of the certified seed produced by seed farmers. Certified seed sales, particularly in Bone regency, compete with subsidized seeds supplied by the government through seed and fertilizer assistance programs. This causes farmers became reluctant to switch to breeder farming and rely only on the cheaper supply of seeds from the government.

From the information collected, it can be arranged several possible models of cropping patterns implemented by farmers in Bone regency. Cropping patterns applied by farmers varied based on the type of land cultivated especially for Rice, Corn and Soybean (figure 1). The number of possible variations of cropping pattern applied by sample farmers in the research area is strongly influenced by the type of land cultivated. The type of land is determined by soil characteristics and the availability of water sources. In general, the type of irrigated rice field has a dam facility that can accommodate rainwater so as to provide a source of water for planting up to the third planting season. However, there is a possibility that the amount of rainfall received in this area is reduced so that even irrigation facilities are available, the water flow is reduced and will affect the farmer's decision to cultivate the cultivation on this land. This may be true when there is prolonged drought.

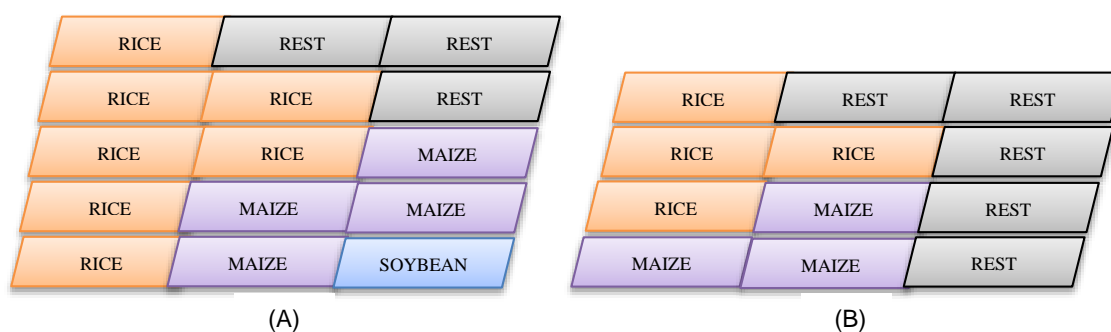


Figure 1. Planting pattern applied by farmer in Bone Regency on irrigated paddy (A) and rainfed (B)

The start of the planting time chosen by the sample farmers to plant the crops during the planting season I, II and III based on the type of land is presented in figure 2. Based on figure 2 it is known that for all types of land, April and May were the time where most of the initial planting for first and second crop were chosen by farmers. In irrigated rice fields farmers tend to plant their land for the first planting season in January, April and May. For the second crop or planting season II, farmers in irrigated rice fields planted in May and some planted their second crop in November. For the third plant was generally carried out between August to December. Implementation of planting time on irrigated land is not constrained by water availability so it is seen that the planting can be done throughout the year by farmers in Bone Regency.

In contrast to irrigated rice fields, rainfed lowland areas only depend on water sources for planting to the available rainfall. This leads to the determination of planting time on this land to refer to the pattern of rainy season and the beginning of the rainy season. Planting for the first planting season on rainfed lowland is only done in April and May. As for the second planting season, most farmers set

November as the beginning of the growing season. The third plant is very rarely done on this land, though it is planted in November.

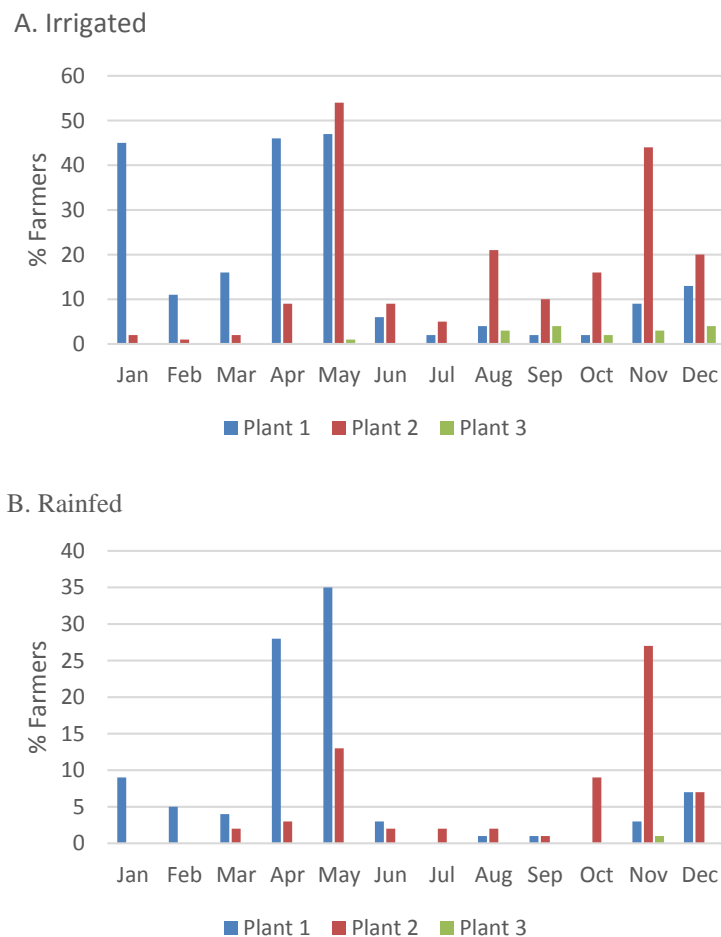


Figure 2. Planting time applied by respondent farmers in Bone Regency per planting season on irrigated paddy (A) and rainfed (B)

The determination of planting time and selection of plant species is applied by sample farmers in Bone district seems to be based on the pattern of climate spread, especially rainfall in this area. Bone district area is divided into two types of rain that is moonson rain type and local rain type. Moonson rain type has the highest rainfall when the Asian monsoon blowing winds are in January and February. This type covers the western part of Bone County. The second type has an inverted rain pattern criteria with monsoon pattern, ie the highest rainfall occurs in May - June. This type covers most of the Bone Regency.

In addition to these two areas, there are Bontocani and Libureng districts, partly following the western region and partly following the eastern region. The amount of monthly rainfall in the Bone Territory varies with an annual average of 201.25 mm. The highest rainfall occurred in June that is 638 mm with the number of rainy days as much as 23 days.

The implications of the information obtained from sample farmers related to planting time is the importance to regulate the supply of seeds for use by farmers. Thus, when the farmers plan planting in the first, second or third cropping season, it is expected that superior planting is available so as not to delay the best planting time where water is sufficient to support plant growth.

3.2. Use and availability of certified seeds

The average rate of seed per hectare per sample farmer per planting season is relatively high. The use of seed per hectare in the 2017 planting season reached 62.25 kg Ha^{-1} in the first planting season of 2017, while in the first and second plant season of 2016 equivalent to 40.62 kg Ha^{-1} , except in the third planting season in 2016 only 20.84 kg Ha^{-1} (figure 3).

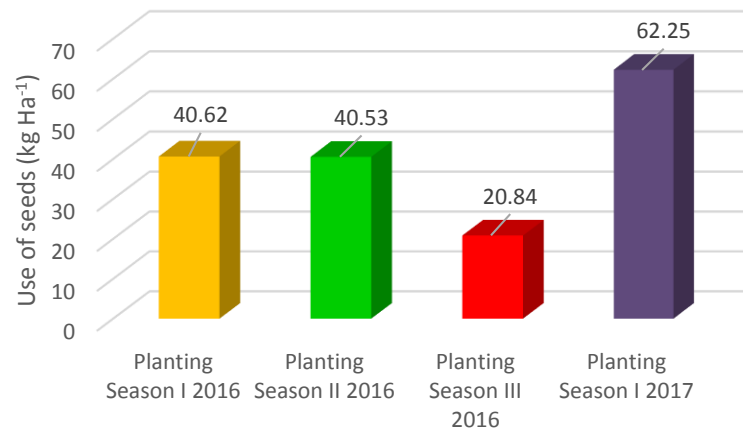


Figure 3. Average amount of rice seed used by respondent farmers in Bone Regency per hectare in planting season 2016 – 2017

The variation of seed use per hectare in the study area varies greatly with the varieties planted. Ciherang and Situ Bagendit varieties showed the highest seed used per hectare reached 57.54 kg Ha^{-1} and 50.50 kg Ha^{-1} respectively, and the lowest was Mekongga variety 37.05 kg Ha^{-1} (figure 4). Despite this, the use of seeds by sample farmers in Bone Regency was still very high compared to the recommended use of seeds for recommended varieties of only 25.00 kg Ha^{-1} .

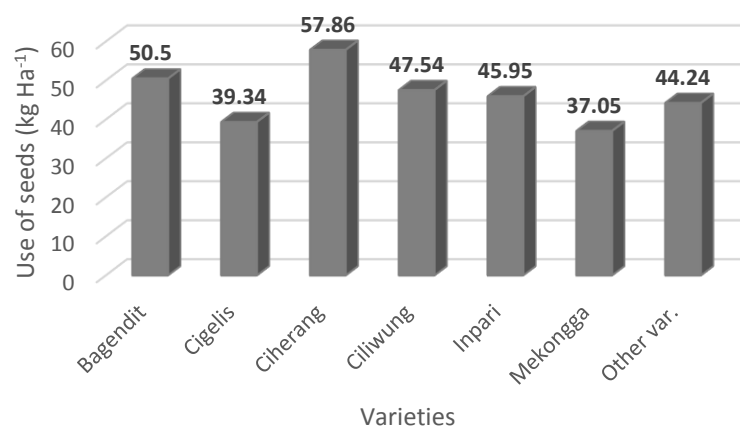


Figure 4. Average of seed use by sample farmers based on variety per hectare in Bone Regency

Rice seeds used by farmers in every growing season were generally open pollinated seeds both certified and non-certified, but dominated by certified seed. Farmers who used hybrid seeds are relatively fewer compared to the use of open pollinated seeds (figure 5).

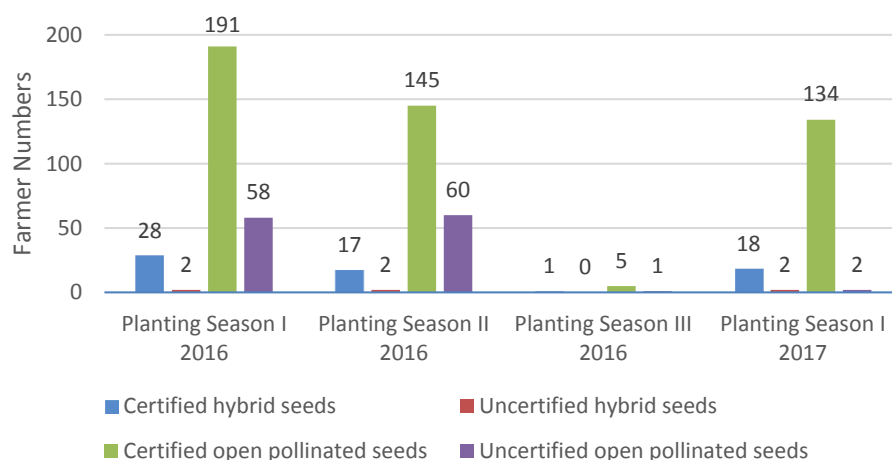


Figure 5. Type of seed used by sample farmers each planting season in 2016 – 2017

The level of superior seed availability at planting in Bone Regency per planting season varies considerably. From the results of the survey conducted on the sample farmers, most of the farmers stated that the superior seeds were available at each growing season (table 2). However, in the first planting season, there were approximately 26.76% of the sample farmers stated that they experienced a delay in obtaining superior seeds at planting and 17.6% of the sample farmers did not get superior seeds in the market. Similarly, during planting season II, although the seed availability was slightly increased, 59.48% of the respondent farmers stated that superior seeds were available, but there were still sample farmers who experienced delays and unavailability of superior seeds ie 26.13% and 14.41% of the sample farmers.

Table 2. Availability of superior varieties seed at planting per planting season in 2016 in Bone Regency.

Availability of superior variety seeds	Planting Season I		Planting Season II		Planting Season III	
	n	%	n	%	n	%
Available	158	55.63	132	59.46	14	73.68
Delayed	76	26.76	58	26.13	3	15.79
Unavailable	50	17.61	32	14.41	2	10.53

Source: primary data, 2017.

Table 3. Solution taken by sample farmers to overcome seed availability in Bone Regency.

How to overcome seed unavailability at planting	Number of farmers n	%
a. Use own seed	237	87.78
b. Delay planting/seeding	17	6.30
c. Look in other regencies	16	5.93

Source: primary data, 2017.

Delays in supply of superior seeds resulted in most sample farmers in the study area (87.78%) switched to use their own seeds saved from previous season harvesting (table 3). The problem that often arises in the use of farmer' own seed is the quality of seeds that do not match the superior seed quality. Quality of seeds below optimal will affect the vigor and seed germination rate at the beginning

of plant growth. In addition, seeds that are not qualified often produce plants that are susceptible to pest disease and low production.

Rice seeds used by the community of more than 60 percent come from the informal sector in the form of grain from some previous season's harvest results repeatedly [6]. This means that rice farmers have not responded to the superior rice seeds well. The problems faced in the acceleration of the use of improved varieties is the information system of the existence of the source seed is still weak so that the user knowledge about the superior variety is still limited, in addition the availability of superior varieties is also limited [7].

The use of the farmers' own seeds can reduce the productivity of rice crops. Implication of other production input and means become less effective in the absences of qualified seeds of high yielding variety [8]. The use of high yielding varieties, responsive to fertilization and tolerance to major pest attacks has been shown to increase productivity [9]. Specifically, the use of high quality seeds has an impact on good crop growth and high yields. The qualified seed requirements are: (1) pure and known varieties; (2) high growing power (at least 80%) and good vigour; (3) seeds are healthy, pithy, not wrinkled, harvested when the beans are fully ripened; (4) harvested from healthy plants, uninfected diseases (fungi, bacteria, and viruses); and (5) seeds not mixed with other seeds or grass seeds [10].

The existence of quality seeds is an absolute necessity in the crop, both in terms of quantity, quality, and timeliness. From the results of discussions of farmers and FGDs at the district level, several important issues that need to be discussed include building a local seed breeder system, utilization of locally produced seeds by existing local breeders and provision of trust by local government to increase the breeder's interest, establishing inter-regional and inter-season seeds business from several districts, and more specifically within the Bone regency region itself and providing access and production facilities to local breeders, and ensure the smooth market of seed production.

4. Conclusion

The high utilization of certified rice seeds in Bone Regency is high but availability of this superior rice seed is not sufficient when needed, especially in the second growing season in April-May. The quality of seeds obtained by farmers from government assistance is less than 40% and only 60% of good quality, although overall it is certified by blue label (spread seed).

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