Empowerment model of seed breeders in the supplying sustainable rice seeds in North Sumattra Province

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Abstract. Empowerment of rice seed breeders in North Sumattra Province aims to improve the ability of seed breeders to become independent and sustainable seed breeders. The study aims to determine the conditions of cultivation, postharvest, and marketing of rice seed breeder and to formulate appropriate models for empowering rice seed breeders. This type of research is descriptive qualitative analysed through research and development methods. The research was conducted in six rice production centre districts in North Sumatra. The results showed that the empowerment of breeder groups was not optimal. This condition is indicated by the dominance of one people in the breeder group as determinants of policy. In addition, most seed breeders are only willing and able to carry out breeding activities only up to the cultivation stage which produces Harvested Dry Grain, do not participate in post-harvest (drying, sorting and certification) and marketing activities. This is due to the lack of motivation of breeders, limited facilities, financial problems and the lack of knowledge and skills of farmers. Therefore, efforts are needed to empower seed breeders in a comprehensive manner, including cultivating motivation, training, partnership, and support from local governments and companies to facilitate breeders in marketing the seeds they produce.

1. Introduction
The use of certified superior seeds has an important role in increasing the productivity of rice sustainably. Provision of superior rice seeds requires a good seed supply system based on farmers' needs. A good seed supply system will create seeds with the right variety, quality, quantity, location, time and price (6 Right). In fact, the current seed supply system has not been able to meet the exact 6 at the farmer level. This condition is caused by problems in the provision of seeds starting from the availability of source seeds, the decreasing number of rice seed breeders, the high risk, the minimum profit level of the breeders, and the limited land for farming.

In order to achieve the 6 right, it is necessary to provide guidance to the breeders. Rice seed breeders have an important role in providing certified superior seeds. This coaching is carried out through an institutional process, namely coaching within a group of rice seed breeders. Training of breeder groups is an effort made so that each breeder has the same knowledge, skills, is able to analyse the situation at hand and is able to take appropriate action.

North Sumatra is one of the centres for rice production in Indonesia. North Sumatra is the province with the fifth largest production in Indonesia and the highest production on the island of Sumatra. Based on data from the Central Statistics Agency [1], rice production in North Sumatra reached 5,423,154 tons in 2018. This condition must be supported by a good seed supply system so that the
sustainability of rice production in North Sumatra as a production centre area remains sustainable. The role of seed breeders in providing certified superior variety seeds is very important, but there are problems faced such as motivation of breeders, bargaining position of breeders, area of production and human resources, infrastructure and facilities, marketing and capital. So that efforts are needed to empower rice seed breeders.

Empowerment of rice seed breeders is expected to be able to increase the potential of farmers, especially in overcoming the problems at hand. Empowerment of lowland rice seed breeders aims to increase the ability of farmers to produce seeds according to farmers' needs. The ability of seed breeders is expected to maintain the availability of rice seeds according to demand, time, and the amount needed by lowland rice farmers, including the availability of components that play a role in it, from farmer distributors to consumers in a sustainable manner. Based on these problems, the objectives of the study were to identify the conditions of cultivation management, post-harvest and marketing of seed breeders and determine the right model in empowering rice seed breeders in the context of providing sustainable rice seeds in North Sumatra Province.

2. Methods

2.1. Research location determination
The determination of location of the study was performed purposively, which by considering the objectives of the study. The research was carried out in six central rice production districts namely Deli Serdang, Langkat, Serdang Bedagai, Simalungun, Tapanuli Selatan and Mandailing Natal Regencies. The research location is determined based on the criteria of lowland rice production level and the potential area of harvested land in North Sumatra.

2.2. Data collection
The data categories used in this study are primary data and secondary data. Primary data were obtained from in-depth interviews using questionnaires and through forum group discussion. Secondary data were obtained from other relevant government agencies which can support the completeness of research data.

2.3. Data analysis
The data analysis method used is the research and development (R & D) method. There are three stages of research, namely the identification stage to produce a draft of the empowerment model, the model validation stage and the field test [2].

![Figure 1. Research steps.](image-url)
3. Results and discussion

3.1. Ability level of breeder in management of seed production
The breeder ability level in the cultivation process is in a good category. Farmers have mastered the cultivation techniques in this rice seed breeding so that they are able to produce seed productivity on average of 6-8 tonnes/ha. The level of ability of breeders in cultivation activities is influenced by: (1) farming experience, (2) farmers only focus on rice cultivation, (3) farmers have access to the latest information through good counselling and mentoring, and (4) availability of facilities and infrastructure production easier.

Meanwhile, the level of ability of breeders at the post-harvest stage, namely in the drying, sorting and certification stages, there are several problems that occur. These problems include:
- The breeders do not have strong motivation to participate in post-harvest, marketing and certification activities. Breeders tend to trust only one person on the grounds that they do not have the means, the need for immediate funds, the inability to dry, sort, and market.
- Most breeders do not have their own drying floors due to limited land and funds to finance them. Therefore, drying activities are often carried out by only one person who has a drying platform and sufficient capital in each village.
- Breeders tend to sell their crops in the form of Harvested Dry Grain (GKP), because they need funds from the sale immediately.
- Most breeders do not carry out sorting and certification activities. There is only one person, which is generally carried out by the group leader who carries out activities ranging from drying, sorting to certification.

Based on the research results, it appears that the empowerment of breeders in post-harvest activities has not been going well. Most rice seed breeders only carry out activities at the cultivation stage. The breeders only entrust one person to carry out post-harvest activities which are generally carried out by the head of the breeder group.

Likewise seen in marketing activities. Most breeders do not sell their products in the form of seeds but are still wet (GKP). The marketing channels that commonly occur in rice seed breeding are as follows:

**Figure 2.** Marketing channel in rice seed breeding.

3.2. Empowerment model of rice seed breeders in North Sumatra
Empowerment of breeders is an effort carried out with the aim of increasing the ability of breeders to produce superior seeds [3]. Improving the ability of breeders can be done through education and
training, mentoring, consolidation and coordination, opening access to information and marketing [4]. Empowerment of farmers means that all breeders have the power independently in the production and marketing system for quality rice seeds.

Strengthening the production and marketing system for quality rice seeds at the farmer level requires the development of an efficient production and marketing system including entrepreneurial skills among seed actors. This can be done by: (1) improving the flow of information on quality assurance of domestic varieties in the market; (2) the appropriate linkage of variety development and seed propagation chains with marketing to reduce mismatches in supply and demand; (3) strengthen the market and seed infrastructure facilities for adequate production, processing, packaging, labelling and branding [5].

Empowerment of breeders must also be institutionalized so that each breeder has the same ability. Based on the results of the research, it was found that the model of empowering seed breeders is empowerment in the sense of institutional breeders, namely breeder groups that multiply various parties from the head of the breeder group, members of the breeder group, extension agents, businessmen, academics to other institutions. As for several things that need to be done in increasing the empowerment of breeders are as follows:

- Increase the motivation of all seed breeders. Motivation and active participation of all seed breeders are expected to be in various breeding activities starting from cultivation, post-harvest and marketing so that there is no dependence on someone in the group.
- On-going training and mentoring.
- Involvement of the local government in absorbing the seeds of breeders with a good price and payment system.
- Do partnerships with other business sectors so that there is mutual need.

![Empowerment model of rice seed breeding group.](image)

**Figure 3.** Empowerment model of rice seed breeding group.
Meanwhile, from the institutional side of rice seed marketing, it is also very important to pay attention. So far, the cooperation with several state-owned companies is felt that there are still problems such as long payments, inappropriate production schedules and long distribution. In addition, seed breeders also have relatively difficulty in marketing seeds because the rice seeds that are provided for assistance come from rice seeds not from local breeders but from outside the region. one of the things that can increase seed production capacity in a sustainable manner is by developing commercial seed production units at the local level [6]. So according to [7] that the proximity of seed suppliers, time and price are important things to consider in seed marketing. Therefore, empowerment of seed institutions can be carried out through two events, namely:

1. The government, both Central and North Sumatra Province, through the APBN/APBD provides sustainable assistance in the form of funds to captive businesses for the operation of captive business activities as well as agricultural tools and machinery as well as post-harvest facilities and infrastructure that involve assistants to provide assistance to captive efforts which then seeds produced by farmers assisted by a companion institution are distributed to rice farmers in areas around the breeders or areas not far from the breeder locations.

2. The Central Government and Provincial Governments cooperate with companion agencies to assist breeders in producing seeds, which then the government buys the breeder products completely and distributes them as seed subsidies to rice farmers by means of rice farmers buying seeds at prices far below the market (There is a Seed Price Subsidy to rice farmers).

![Empowerment model of breeder seed marketing.](image)

**Figure 4.** Empowerment model of breeder seed marketing.

4. **Conclusions**

Breeding farmers have good production management skills, but marketing management only rests on certain parties. Not all farmers have the ability and willingness to carry out the post-harvest process and marketing. The model for institutional empowerment of marketing of breeder groups is carried out through financial assistance to breeders accompanied by companion agencies and through subsection of the price of seeds sold to rice farmers. Model of empowerment of seed breeder groups in the framework of guaranteeing the sustainability of breeder businesses can be developed through increasing the capacity of farmers, access to capital, access to marketing, participatory counselling, quality assurance, packaging and brands, as well as partnerships for marketing seeds with government
This increased empowerment can be achieved through empowerment efforts that are carried out in a sustainable and consistent manner.

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