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Optimizing Maize Seed Assistance Programs for Enhanced Productivity in Indonesia

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Key Messages

- Maize is important for the economy as its output is widely used as raw material and intermediate goods by downstream sectors such as feed (62.72%) and processed flour (11.40%). Additionally, maize is the agricultural sector with the third-highest value-added, after rice and palm oil.
- Compared to 2014-2019, annual maize productivity in the last five years has decelerated. Maintaining and improving productivity momentum is thus important. Improving the adoption of high-yielding seeds through seed assistance programs is a viable policy option. However, the Crop-Cutting Survey from Statistics Indonesia shows that farmers who received seed assistance had lower productivity than farmers who did not, with the productivity of assistance recipients declining between 2019 and 2022. This shows the urgency of evaluating the effectiveness and efficiency of seed assistance programs.
- Improvements in assistance targeting using a dataset to determine market status have resulted in more farmers independently adopting high-yielding seed varieties after the program and less market distortion. However, there is still substantial recipient leakage and marginal improvement in the overall program's benefit and cost ratio.
- To support maize productivity growth, the improvement of the seed assistance program needs to be comprehensive. This goes beyond expanding the implementation of area classifications based on market status and covers the planning, implementation, monitoring, and evaluation processes. This includes establishing integrated strategic planning, clear program objectives, seed adoption monitoring, accurate targeting, alignment with GAP assistance, and infrastructural support.

Evaluating Seed Assistance Programs to Increase Productivity

Maize is one of Indonesia's most important agricultural commodities in terms of its productivity growth and economic contribution to other sectors in the maize value chain. Maize products are widely used both as raw materials and as intermediate goods in downstream sectors, such as animal feed (62.72%) and processed flour (11.40%). Additionally, maize has the third highest added value in the agricultural sector, following rice and palm oil. Compared to rice and soybeans, maize has recorded the highest annual productivity growth (Ministry of Agriculture, 2023). The successful adoption of high-yielding maize seeds—reaching around 84% of farming households in 2022—has been a critical factor behind the high productivity of maize (Statistics Indonesia, 2023). However, the growth rate of maize productivity over the past five years has been decelerating compared to its growth during the 2014-2019 period. Continuing to expand the adoption of high-yielding seeds might be the key to unlocking further productivity growth.

Seed assistance is a viable policy option to improve the adoption of high-yielding seeds, but its effectiveness and efficiency must be improved. Currently, most maize seed assistance programs are funded by APBN or APBD and delivered by local governments through in-kind assistance. The recipients are selected based on broad criteria regarding land size and membership of farmer groups. There are often weaknesses in the implementation, such as incompatibility with recipients' preferences or sudden announcements and short timelines, especially for programs funded by APBN. Meanwhile, the seed produced by domestic licensed producers using varieties released by government research agencies as the main supplier of seed assistance is struggling to secure enough parent seeds[1] and lacking commercial market orientation. The Crop-Cutting Survey from Statistics Indonesia further shows that farmers who received seed assistance had lower productivity than farmers who did not, with the productivity of assistance recipients declining between 2019 and 2022 (Statistics Indonesia, 2023).

To improve assistance delivery and its impact, several local governments have attempted to adopt a "smart subsidy" mechanism as an alternative that determines market status in a specific area according to datasets.[2] This allows for targeting of the assistance program in strong and semi-strong markets with suitable mechanisms only where the program will be the most effective, while weak maize markets may be considered for targeting only if they show potential for development. Both the conventional and smart subsidy mechanisms should be evaluated to properly assess their effectiveness and whether the smart subsidy is a worthwhile improvement.

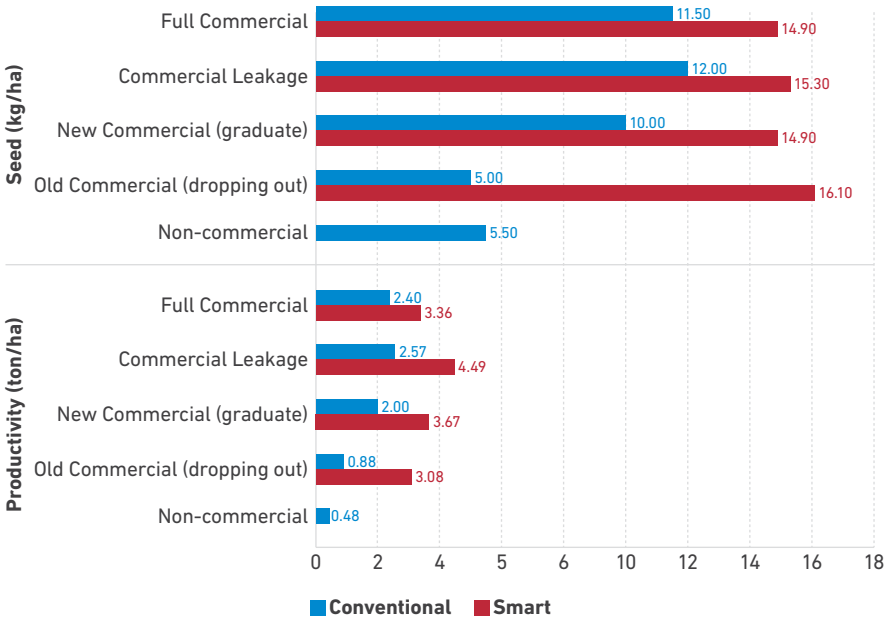
[1] There is an ongoing disruption of parental hybrid seed production due to unclear regulation on royalty in the wake of the transition of government research institutions, including seed breeders affiliated with government agencies such as the Grain Research Institute (Balitserealia Maros), to BRIN in 2022.
[2] Smart subsidy datasets are utilized to determine 3 market statuses (weak, semi-strong, and strong) in a specific area (sub-district or village level). The dataset indicators comprise harvest area, productivity, marketing activities by seed companies, and access to kiosks and local traders.

Lessons Learned from Smart Subsidy Implementation

Using cost-benefit analysis (CBA) surveys and in-depth interviews in areas with smart subsidies and conventional subsidies[3], this study looks at the effectiveness and efficiency of seed assistance programs. In general, the study finds the following results.

1. In both smart subsidy and conventional areas, 61 to 88 percent of assistance recipients were farmers who could make seed purchases on their own, indicating substantial leakage of the assistance. Meanwhile, about 39% of recipients in the smart subsidy area were commercial farmers who became solely dependent on assistance since the last two years. This shows that well targeting of recipients already happened in the smart subsidy area, but more improvement is still needed to reduce the leakage and prevent dependency.
2. Up to 24 percent of commercial farmers in the smart subsidy area graduated from subsidy recipients in the last five years, compared to only 3 percent in the conventional area. Graduated farmers show the highest increase in Benefit Cost Ratio (BCR) projection in the next five years, though their productivity could be improved. Meanwhile, about 8 percent of subsidy recipients in the conventional area (versus none in the smart subsidy area) keep receiving subsidies without transitioning to becoming a commercial hybrid maize user. This demographic shows the lowest productivity and is prone to reverting to local maize.
3. At 15.3 kg/ha, seed use is relatively more ideal across all types of farmers in the smart subsidy area compared to the conventional area (**Figure 1**). This appears to have resulted in better average productivity of 3.71 tonne/ha in smart subsidy, compared to 2.38 tonne/ha in conventional.

Figure 1.
Average Productivity and Maize Seed Usage in Areas with Smart and Conventional Subsidies



Notes: (1) ***Fully commercial:*** Never received seed assistance in the last 5 years. (2) ***Commercial Leakage:*** Continue to receive seed assistance and purchase hybrid seeds. (3) ***New Commercial (graduate):*** Only receives seed assistance before 2022, then purchases seeds independently later on. (4) ***Old commercial (dropping out):*** Purchase seeds before 2022, subsequently only planting maize if receiving seed assistance. (5) ***Non-commercial:*** Never purchased any seeds independently.

[3] The study was conducted in two neighboring districts with similar agri-climate conditions and transitioning practices from traditional maize cultivation using local seeds to the adoption of high-yielding seed varieties and good agriculture practices. The areas were selected to evaluate the impact of seed assistance on independent adoption after the program and on the maize supply chain. The study focused on the maize supply chain in the rainy season of 2023 and tracked farmers' seed habits over the last 5 years.

4. At 21 percent, market distortion at the district level (percentage of commercial hybrid seed users receiving assistance) is higher in the conventional area compared to the smart subsidy area at 6 percent. The conventional mechanism is also found to distribute more seeds that overlap with brands sold commercially. This may have a harmful effect by dissuading independent purchases in areas with an already developed seed market. Aside from this, recipient farmers sometimes receive brands with a lower potential yield or suitability to their land characteristics, which may also dissuade independent purchases due to lower yields than expected.
5. There is a minimal BCR increase between the assistance and no-assistance scenarios in both areas (0.03 and 0.06). This has two implications. First, when the impact of subsidy is limited to farmers' cost reduction, the overall benefit is only marginally better in the assistance scenario. Second, in order to increase BCR, the program needs to have an impact on unlocking further productivity. The program should, therefore, aim to increase the number of graduated farmers and their productivity while preventing commercial users from resorting to seed assistance. This can be achieved through better GAP support, reduction of leakage, and non-distortive distribution mechanisms such as cash transfers.

Achievements and Challenges of Smart Subsidy Implementation

The smart subsidy implementation has been supported by a number of improvements. Its mechanism has been supported by a strong legal basis (Surat Keputusan or Decree) consisting of Technical Guidance at the provincial level and an Implementation Guideline at the district level. Aside from the legal basis, smart subsidy provides datasets and tools to identify market status by considering the adoption level of high-yielding seed, potential maize cultivation, and the presence of maize market actors in each area. In terms of distribution mechanism, smart subsidy offers flexibility for assistance mechanisms according to market status for each area. Instead of proposing a particular mechanism to all market status types, the smart subsidy allows adjustment for weak market status with the development potential to receive in-kind assistance, price subsidy or in-kind assistance for semi-strong markets, and cash transfer mechanism for strong market areas.

Despite its achievements, there are areas of improvement for smart subsidy preparation and implementation. Some local governments still find collecting (and, ideally, regularly updating) the datasets and tools on the maize market time-consuming, resulting in delays in preparing the data in smart subsidy programs[4]. As for implementing a distribution mechanism, budget holders still prefer in-kind assistance due to its practicality. Meanwhile, price subsidy is perceived to be the most challenging as it involves distribution to kiosks and subsidy settlements with participating vendors.

[4] When the study was conducted, the dataset was still ongoing and was completed in August 2024.

Lessons Learned from International Experiences

Several Sub-Saharan African countries–Malawi, Zambia, Tanzania, and Nigeria–have implemented similar maize seed assistance programs that have several important features that Indonesia can learn from. These features have allowed the programs to run more efficiently, minimize corruption, and achieve a better impact on high-yielding seed adoption and productivity (Kato and Greeley, 2016). These features are:

- **Clear and specific objectives.** These programs are focused on clearly defined and specific goals. Nigeria, for example, targeted the development of the private input sector, while Malawi and Tanzania prioritized female-headed farming households.
- **Cash support using vouchers (physical or electronic)**. In Zambia and Nigeria, assistance redemption was provided using vouchers or even e-vouchers on mobile phones that farmers can use to obtain the seeds they need in the market. By avoiding in-kind distribution, these programs could reduce the number of intermediaries.
- **Private sector participation**. Recipients could choose to redeem the vouchers for the brands of seeds that they desire, thus reducing market distortion. Seed companies' participation varied from only a few contracted companies in Zambia and Tanzania to any seed brand in Nigeria.
- **Exit strategy**. Tanzania rotated the recipients every three years and ended the program after six years of implementation. Zambia gradually reduced the amount of subsidy that the recipients received.

Conclusion and Policy Recommendations

From the discussion above, smart subsidy implementation is correlated with better overall productivity, more optimal seed use, and better commercialization opportunities via graduated farmers. At the same time, it still comes with shortcomings, such as substantial recipient leakage and marginal BCR improvement. To support the maize productivity growth, there is a need for a comprehensive reform of the seed assistance program that goes beyond better targeting and criteria setting of the current smart subsidy practice. Below are the recommendations for reforming seed assistance programs.

A. Planning

Grand Design

A1. Establish an integrated strategic plan for all seed assistance programs nationally. This requires the national government to have a medium-term Grand Design of Maize Development to meet the demand for feed and food, establishing the strategic direction regarding maize sector development. In the context of seed assistance, the document should include the identification of regional focus areas (province or district) and key objectives of assistance (e.g., development of a new maize production center, further boosting the productivity of existing centers, or improving farmer's terms of trade/NTP).

A2. Align seed assistance programs with infrastructural support, such as irrigation and post-harvest facilities, to ensure the achievement of Grand Design. At the national level, this may require an MOA Regulation on the General Guideline on Government Assistance to serve as a basis for different Technical/Operational Guideline (Juknis/Jukops) documents from the Directorate General of Food Crops and Directorate General of Agricultural Inputs and Infrastructure.

A3. Expand the implementation of area classifications based on market status nationally, utilizing available data from agriculture offices and public extension services (BPP). A national expansion entails prioritizing the provinces and districts based on the Grand Design and normalizing the updated data.[5]

Guideline – These recommendations cover the additions/modifications to guidelines from the budget owners (APBN, APBD), which should serve as the basis of implementation at the district level. They include:

A4. Establish clear and specific program objectives and outcome indicators (e.g., productivity increase, introduction of climate-smart varieties, or cost reduction) aligning with the development plan established in the Grand Design.

A5. Determine market status criteria and aid distribution mechanisms in accordance with market status and program objectives in the districts that have been identified. For example, if the goal is to increase productivity, an in-kind mechanism targeting areas with semi-strong or weak market status with justification for potential development would be appropriate. Meanwhile, if the goal is to reduce farmers' costs, the program needs to use a cash transfer (e.g., direct redemption using a smart card or ID card) targeting smallholder farmers in areas with strong market status.

A6. Establish clear recipient criteria that consider the history of seed purchase and usage to align with the program objective.

[5] Except for productivity, which needs to reflect a target increase

B. Implementation

Procurement process

B1. For in-kind assistance, the budget owner's procurement needs to require participating vendors to provide embedded GAP assistance for farmers and/or extension officers in target areas.

B2. Finalize intellectual property and royalty arrangements for seed varieties related to the researchers' transition to BRIN or other entities to ensure the supply of parental seeds to licensed seed companies. This will enable national companies with commercial market orientation to participate in the program as an entry point for market expansion.

Targeting process (CPCL)

B3. Assigning market status up to the village level. This refers to the districts as identified by the Grand Design.

B4. At the district level, local agricultural offices must align the location criteria in different Juknis/Juklak on seed assistance, tools and machinery, and irrigation to optimize the impact on program objectives.

B5. Select areas and farmer groups by considering the program's distribution mechanisms, market status, and recipients' seed purchase and usage history.

Program Execution

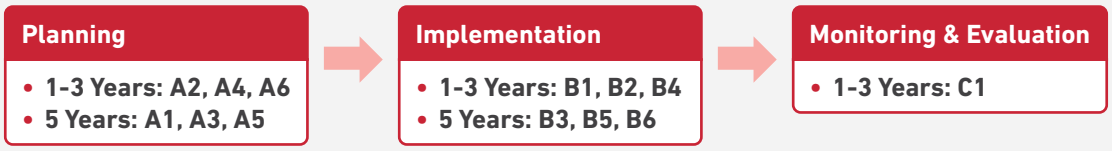
B6. The district agricultural offices should map the contents and schedule of agronomist visits provided by the private sector and synchronize them with those provided by the public extension services. This is essential for in-kind seed assistance targeting the adoption of high-yielding seed varieties and good agriculture practices.

C. Monitoring and Evaluation

C1. Monitor and evaluate program performance in relation to program objectives during and after the program.

Considering current technical and institutional readiness, these recommendations can be grouped into low-hanging fruits – those that can be implemented in 1-3 years – and medium-term recommendations to be implemented within five years (**Figure 2**).

Figure 2.
Short- and Long-Term Recommendations for Reforming Seeds Assistance Programs



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