Formal and Informal Rice Seed Systems: Evidence from Tasikmalaya, Indonesia

Global population growth leads to an ever-increasing demand for food and other agricultural products. As key agricultural products, seeds are directly connected to food security. To ensure food security, seeds, i.e. crop genetic resources, need to be accessible through functioning agricultural markets and interlinked institutions in the formal and informal seed sector.

In Indonesia, rice is the major staple food. Organizing and developing the (local) rice economy is thus crucial for the national government as well as regional and international institutions. In the management of the rice seed system, the handling of different seed varieties, including both traditional local varieties and modern varieties, plays an important role. Understanding the structure of the seed system, especially the intertwining of formal and informal institutions, allows targeting shortcomings in the respective seed sector and improving farmers' access to the desired seed material.

This policy brief presents the current status of the rice seed management system in the district of Tasikmalaya, West Java. The underlying case study

- identified the relevant actors in the seed network from a farmer's perspective, and
- lists the benefits and shortcomings of the formal and informal seed sector.

Specifically, we visualize the seed system's structure, the flow of seed and information material of modern varieties and traditional varieties, the handling of seeds and the influence distribution within the network. In doing so, the formal and informal systems are contrasted and compared.

The Research

This policy brief is based on a dataset which comprises in-depth interviews complemented by network analysis using the Net-Map method. The data collection took place from March to June 2019. With its participatory nature, the Net-Map method allows farmers to map their respective seed system, more precisely; the farmers themselves designed their own Net-Maps. The



Topics

- The Rice Seed Management System
- Network of formal and informal seed actors

IndORGANIC

IndORGANIC is a German Indonesian interdisciplinary research project that aims to investigate the potential of organic farming in Indonesia in general and in Java more specifically. The project is funded by the German Federal Ministry of Education and Research and based at the University of Passau, Germany. IndORGANIC cooperates with three institutions in Indonesia, the Universitas Atma Jaya in Yogyakarta (UAJY), the Institut Pertania Bogor (IPB) and Alliance Organic Indonesia (AOI). AOI is an umbrella organization for organic agriculture in Indonesia.



individual maps were then also discussed in groups of farmers. Network analysis enables the identification of all seed relevant actors and their relationships, the modeling of the origins and paths of seeds, and the visualization of intra-community dynamics and influences within the seed network. Seed actors in Tasikmalaya comprise of farmers, commercial shop employees, extension officers, seed experts, seed banks and the ministry of agriculture in Tasikmalaya.

Farmers' Seed Networks





Seed System
Informal System
Formal System
Links between Actors
Green Seed Flow
Purple Information Flow
Blue Instructions
Yellow Problems
Size of Nodes

Influence of Actor Large = higher importance Small = lower importance

(...%) Percentage of farmers using this relationship The seed networks of farmers in Tasikmalaya consist of multiple actors. Both, the formal and informal seed system coexist next to each other with farmer groups bridging both systems. However, the two systems interact only marginally. The government focuses on developing the formal system and distributing modern varieties through formal institutions. Yet, the network analysis reveals that farmers prefer and more frequently use the informal seed system as source for seeds and information rather than the formal seed system.

Seed Flow: Farmers primarily save their own seeds (98%) or exchange seeds within the farmer group (93%) and with neighbors (83%). Only few farmers receive seeds directly from the BPP as those seeds are mostly given to the farmer group (77%). Furthermore, commercial shops appear to be less relevant as seed source (35%).

Information: While 78% of farmers exchange information with farmer group members, only 35% of all interviewed farmers reported to receive information directly from the BPP. As in the case of seeds, information from the BPP reaches farmers not individually but is rather delivered through the farmer group.

Problems: With respect to the formal sector farmers mention problems regarding the punctuality of the seed delivery and the quality of the seed material.

Instructions: Instructions on farming practices (e.g. required usage of plant seedlings, distance in between seedlings) only occur in the formal system, revealing the hierarchical position of the formal institutions.

Findings: Importance Towers





Figure 2 presents the results for the importance towers. The results show that farmers consider the informal sector significantly more important than the formal sector. Farmers rate their own importance with respect to seed acquisition particularly high, i.e. they see themselves and their onfarm saved seed material as the most important. However, the BPP is also mentioned as an important actor, mainly due to the provision and distribution of free and subsidized seeds. This indicates that while farmers are not fully satisfied with their relation to the BPP, they still value the low costs of seed material.

Determining Factors for Seed Selection

Traditional varieties are only traded/exchanged in the informal seed system and are not promoted by the formal system, whereas modern varieties appear in both systems. Farmers report using a high diversity of seed varieties; on average, they used 6 modern seed varieties and 2-3 traditional seed varieties in the past 5 planting seasons. According to the farmers, traditional varieties are better suited for the local conditions as they are more resistant against pests and diseases and are better suited for the local climatic conditions. However, farmers often prefer modern varieties due to their superiority in yields and shorter growth period. This indicates that farmers consider high yield and short growth period as the most im-



Formal Seed System

- Standardized flow of seeds and information through official channels
- Approved and certified seeds with explicit property rights
- Seed exchange via purchase in commercial shops, free/subsidized seeds from the BPP

Informal Seed System

- Cultural norms, local standards and social structures
- Seed exchange via gift/ exchange with family, friends, neighbors and farmer group
- Own stock of seeds



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Bundesministerium für Bildung und Forschung portant factors for their seed procurement. Additionally, the availability and access of seeds is crucial for farmers' seed selection. In the informal system, seeds are always available and accessible. Seeds from commercial shops are theoretically always available, but farmers are largely unwilling to purchase these seeds, because they consider it as too costly. Seeds from the BPP are often not available or arrive too late. In comparison to traditional varieties, modern varieties cannot be saved on-farm and re-used. However, farmers often lack this information, and, thus, face severe harvest losses in following periods. The price of seeds is cheap in the informal system and in the formal system sometimes free or subsidized from the BPP, but expensive in commercial shops.

Implications for Organic Farming

Conventional seed breeding strategies are often not suitable for organic farming. Originally, organic farming is based on informal systems that rely on traditional seed varieties. In Tasikmalaya, organic farmers report that traditional varieties require less fertilizer and are, thus, more compatible with organic farming. Yet, as modern varieties need more external input, the BPP proposes a high usage of chemical fertilizer. Thus, the seed sector development currently does not take organic farming into account and could include organic farming in its agenda.

Key Messages and Policy Recommendations

- The main determining factors for farmers' seed selection are: high yield, short growth period, seed access, seed quality, seed prices
- High prices were stated as disadvantages of non-subsidized modern rice varieties
- Timing of seed delivery is a challenge for farmers. More channels and the establishment of a new ordering system might enhance farmers' ability to secure seed availability
- Farmers in Tasikmalaya preferably interact in the informal sector, although a formal sector is broadly established
- To foster the interaction between the formal and informal sector, extension services and other activities could integrate the local, informal seed dimension
- While the storage of modern varieties is assured through the formal sector, traditional varieties have little storage facilities. Establishing a local seed bank could create storage possibilities for traditional varieties and secure farmers' seed access.