



## Organic Visions – Policy Recommendations for Organic Farming on Java



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## IndORGANIC Project Summary

IndORGANIC aims at analyzing the current state and potential of organic farming to improve food sustainability in Indonesia in the long run. We propose organic farming as a necessary transition of the food system, which we see as a subsystem of the ecosystem. Organic farming might be a possible answer to the eminent societal changes after energy supplies will get increasingly costly. Proposing organic farming as way to achieve sustainable food production implies transformation processes touching upon distributive questions, conflicts about values and institutional change. IndORGANIC analyzes organic farming as an alternative to contested conventional agriculture from an anthropological, social and economic perspective in an inter- and transdisciplinary approach. For this end we integrate the analysis of belief systems motivating human behavior, of institutions regulating the organic sector and evaluate the conditions that may enable local farmers to convert to organic farming.

‘Transformation’ is understood as societal change and an inter- and transdisciplinary process, inducing a broad shift in behavior. In the long run it has to be supported by institutionalized policies and national strategies. Therefore, IndORGANIC analyses these societal changes from different, yet supplementary perspectives in Indonesia. IndORGANIC explores the values and belief systems, institutions and organizations, economic success and failure pertaining to organic farming. Consisting of four work packages, disciplinary contributions from anthropology, development sociology and development economics feed into its analysis. An overarching work package aims from the very beginning at integrating these fields of expertise throughout the research phases. The inter- and transdisciplinary project combines qualitative and quantitative empirical research with field experiments.

IndORGANIC researches the potential and current state of organic farming in the light of debates around food security, food sovereignty and food sustainability in Indonesia. Three levels of transdisciplinary knowledge are tackled:

**System knowledge:** To understand the current state of organic farming in its social, economic and ecological dimensions.

**Target knowledge:** To envision the scenario of a bio-economy-based farming and to identify sustentative belief systems and their adequate scientific framing.

**Transformation knowledge:** To identify the necessary areas of societal change, conflict and innovation to attain a reconfiguration of fundamental conditions for sustainable agriculture.

IndORGANIC’s scientific goal is to increase the knowledge on the complexity of transformation processes related to a ‘bio-economy’. Systematic solutions require an integration of social sciences, economics and humanities. By naming the necessary social and structural changes, IndORGANIC provides normative and legitimate foundations for such an eminent change. The results will be actively shared and distributed among the relevant actors in Indonesia as well as in the scientific community. This ensures that IndORGANIC contributes to the scientific and societal discourses.

# Executive Summary

Organic agriculture in Indonesia offers great potential and the opportunity to connect social, economic and ecological dimensions of food production. To exploit this potential, there is need for knowledge integration on different levels. From the producers' perspective, information constraints have been identified as a key barrier to the adoption of agricultural technologies. Therefore, it is beneficial to identify ways for monitoring and making a positive impact on farmers' perception, knowledge and ultimately the adoption of organic farming practices. Actors in civil society and the Indonesian organic social movement have developed different strategies and have reacted differently to the government's framework of regulated standardization, certification, and open trade. This suggests that further knowledge integration and collaboration on all levels can be conducive to formulate more coherent and inclusive organic farming policies. Proposing organic farming as a way to achieve sustainable food production, the research findings from the IndOrganic project provide several key messages and policy recommendations, which are each presented in a separate policy brief (PB):

## **PB #1: The many meanings of organic farming in Indonesia: State actors and civil society**

Instead of reconciling the tensions within the different framings around organic agriculture, the Indonesian State may productively work with frictions resulting from the legitimate diversity of meanings, and enable an open and inclusive debate on the ways forward for organic agriculture. Thinking beyond economic perspectives challenges the outlook on development by the State, but might offer new alliances and strategies. We propose to establish platforms for debate and discourse on the future of organic farming in Indonesia, tying in agribusiness as well as social movements and smaller deviants, including potentially influential, innovative and powerful groups and organizations.

## **PB #2: Integrating organic values, knowledge, and practices into the agro-industry**

Identifying distinct groups of organic actors and acknowledging their organic values is crucial for assessing their diverse knowledge. By adapting official policies and regulations to the socio-ecological demands of these actors, their distinct kinds of knowledge can be harnessed and provide innovative contributions to the Indonesian bio-economy. This does not necessarily mean to reconcile socio-ecological ideals with market expansion and industrial-scale production. We rather propose possibilities for establishing middle grounds or alternative spaces that can engage the potential of the organic market and improve the economic welfare of producers, while maintaining deep agro-ecological practices and a socio-ecological commitment to equitable producer-consumer relations.

## **PB #3: Local agricultural knowledge in Indonesian organic farming**

Taking into account the diverse agricultural knowledge and variations in local conditions in which organic farming is practiced, we propose a framework for context-based organic farming guidelines. The framework is designed at the national level by the Ministry of Agriculture, together with representatives from scientific communities, organic farming practitioners, and other relevant bodies. The aim of the framework is to outline the specific aspects of local agricultural knowledge and terms, biophysical conditions, belief systems, and social organizations which are relevant for the implementation of organic farming policies. Ultimately, the framework is used to formulate context-based guidelines for the implementation of organic farming.



#### **PB #4: Institution of Organic Farming in Java**

Taking into account the profiles of these diverse stakeholders within organic farming institutions and decentralization processes in Indonesia, we suggest a two-fold strategy of participative policy formulation and cross-ministerial cooperation. To accommodate the diversity of goals, perceptions, and strategies among organic actors, the government may consider creating a shared platform with various actors to jointly collaborate in formulating more coherent organic farming policies. To facilitate development that captures the aspirations of and challenges faced by farmers, the Ministry of Agriculture may consider cooperating and coordinating with other relevant ministries, for instance the Ministry of Environment and Forestry or the Ministry of Trade.

#### **PB #5: Formal and Informal Rice Seed Systems: Evidence from Tasikmalaya**

Our findings show that the main determining factors for farmers' seed selection are high yield, short growth period, access, availability, quality, and prices of seeds. Farmers in Tasikmalaya preferably interact in the informal sector, although a formal sector has been established. To foster the interaction between the formal and informal sector, we propose extension services and other activities to integrate the 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.

#### **PB #6: Organic Farming: The Impact of Training on Perceptions, Knowledge and Adoption**

Our findings show that information constraints are a substantial barrier to the widespread adoption of organic farming, and that training can change farmers' perceptions of and knowledge about organic farming. The training in IndOrganic increased the share of organic fertilizer and organic pesticide users; for organic fertilizer, the training significantly increased the probability of use. Based on the findings from this study we propose policy makers and other stakeholders to establish farmer trainings as an effective intervention to boost organic farming.

#### **PB #7: Information sharing within social Networks: Lessons from an Organic Farming training**

Socially central individuals are those with the highest propensity to adopt organic farming practices after they received training on organic farming practices. We suggest to target Central farmers specifically for agricultural extension and training interventions since it can enhance adoption of organic farming through social learning. Targeting these central farmers will increase information spreading within the network and lower the adoption barriers for peers and other network members. Simply asking village members for the names of central farmers is not as cost-effective as collecting full information about social structures within a village to identify central farmers.

#### **PB #8: Do Indonesian Consumers Value Organic Rice? Evidence from an Incentive-Compatible Willingness-to-Pay Experiment**

We explored consumers' willingness-to-pay for organic products in order to make an assessment of the market potential and to formulate recommendations how this potential can be further developed. This policy brief summarizes the main findings from this study.

# Organic Farming and the paradigms of a Knowledge-based Bio-economy

The production, utilization and management of natural biological resources and the related rapidly expanding web of relations are increasingly conceptualized as a bio-economy, with various interpretations of the concept setting different premises and priorities. The European Union (EU) has long promoted techno-scientific advance as a rationale for research and development (R&D), yet it remained open, how the EU policies link R&D with societal progress, and what different paradigms contend for influence. Different innovation paradigms depend on different hybrid combinations of private and collective knowledge, as a dual source of product coherence and market power. However, the knowledge-based bio-economy has gained prominence as an agricultural R&D agenda of the EU, which includes giving special consideration to farmers' knowledges and innovations, and allowing their participation in agenda-setting and policy formulation. This is presented as part of a holistic approach and as a basis to enhance environmental sustainability, global economic competitiveness and prosperity for all (producers and consumers).

In Indonesia, the bio-economy represents a national project that aims to improve resource efficiency and to find new ways by which bio-mass can be converted into a diverse and comprehensive range of products. Besides bio-energy, the national agro-industry is the second area that is politically fostered as part of the bio-economy development. With the "Grand Strategy of Agricultural Development 2015–2045" the government formulated a long-term agricultural and rural development plan which seeks to respond to current societal challenges and trends. With a view to a bio-based economy, the plan formulates the vision of transitioning to "a sustainable agricultural bio-industry system to produce diversified healthy foods and high value-added products from tropical agriculture and maritime resources for food sovereignty and farmers' welfare" (MoA 2015). The foundation for a sustainable agricultural bio-industry should be laid in the period 2013–2015 and further strengthened by 2019. The agricultural development strategy focuses on upgrading and the transition from primary agriculture to an integrated agricultural bio-industry based on local resources, sustainable (small-scale) agriculture and the creation of a favorable infrastructure for bio-businesses. The plan also encourages the development of a sustainable bio-economy in rural villages throughout the country. In the Strategic Plan for 2015–2019, a policy mix is proposed that ranges from increasing crop yields, fostering clusters and capacity development for marketing and a sustainability monitoring.

Organic farming in Indonesia has developed from a form of resistance towards conventional farming to a government strategy for food sovereignty. In the 21st century, organic agriculture in Indonesia began to enter the phase of standardization and expansion towards large-scale production and trade, following the dominant agro-economic trajectory. One of the aims defined by the National Standardization Agency (BSN) is "to create agriculture that is socially, ecologically, and economically sustainable" (BSN 2002). In order to realize these sustainability goals it is of vital importance to incorporate an integrated, participative approach on organic agriculture into the bio-economy set out in the "Grand Strategy of Agricultural Development 2015–2045".

Thus, the overall recommendation of the IndORGANIC research team is to establish organic farming in accordance with the paradigms of a knowledge-based bio-economy, i.e. to acknowledge farmers' values and knowledge, and to incorporate them in agenda-setting and policy formulation.

# The many meanings of organic farming in Indonesia: State actors and civil society

## The many meanings of organic farming for civil society and the state

Organic farming was initially adopted by non-state actors in Indonesia, first by faith-based organizations (1) and then by small farmer associations (2), while the state support for organic agriculture (3) followed at a later date. The three groups adopt different positions with regard to the definition of organic agriculture. By comparing their understanding of organic farming we reveal the many meanings of organic farming.

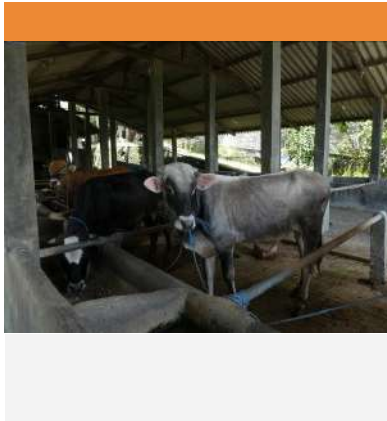
We base our findings on a comparative case study, looking into a pioneering civil society organization, a national peasant alliance, and the state as actor. Data on the history and perspectives the civil society organizations were obtained through interviews (face-to-face or via video link) and interactions with members during workshops held in 2017. These were complemented by content analysis of the organizations' publications and internal documents. Data on the state were obtained by reviewing official documents and relevant academic literature.

For the faith-based foundation, organic farming is both a spiritual worldview and a practical philosophy. For the peasant union, organic agriculture is foremost a political tool to resist global capitalist agriculture. Despite their very different outlooks, both these two civil society organizations see organic agriculture as a post-materialist enterprise directed towards explicitly social-political goals. By contrast, the government's engagement in organic agriculture, although including notions like "back to nature", is driven primarily by visions of developing a new niche market for Indonesian exports.

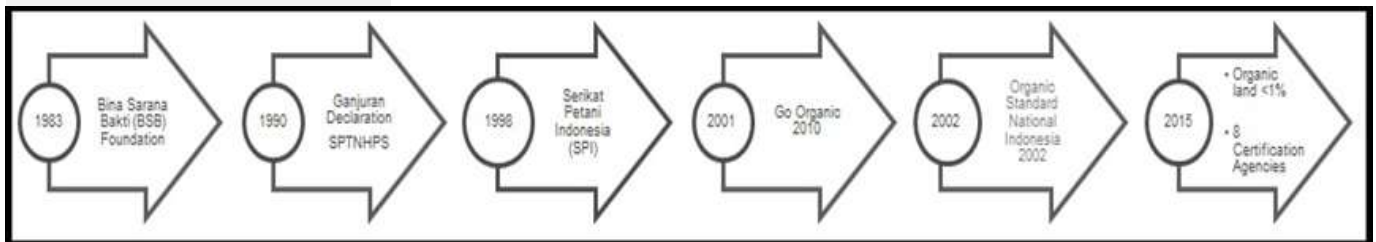


## TOPICS

- The many meanings of organic farming for civil society and the state
- Different civil society organizations and different ways of certification
- An outlook on the future development of organic farming in Indonesia
- Recommendations for a more inclusive government approach



In Indonesia discussions over food security (ketahanan pangan) and the interrelated yet different concepts of food self-sufficiency (kemandirian pangan) and food sovereignty (kedaulatan pangan) are subject to contestation. Although both Indonesian state and non-state actors frame food security, food self-sufficiency, and food sovereignty in normative terms, they disagree in their definitions as well as approach how to reform the country's food system. We show how actors of the organic farming movement frame these terms and how to they correspond or diverge from the official food policy discourse.



**FIGURE 1:**

Important milestones in the development of organic farming in Indonesia.

## Different civil society organizations and different ways of certification

The faith-based organization (1): For the investigated faith-based organization, founded in 1984, organic farming describes a worldview that draws on Asian agro-philosophy and the Franciscan conceptualization of humans and nature as God's creation, in which the human and non-human are parts of a single organism. This connection between religious beliefs and environmentalism is a powerful driver of the transformation of farming practices and the adoption of conservation agriculture. Muslim eco-theology also inspires many Indonesians to become actively involved in environmental protection. However challenges by adherents of 'green Islam' to the government's development agenda remain largely ignored by the State.

The umbrella organization (2): For the peasant union, founded in 1998, by contrast, organic agriculture is first and foremost a political issue: organic farming is inseparable from political resistance. Specifically, adoption of organic agriculture is one way to resist global agribusiness, and part of the wider struggle for peasants' rights, environmental justice, and food sovereignty. The union agrees with the government's focus on (national) self-sufficiency and the use of protectionist trade policies to achieve this goal. However it disagrees with the state's productivist conceptualization of food sovereignty, arguing that sovereignty over agricultural and food policies need to be placed in the hands of farmers in order to tackle food insecurity effectively. The union also rejects the idea of organic agricultural production for the export market and advocates "sustainable agriculture based on family farming".

The unions' stance on certification is consistent with its anti-capitalist perspective. Self-certification, which also appears to be supported in principle by the foundation, and participatory guarantee schemes (PGS) could be a viable alternative to conventional certification schemes in situations where producer-consumer relations are very close, for example when products are sold at the farm gate.





Supporters of this approach argue that it fosters knowledge exchange and builds on a foundation of trust, based on the direct engagement of actors. Yet, it is claimed that conflict avoidance, free riding and partiality, as well as time constraints can threaten the sustainability of PGS schemes.

The Indonesian state (3): The government's engagement in organic agriculture, although employing words such as "back to nature", "holistic" and "local knowledge", seems to be driven primarily by visions of developing a new niche market for Indonesian exports. The State has adopted a contradictory approach, making it difficult to frame consistent strategies to support organic agriculture. For example, policy measures make provision for training of government staff in organic techniques, while still keeping crop yields as the main benchmark. On paper, the state appears to be open to alternative visions of organic agriculture, but productivist and export orientation dominate the policy framework and leaves little room for constructive engagement with non-state actors and their evolving ideas about the meaning of organic agriculture. The Indonesian State has an all-encompassing interest in maintaining control over the still-evolving organic sector.

The Indonesian organic agricultural sector is highly fragmented, with 8 national and 14 international certification systems coexisting. More than half of the so-called 'organic land' has not been certified yet. As producers often do not extend their certification, the figure differs greatly from year to year. The cost of certification can hinder smallholder producers in entering the formal organic market that now requires certification. Nonetheless, the Indonesian state aims to expand official certification according to the national standard (SNI), and so far rejects alternatives like self-certification or PGS.

## An outlook on future developments

The different positions adopted by state and civil-society actors in the organic farming movement will influence the future development of organic farming in Indonesia. The Indonesian State has the power to define organic agriculture in legal and regulatory terms. A one-dimensional productivist definition excludes the different meanings and traditions of organic farming practiced in the civil-society. Specifically, the reduction of the meaning of 'organic' to 'organically certified products' excludes many farmers who consider they are practicing organic agriculture and makes it illegal for them to claim to be doing so. It also discriminates those farming organically by default, such as the occupants of upland swidden farms in remote areas of Indonesia who do not possess the financial means to obtain synthetic fertilizers.

## Different civil society organizations and different ways of certification

The faith-based organization (1) and the umbrella organization (2):

The two civil society organizations define organic agriculture very differently and draw inspiration from different philosophical, political and social-cultural traditions. However both see organic agriculture as a post-materialist enterprise explicitly directed towards social-political goals.





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As the Indonesian state is issuing more and more detailed regulations and forms more government bodies to ensure compliance, civil society institutions are demarcating their positions from the government agenda. Small-scale farmers or peasants whose ideas about organic agriculture are diametrically opposed to export-oriented vision of the State might engage in unauthorized 'guerrilla organic farming' in order to stay with their conviction in practices of farming in an organic way.

As the sovereign authority, the state asserts its right to define the content of organic agriculture, to demarcate its boundaries, and to decide on the rationale for supporting it. By doing so from a privileged position of power, the State delegitimizes different understanding of organic farming and its role in other policy fields. In response, civil society actors are adopting an alternative interpretation of sovereignty as vested in the voices and interests of small organic farmers. Inspired by spiritual and humanist values, this involves a shift in perspective away from purely ecological considerations towards a vision of organic agriculture as an ex-expression of peasant sovereignty, inseparable from struggles for access to land, markets, dignified living and working conditions.

### Recommendations for a more inclusive government approach

1. The Indonesian State should relax its regulatory grip on the organic sector. Allowing for openness and diversity would create room for sorely needed innovation and cooperation among the different actors involved. The State would display true sovereignty by enabling an open and inclusive debate on the ways forwards for organic agriculture in Indonesia.
2. Instead of reconciling the tension within the different framings around organic agriculture, the State may productively work with this frictions resulting from the legitimate diversity of meanings attached to organic agriculture. While regency and district level policies are much more flexible to accommodate local requests for support of organic agriculture, their room of maneuver is restricted by the overall contradictory agricultural and food policies of the Indonesian State.
3. We propose establishing platforms for debate on the future of organic farming in Indonesia, tying in agribusiness as well as social movements and smaller deviants, including possibly influential, innovative and powerful groups and organizations. The debate on how to create a diverse and localized version of organic value constellations must include motivations and value beyond the market perspective. Thinking beyond economic perspectives might offer new alliances and strategies. Yet, the existing political will to promote organic farming is a promising way forward.

# Integrating organic values, strategies, and knowledge into the agro-industry.

## Tensions and trade-offs in the organic sector

Today, a variety of ideas, organizations and networks of non-state actors exists, who maintain and promote their organic values. These values, however, are sometimes in contrast to the intentions pursued by the Indonesian Government, namely the adoption of market and institutional structures of conventional agro-industry and agribusiness. For many organic actors, there is an ideological tension between a holistic organic perspective and the current trend in organic market expansion, which favors more capital-rich farmers. For others, deep ecological values and commitment determine their vision and strategy, and their socio-ecological ideals are incompatible with the dominant agro-economic framework.

To investigate the different values, strategies, and practices of organic actors, we conducted in-depth interviews with organic pioneers and value communicators in our two study regions West- and Central Java. These interviews were complemented by participant observation of organizational events, and the analysis of texts written by the key actors. Our main objective was to illustrate the background and reasons for either resistance against or compliance with the Indonesian government strategy and the trajectory of organic farming towards industrial-scale agriculture.

Recommendations in order to solve the tensions and trade-offs in organic are to accurately identify the values and strategies of organic actors, so that appropriate solutions can be proposed, and the adaptive capacity of institutions and policies can be increased. The expected mutual benefit is that civil society actors provide alternative and innovative contributions to the Indonesian bio-economy.

## TOPICS

- Tensions and trade-offs in the organic sector
- Values, strategies, and knowledge of organic actors
- Reconciling socio-ecological ideals and market expansion
- Possibilities for integrating knowledge and solving trade-offs

### Rationale:

Identifying distinct groups of organic actors and acknowledging their organic values is crucial for assessing their knowledge and sphere of influence.

By adapting official policies and regulations to the socio-ecological demands of these actors, their distinct kinds of knowledge can be harnessed and can make alternative, innovative contributions to the Indonesian bio-economy.



Specifically,

- we identified **three different value systems** of organic actors, namely Islamic, Christian, and local cultural environmentalism
- we examined whether a **reconciliation of socio-ecological ideals with market expansion** and industrial-scale production is possible, and
- we investigated how civil society actors can provide alternative and innovative contributions towards the Indonesian bio-economy through **knowledge integration**



## Tracing values, strategies, and knowledge

We identified three distinct groups of organic actors, who differ in terms of value systems and strategies for organic agriculture.

1) **Islamic environmentalism:** Together with the Indonesian government, Islamic organizations have established so-called ‘green pesantren’, in which Muslim scholars collaborate with local government officials to develop Islamic eco-theology and implement programs such as waste management and organic farming. However, there are also *pesantren* that don’t follow government curricula, and establish alternative approaches and teachings without financial support and formal acknowledgment by the government. They combine concerns for healthy nutrition and the environment with Islamic values, and promote organic local or home production as an alternative to “certified, yet socially and environmentally unsustainable food”. Key figures in these *pesantren* have consolidated knowledge about the health benefits of locally produced herbs or local seed varieties that offer higher yields and better resistance to difficult environmental conditions. In this case, Islamic values are the foundation for interconnecting and protecting farmers, and to promote healthy local, small-scale farming and food systems beyond the control of the government.

2) **Christian environmentalism:** Catholic groups in Java have been working actively towards an integration of their faith with ecological principles since the 1990s. Until today, the Catholic Church plays a significant role in the organic movement in Indonesia. In West and Central Java, Catholic groups promote organic farming and an organic lifestyle based on Christian values, partly in line with the Indonesian government approach. Some groups possess and guard agricultural knowledge such as the mixture of a liquid organic fertilizer based on microorganisms. They promote organic farming and lifestyle on the producer and consumer level based on Catholic values, without putting religious ideas at center stage. In Central Java, there are groups who use a combination of Javanese cultural values and Catholic values to substantiate and promote self-sufficiency and protection of farmers and farmer groups – also beyond government control.

3) **Local cultural environmentalism:** Javanese cultural traditions and beliefs about human-nature-relations do no longer primarily reflect ideas about organic farming and related practices. This is partly due to the New Order regime’s implementation of the Green Revolution, but more generally caused by modernization of agricultural production in terms of refined growing methods. Cultural traditions and values are, nonetheless, used as a foundation for promoting healthy, sustainable, eco-friendly farming and living. Sundanese cultural traditions are used to promote environmental protection as cultural heritage among the broader public. The aim of those communities, whose territories are officially recognized by the government as preservation areas and tourist sites, is to promote a sustainable living “close to nature”.



In contrast, cultural centers in Central Java use cultural traditions and Javanese philosophy to promote organic farming and lifestyle, in particular among farmers and small-scale producers. Besides sustainable agricultural techniques and methods, the presented approach supports farmers' sovereignty - which differs essentially from the government idea of national food sovereignty.

## Reconciling socio-ecological ideals and market expansion

Despite differences in knowledge and belief systems, all actors face similar tensions and trade-offs between their respective values on the one hand, and practices that are linked to the market and institutional structures of the agro-industry on the other hand. They also face similar hurdles including the cost of certification, which can hinder smallholder producers in entering the formal organic market that now requires certification. Other problems in organic farming are limited use and knowledge of organic farming techniques, the lack of support by extension workers, the small number of organizations among organic farmers, and lacking market access and price control. Two major strategic directions for solving these tensions emerged over time:

a) Some organic activists are adamant about the **holistic ideals of the organic farming pioneers**. They encounter problems with the current conventional market direction on different levels. Firstly, they face inequality in market relations, meaning in particular the control of price premiums and profits by traders or agribusinesses. Secondly, they view that organic agriculture is reduced to being about organic inputs but without further consideration of socio-ecological implications, i.e. equitable consumer-producer relations, multi-cropping, and reducing external input. Their **deep ecologically oriented organic agriculture** that emphasizes farmer sovereignty and alternative marketing is only to a limited extent marketable.

b) Other organic organizations shift from their earlier emphasis on developing organic farmer groups to the **establishment of a marketing network for organic agricultural products**. The main organizational factor behind the shift to marketing is the change in organizational funding. While formerly external donors provided funds for farmer group trainings and monitoring, the organic organizations now rely on trading organic produce with an objective towards economic expansion. They aim at profitable economic returns in addition to the environmental benefits and farmers' sovereignty they originally advocated for.

## Different organic actors

All three groups share the values of a deep agro-ecology and organic lifestyle, promoting eco-friendly small-scale production and consumption of healthy, local food. Their common objective is to protect the environment - "the creation" - and farmers' (food) sovereignty, recognizing their agricultural knowledge and technologies. The explicit opposition to government control is an expression of rejection of the agro-economic framework.





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The different strategies show that not all organic actors are willing to make an attempt at reconciliation of socio-ecological ideals with market expansion and industrial-scale production. Nonetheless, possibilities for an integration of knowledge and distinct values exist.

## Possibilities for integrating knowledge and establishing middle grounds

Acknowledging different values and approaches on organic farming, and considering alternatives to the national framework of standardization, certification, and open trade is essential for an inclusive development of the organic sector. As a whole, this can provide access to previously concealed innovations in terms of production methods and practices, and encourage organic actors to explore new marketing opportunities for organic agricultural products. Thus, **we recommend to**

- **identify, acknowledge and harness the knowledge of value communicators**, to ensure knowledge integration and participation on the different levels of value systems in the organic sector. This would be a convincing signal of commitment to further democratize techno-scientific innovation. Allowing organic actors participation in knowledge production can unravel the assumptions underlying innovation trajectories. This may question expert assumptions about problems and solutions, and thus increase the accountability for policy choices.
- **establish middle grounds or alternative spaces** for the different groups of organic organizations and their strategic orientations. For those who take the initiative in developing their trading business and expanding their organic market, support can be granted for the development of marketing networks of organic agricultural products. For those who maintain their deep agro-ecological practices and emphasis on equitable producer-consumer relations, the creation of incentives for engaging in the organic market and thereby improving the economic welfare of producers seems promising. A potential middle ground, specifically in Central Java, could be the effort in revitalizing the so-called Pamor participatory guarantee system. More generally, alternative agri-food arrangements such as community supported agriculture, organic boxes (delivered directly to the customer), farmer markets or organic Fair Trade can serve as marketing outlets that maintain the participatory and community-based values of organic agricultural production based on equitable producer-consumer relations.

# Local Agricultural Knowledge in Organic Farming

SNI 6729:2016 recognizes organic farming as, “a set of management practices that are based on cultural, biological, and mechanical methods and aim to improve nutrient recycling from the waste of plants and animals on the farm, thus reducing the application of non-renewable resources.” According to this standard organic farming should depend on renewable and locally managed resources while also taking into account the adaptation to local conditions. Furthermore, it provides detailed information on biological and mechanical methods, such as buffer zone specifications or permitted substances for making compost, organic pesticides and pest control. However, there is less specification with respect to cultural methods, local management practices and aspects of local conditions that farmers should adapt to.

Based on our field research in Yogyakarta, there is a diversity of organic farming practices, which are informed by both scientific understanding on organic farming, and Javanese farming practices. For example, for the past few years there has been growing interest among organic farmers in Yogyakarta to experiment with Natural Farming. This farming method is able to accommodate local conditions, such as biophysical characteristics of a particular area, as well as cultural and social characteristics of farmers, and their beliefs. Given the diverse local environmental and agricultural knowledge among different ethnic groups in Indonesia and the potential of this type of knowledge in achieving a more sustainable world, we have the following policy recommendation.



## TOPICS

- [Context-based organic farming guidelines](#)
- [Natural Farming](#)
- [Implementation example](#)

## Natural Farming

In Central Java, Natural Farming is influenced by the teaching of ‘do nothing farming’ by Masanobu Fukuoka from Japan and the **Nutritive Cycle Theory** introduced by Dr. Cho Han-Kyu from South Korea. The adaptability of Natural Farming contributes to its expansion in Central Java despite the different climatic conditions compared to the origin countries of Natural Farming.

In **India**, Natural Farming is associated with **ZBNF** which stands for **zero-budget natural farming** or **zero-budget spiritual farming**. Since 2016, this has been adopted as a state program in the state of Andhra Pradesh as an initiative to reduce farmers’ debt and cost of agricultural production.

## Recommendation

Taking into account the diversity of agricultural knowledge and local conditions in which organic farming is practiced, we propose a **framework for designing context-based organic farming guidelines** which :

- Is designed at the national level by the Ministry of Agriculture jointly with representatives from scientific communities, organic farming practitioners, and other relevant bodies.
- Aims to outline the specific aspects of **local agricultural knowledge** and **terms, biophysical conditions, belief systems**, and social **organizations** which are relevant for the implementation of organic farming policies.
- Is used to formulate **context-based guidelines** for the implementation of organic farming, for example at the district level, so that the guidelines are mainly used by extension workers, farmers, and scientists.



## Framework for designing context-based organic farming guidelines

On the one hand, there is a clear recognition regarding the importance of local knowledge and conditions in the implementation of organic farming methods. On the other hand, there is limited information on what the terms ‘local knowledge’ and ‘local condition’ actually mean. The resulting variety of interpretations by policy makers and practitioners can hinder the effectiveness of policy implementation. Therefore, we encourage the MoA together with other stakeholders to outline aspects of local knowledge and conditions that are considered important and which can directly influence farmers’ understanding and decision making in practicing organic farming.

### Rationale

The framework that we propose offers guidance for the departments of agriculture at the district level and for extension offices to design the guidelines for the implementation of organic farming in their respective areas. This approach takes into account the way culture leads to variations in farmers’ knowledge on farming and their environment. Important aspects are local farming practices, the significance of various plants and animals to farmers, the hierarchy of their importance, and the values attached. In addition, the guidelines can facilitate horizontal learning among farmers and vertical learning between farmers and departments of agriculture.

Based on our field research in Yogyakarta, we identified widely known Natural Farming practitioners whose farming approach emphasizes on the availability of local resources (such as diverse plants and animals), farmer-to-farmer learning, and framing agricultural knowledge according to local terms and belief systems, in this case Javanese farming practices. In addition, the focus in Natural Farming training is more on experimentation and learning by doing and less on mastering the scientific terms and explanations in doing agriculture. The pragmatic and adaptable aspects of Natural Farming encourage farmers to experiment using their pre-existing knowledge and cultural understanding and to learn from one another. Therefore, Natural Farming is an example of collaborative learning in farming that recognizes the cultural and environmental variations under which farming is practiced.



Research Project IndORGANIC

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## Implementation example

Similar to Natural Farming, an approach that takes into account **farmers' observation, decision making, learning capacity, and local conditions** has been implemented to a certain extent in IPM farmer field schools and more recently in the agrometeorology science field shop model.

The objectives of IPM farmer field schools are to equip farmers with necessary skills to identify the problems they face and to control pest populations by observing the natural cycle of pests' natural predators. The objective of science field shops on agrometeorology is to support farmers' empirical observation on environmental phenomena, particularly on weather events, that influence their farming practices through collaboration between agrometeorologists, anthropologists and farmers.

These two models could potentially provide foundations for developing institutions of organic farming which are context specific and adaptable to local conditions.

# Institution of Organic Farming in Java

According to SNI 6729:2016, one of the aims of organic farming is to create agriculture that is socially, ecologically, economically, and ethically sustainable. Starting from the early 2000s the Indonesian Ministry of Agriculture (MoA) has issued a number of regulations and programs that define, standardize, and set the agenda for the development of organic farming. The government's approach in developing organic farming focuses on a top-down distribution of agricultural inputs, knowledge dissemination, and financial and institutional support for farmers to apply for organic certificates. This approach does not necessarily align with the holistic definition of organic farming as mentioned above.

In addition to the government, there exists a variety of different stakeholders engaged in organic farming which have diverse goals, roles, and motivations. To investigate the stakeholders who shape the institutional landscape of organic farming, we applied Net-Map method as a participatory method in the transdisciplinary workshop that we organized in 2017. The guiding question for this method was: Who are the influential stakeholders in organic farming, especially in Java? The focus on Java was motivated by the composition of the participants who were primarily active as consultants, farmers, government officials, academia, traders, and activists in West and Central Java.

Given the dominant role of the government in organizing organic farming in Indonesia, we distinguish stakeholders according to their degree of engagement with the government. This information can assist the government in better understanding the relevant stakeholders in organic farming, especially in terms of their multiplicity of strategies, perceptions and rationales regarding organic farming.

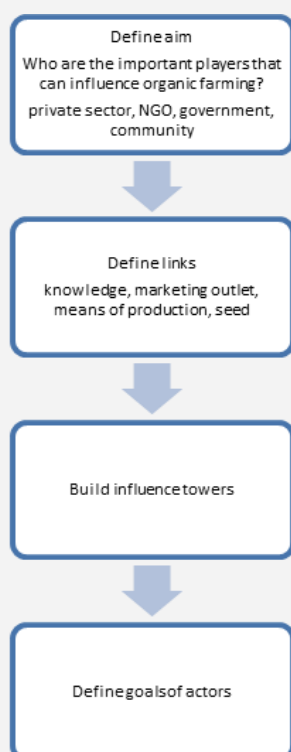


## TOPICS

- Participative policy formulation
- Cross-ministerial cooperation
- Net-Map

## Net-Map

Net-Map is a participatory interview-based mapping tool that enables people to understand, visualize, discuss, and improve conditions where different actors can influence outcomes. The advantages of this method are that it is suitable for intercultural settings, facilitates learning process and active engagement among participants, and is potentially useful for participants in strategizing future cooperation with other stakeholders. The procedure is:



## Recommendation

Taking into account the profiles of these diverse stakeholders within organic farming institutions, we have the following policy recommendations:

1. **Participative policy formulation**: to accommodate the diversity of goals, perceptions, and strategies among organic stakeholders, the government may consider creating a **shared platform** with various stakeholders to **jointly collaborate in formulating more coherent organic farming policies**
2. **Cross-ministerial cooperation**: to facilitate organic farming development that captures the **aspirations of and challenges faced by farmers**, MoA may consider cooperating and coordinating with other relevant ministries in developing organic farming, for instance the Ministry of Village, Ministry of Environment and Forestry, and the Ministry of Trade.



## Participative policy formulation

SNI 6729:2016 on the Organic Farming System introduces a holistic and multidimensional definition of organic farming. So far this standard emphasizes the ecological and economic aspects of organic farming. This is demonstrated by a series of technical measures, a list of permitted and prohibited substances and a description of the certification mechanism to facilitate organic market creation. Parallel to the government, different stakeholders are interconnected regarding the exchange of knowledge, agricultural inputs, and marketing channels. Thereby, organic actors develop different understandings, rationales and aspirations regarding organic farming compared to the government. In the context of the decentralization of decision-making power, this diversity in understandings, rationales and aspirations requires the inclusion of relevant stakeholders in the creation of national organic farming policies. Examples where other stakeholders may contribute include social and ethical sustainability.

## Rationale

Participative policy formulation can assist the creation of more coherent and comprehensive organic farming policies because it can facilitate the communication and learning process between policy makers and other stakeholders, especially in terms of their rationales, challenges faced in organic farming, and possible adaptation strategies. For example, we identify stakeholders who are particularly critical towards the cost of organic certification as this poses challenges for smallholder farmers to enter the organic markets. Their strategy is to establish a local market community to facilitate the exchange of knowledge and non-certified organic products on a trust and peer-control based regime. In addition, we identify a number of NGOs, such as Farmer and Fisherman Association World Food Day (SPTNHPS) and Bina Sarana Bakti (BSB) Foundation who are organic farming pioneers in Central and West Java. These organizations are crucial in facilitating the transfer of organic farming techniques and knowledge to other NGOs, farmers, farmer groups, and government bodies. Given their number of connections in the social network (Refer to Policy Brief 7 for information on network analysis), these stakeholders are influential in promoting organic farming and interacting with farmers at the ground level and could therefore be involved in the formulation of policies.

## Implementation example

In Yogyakarta, there are several hamlets which participate in the 1000 Organic Village Program. While there is so far only limited information with respect to the success of this program, we observed that several farmer groups received training in organic farming practices which was given by field officers. In addition, we observed the roles of government officials in distributing organic inputs and in facilitating the certification process. The **learning process** and **social organization**, e.g. **organic farmer groups**, which were formed in the course of this program can serve as a foundation for **identifying relevant stakeholders** who have **experience** and **knowledge in organic farming**. This has thereby the potential to contribute **to policy formulation from the village level**.



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## Cross-ministerial cooperation

At the moment, MoA and its departments at different administrative levels take the leading role in designing organic farming policies and programs, their implementation, and their monitoring. In addition, some of the goals of organic farming, such as biodiversity and environmental conservation and international trade, can serve as entry points for cooperating with other ministries. Therefore, to develop organic farming in an integrated and holistic manner, the MoA may consider working closely with other ministries, especially in implementing and evaluating national organic farming programs.

## Rationale

Cross-ministerial cooperation can potentially improve the effectiveness and performance of the implementation of organic farming policies and programs. While current policies on organic farming emphasize the production side of organic farming, organic farmers are still facing challenges in selling their organic-certified products. There is also only a limited systematic documentation on the environmental benefits of organic farming in Indonesia. On the one hand, there have been several initiatives by the departments of agriculture to organize farmers' markets on their premises to support organic farmers in their respective regencies or districts. On the other hand, organic farmers need support from various institutions to access international organic markets. Based on our research we identified stakeholders, for instance Wahyu Tumurun Batik which sells natural-dyed batik and snake fruit cooperatives, who interact closely with the department of industry and trade in exchanging information on trade fairs for organic or natural products. Therefore, closer cooperation between MoA and the Ministry of Trade can assist organic farmers in accessing international markets. In addition, organic farming policies explicitly mention the contribution of this type of agriculture to environmental and biodiversity conservation, thus MoA may consider exploring a closer collaboration with the Ministry of Environment and Forestry to systematically evaluate and assess the potential environmental benefits of organic farming.

## Implementation example

Farmlands are predominantly located in rural areas and they are ecologically, culturally, and socially diverse. Village governors are usually well-informed about these local conditions. In addition, the availability of **village funds** allows village development according to the inhabitants' needs where needs are discussed from the neighborhood up to the village level. Therefore, MoA could establish closer cooperation with **the Ministry of Village**, for example extension workers can work together with village governors to identify opportunities and needs to identify potential areas where organic farming can be part of the village development plan.

# 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

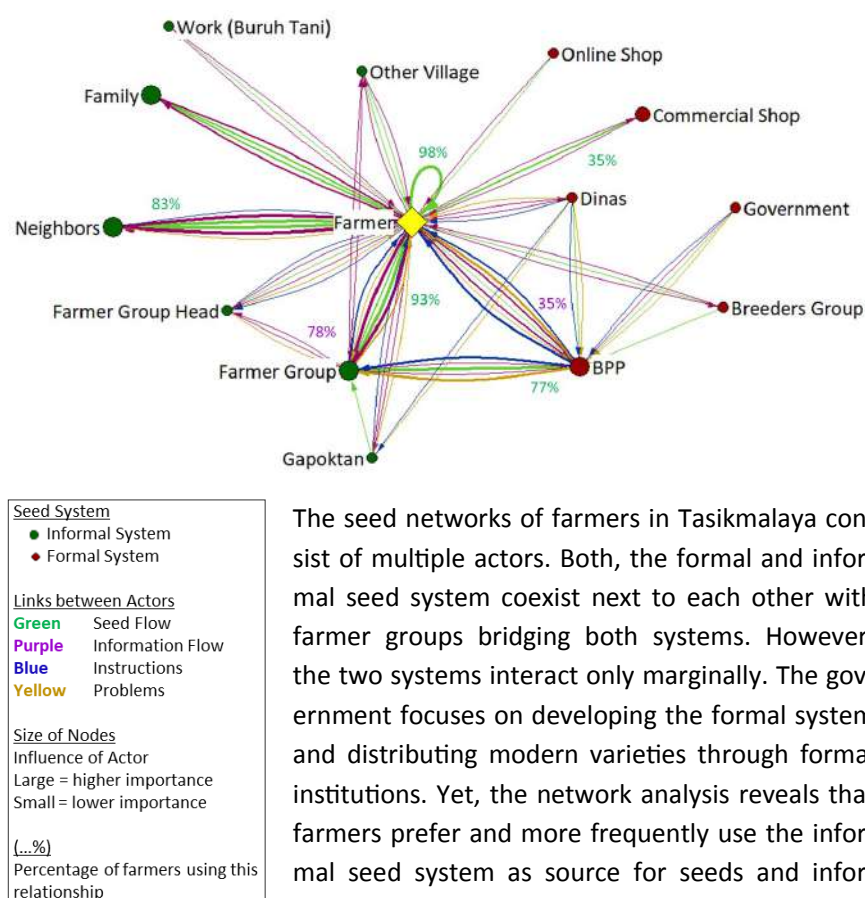
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individual maps were then also discussed in groups of farmers. Network analysis enables the identification of all seed relevant actors and their relationships, the modeling of the origins and paths of seeds, and the visualization of intra-community 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

**Figure 1.** Rice Seed Network



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%).

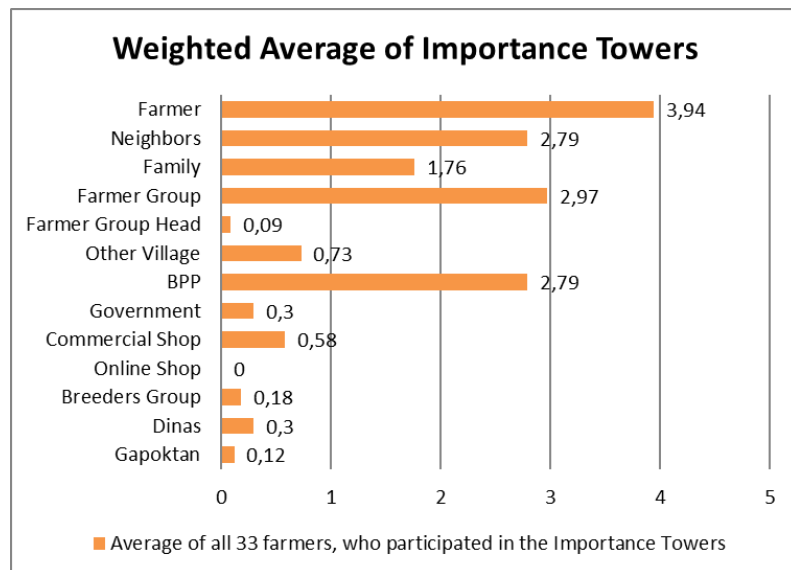
**Information:** While 78% of farmers exchange information with farmer group members, only 35% of all interviewed farmers reported to receive information directly from the BPP. As in the case of seeds, information from the BPP reaches farmers not individually but is rather delivered through the farmer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



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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.

# Organic Farming: The Impact of Training on Perception, Knowledge and Adoption

## A Lack of Information About Organic Farming Hinders Adoption

The agricultural sector in Indonesia faces several challenges, including food sustainability, environmental degradation and climate change. Growing concerns about the adverse health and environmental impacts of input-intensive conventional farming led to an increasing interest in organic farming. By abstaining from using chemical inputs and by promoting practices such as crop rotation and vegetative buffer zones, organic farming offers the potential to regenerate agricultural land and to counteract biodiversity loss. However, despite various government and NGO initiatives, the adoption of organic farming is still at a very low level in Indonesia.

More widespread uptake of organic farming requires a better understanding of the drivers and barriers to its adoption. Information constraints have often been identified as a key barrier to the adoption of agricultural technologies. Providing farmers with information can increase problem awareness and knowledge of new techniques, both are prerequisites for subsequent adoption. Extension programs and training are a frequently used policy intervention to remove information constraints, to change perceptions about innovations and to promote the adoption of new agricultural technologies.

This policy brief presents the results of a randomized experiment that was designed to evaluate the effectiveness of a three-day hands-on training on organic farming targeted at smallholder farmers. Specifically, the evaluation addresses the effect of the training on

- (i) **perception** of organic farming,
- (ii) **knowledge** about organic farming,
- (iii) **experimentation** with and, ultimately, **adoption** of organic farming.



## Topics

- The effect of training on the perception, knowledge and adoption of organic farming
- Random experiment

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## The Experiment

The experiment was conducted in two regions on Java: in Tasikmalaya district, West Java Province and in the three districts Sleman, Bantul and Kulon Progo all Yogyakarta Province. Pre and post-intervention data was collected in March and April 2018 and 2019 in 30 villages in Yogyakarta and 30 villages in Tasikmalaya. Respondents were sampled among farmer group members. In total, 1,200 farmers were interviewed, i.e. 20 from each sampled village.

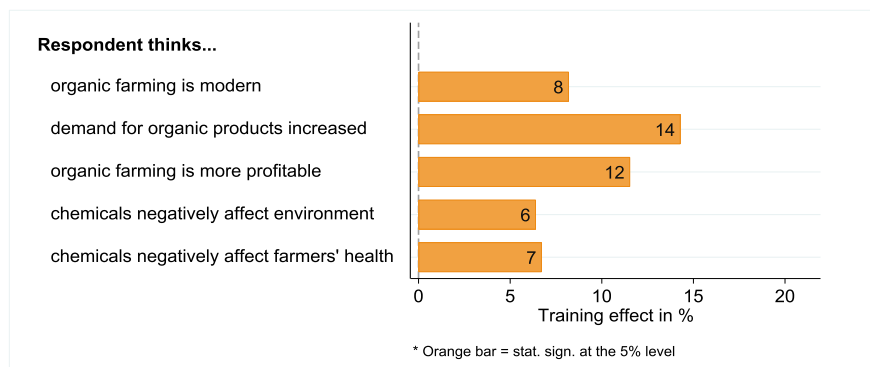
## The Training

The organic farming training ('treatment') was randomized at the village level. After the baseline data collection in 2018, respondents in half of the villages (equally split between Tasikmalaya and Yogyakarta) were invited to the training. Control villages did not receive any training. The Indonesian non-governmental organisation **Aliansi Organik Indonesia (AOI)** designed and delivered all trainings.

The **trainings were participatory** and involved many practical exercises such as the production of organic fertilizer, but also included some classroom sessions on organic principles and on problems associated with input-intensive conventional farming. The trainings were held in the respective villages to minimize travel time for respondents. Per invited farmer, the three-day training implied a total cost of IDR 315k (US \$23). The participation rate was very high, on average 18 out of 20 invited farmers per village participated.

## Findings: Perception

**Figure 1.** Effect of training on perception



The results show that the training changed farmers' perceptions of organic farming. Comparing the treatment with the control group shows that the training increased the share of farmers who perceive farming as 'modern' rather than 'old fashioned' by 8 percent. Further, farmers in the treatment group were 14 percent more likely to think (rightly) that within Indonesia demand for organic products has increased in the past five years. This is promising as it increases the attractiveness of converting to organic farming.

The training also increased the probability that farmers perceive organic farming as more profitable compared to conventional farming. Finally, the training strengthened farmers' awareness of the negative effects associated with conventional farming, which again is a crucial step for future adoption. The probability that farmers think that chemical negatively affect the environment and farmers' health increased by 6 and 7 percent, respectively.



## Findings: Knowledge

**Figure 2.** Effect of training on knowledge

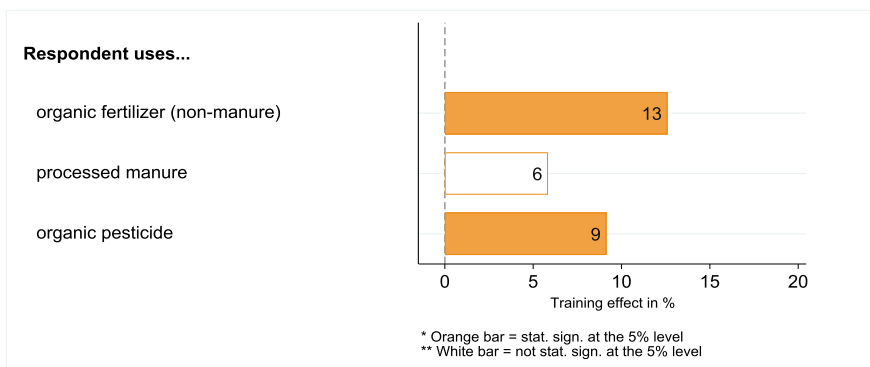


The evaluation shows that the **training was successful in enhancing farmers' understanding about organic farming**. Measuring knowledge served two purposes. First, it allows assessing knowledge gains. Second, it allows measuring the training impact in a way that is not prone to a bias arising from strategic answers by respondents, i.e. if they just reported what they think interviewers want to hear without however understanding. The positive effects for knowledge thus further strengthen the robustness of our findings.

The training increased the probability that respondents knew about the need for a buffer zone between organically and conventionally farmed land by 20 percent. Furthermore, the training caused a 16 percent increase in the probability that respondents knew that the conversion from conventional to organic farming requires some time. This is important as farmers should have realistic expectations about conversion. Training also positively affected farmers' knowledge about the practices that are not allowed in organic farming, such as burning plant residues. Additionally, the training increased the probability that farmers are aware of the existence of organic farming labels by 20 percent.

## Findings: Adoption/ Experimentation

**Figure 3.** Effect of training on adoption/ experimentation



Our findings indicate that **information constraints are a substantial barrier to the adoption of organic farming** as the information provision through the **training increased the uptake and use of organic fertilizer and organic pesticide**. Here, information refers to information about how to use organic practices and why to use organic practices.



## Randomized Experiment

In this study, we used a randomized controlled experiment (RCT). Random assignment allows for a causal interpretation of the impact of the training. Simply comparing organic to non-organic farmers or comparing farmers before and after adoption can be misleading as both groups of farmers might not be comparable and as other relevant factors change over time too.

Like in a medical trial, the random assignment in combination with the large sample ensures that both groups are structurally exactly the same. Therefore, any difference in outcomes observed can be causally attributed to the treatment as all other factors have changed for both groups (treatment and control) in the same way.



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The training increased the uptake of non-manure fertilizer by 13 percent. It also raised the share of organic pesticide users by 9 percent. Yet, we find no robust evidence that the training also increased the uptake of processed manure. The results are consistent with the focus of the training, which was on practical experience in producing fertilizer and pesticide with the materials farmers typically have at hand.

Hence, some farmers in the training group have started to experiment with and to adopt the methods taught during the training. Given the short observation window between the start of the intervention and the survey of just one year, it is too early to expect full conversion. This will take more time.

**Figure 4.** Number of new users of organic fertilizer by farmer group

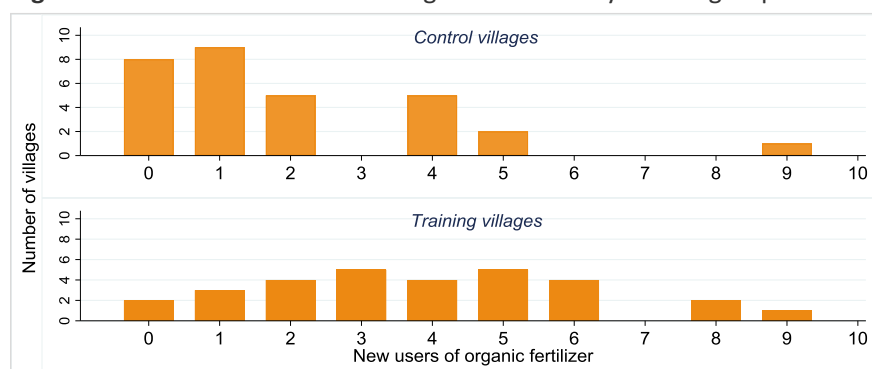


Figure 4 shows how many farmers did not use organic fertilizer during the survey in 2018 but did so during the survey in 2019. Compared to the control villages, there are more treatment villages which count three or more new users among the 20 respondents. On average, the **number of new users was four in the treatment group compared to only two in the control group**. This could be an essential difference as a widespread and continuous uptake of organic farming methods probably requires a critical mass of adopters who support each other and, through their experience, motivate others to start experimenting.

## Key Messages

- Information was provided through a three-day hands-on training at a cost of only IDR 315k (US \$23) per farmer.
- The training changed the farmers' perceptions of and particularly their knowledge about organic farming.
- The training increased the share of organic fertilizer and organic pesticide users. For organic fertilizer, the training increased the probability of use by around 12 percent.
- This evaluation is based on a one-year observation window which does not allow to observe full conversion; this will require another one to two years and hence will be subject of a follow-up study.
- The findings from this study can serve policy makers and other stakeholders that look for effective interventions to boost organic farming.

# Information Dissemination in Social Networks and its Importance for Organic Farming

## The identification of central actors in a Network can help to promote Organic Farming

The agricultural sector is still one of the key sectors of the Indonesian economy. However, with the looming climate change, the current soil degradation through high usage rates of chemical fertilizer, and environmental pollution, it will face severe environmental and agricultural challenges in the near future. Organic agriculture is a promising approach to address some of these environmental challenges and can contribute to smallholder and global food security. Since organic products have higher price premiums than conventional products, organic farming may also come with substantial financial benefits, especially for early adopters.

Yet, smallholder farmers often lack sufficient information about organic farming practices, keeping the adoption rates at very low levels in Indonesia. In remote rural areas, access to information is especially limited, yet can be induced through agricultural trainings and extension programs. These programs often follow the approach of targeting only a few farmers and assume that information and knowledge are spread to non-participating neighbors, peers, and other farmer group members. Identifying those farmers that are likely to adopt organic farming practices quickly and can spread the knowledge within their network therefore of foremost importance.

This policy brief presents the investigation of the role of social networks in spreading information about organic farming and the importance of the position in a network. More specifically, after the implementation of an organic framing training, we:

- i) investigated the **learning networks of farmers** and individual characteristics that determine information exchange,
- ii) investigated whether **central farmers**, i.e. farmers that are better connected in a network, **are more likely to experiment with organic farming practices** after they received information in the agricultural training,
- iii) compared two methods for the **identification of central farmers** with respect to costs and efficiency.



## Topics

- The importance of networks in information spreading
- Network Analysis; Network Centrality
- Identification of central farmers

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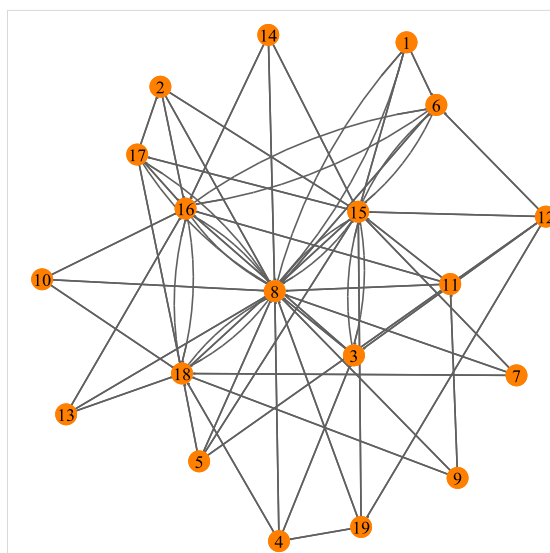


## The Organic Farming Training

In 2018, the non-governmental organization **Aliansi Organik Indonesia (AOI)** designed and implemented a three-day **hands-on training on organic farming** in 30 villages in West Java; 15 villages in Tasikmalaya district and 15 villages in Yogyakarta Province. In each village, 20 farmers were invited to participate and received extensive information about organic farming principles and methods. The sessions were complemented by interactive and practical exercises on soil and water management, plant cultivation, pest and disease control, and organic fertilizer production processes. Environmental and health benefits were discussed and highlighted; another section focused on business potential, certification regulations, marketing, and financial oppor-

## The Information Networks

**Figure 1.** Information Network in Kedungsari, Yogyakarta



In 2019 we interviewed those farmers who had participated in the training and asked them, whether they had experimented with some of the organic practices presented in the training. Further, we collected information about the farmers' general information sources and specifically asked for the names of village members from

which they usually receive information concerning agricultural questions. This data allowed us to calculate a measure for the position within the information network for each individual farmer (*centrality measure*) and to map the networks within each village. Additionally, we could identify individual characteristics that determine the probability whether two farmers are connected.

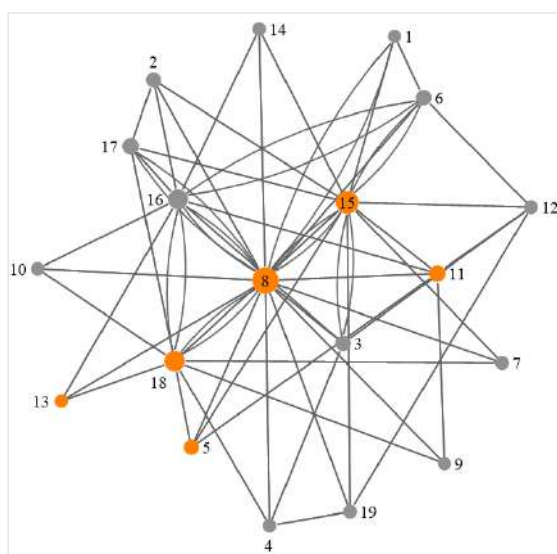
## Findings: Determinants of Information Exchange

Our findings show that information exchange is determined through certain characteristics. Individuals tend to exchange information and advice rather with others that are similar in **age**, belong to the same **farmer group**, and have **similar sized land holdings**. Whereas differences in education are not important, **different levels of income** of two individuals enhance information exchange between them. This should be taken into account when groups are formed for agricultural trainings or extension programs.



## Findings: Network Position and Adoption of Organic farming

Figure 2: Adopters (Orange) and Non-Adopters (Grey) in a Network



Our analysis showed that certain individuals adopted some of the practices they learned in the training while others did not. The highest propensity to experiment with organic farming were indeed those farmers, who were most central within the networks, i.e. those that were better connected to other farmers and had more *learning links*. The most central farmers we-

re up to **30 percentage points more likely** to be among the early adopters of organic farming practices after the training than peripheral farmers of the network.

## Findings: How to identify Central Farmers?

If agricultural trainings or extension programs specifically want to target central individuals, it requires to identify them beforehand. We compared two methods of identification strategies with respect to their costs and effectiveness:

**Method 1:** We asked all farmers in a village to nominate **one farmer**, who they think is the **best informed** in the village with respect to agriculture. This takes considerably few time (and less financial resources).

**Method 2:** We asked all farmers about their learning links to **any other farmer in the village** (*village census*). This takes considerable more time (and more financial resources), but also provides more information.

For both methods, we estimated a measure of centrality for each individual and investigated how well they correlate with being an early adopter, i.e. with experimenting with organic farming practices. Our results show that **Method 2** was more cost-effective in identifying the most central farmers and, thus, the early adopters.



## Network Analysis and Centrality

Network Analysis is a method that investigates social relations between individuals. We asked every farmer, from whom they learn or get new information about agricultural practices. This information allows to draw a map of all *learning links* within a village and to identify central and peripheral farmers. The centrality measure that can be calculated will provide information on how well an individual is connected within a network. More connections mean that a farmer has theoretically access to more information.



## IndORGANIC

### Research Project IndORGANIC

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## Key Messages

- Socially central individuals are those with the highest propensity to adopt organic farming practices after they received a training on organic farming practices.
- Central farmers should specifically be targeted for agricultural extension and training interventions since it can enhance adoption of organic farming through social learning.
- Targeting these central farmers will increase information spreading within the network and lower the adoption barriers for peers and other network members.
- Individuals exchange information and advice rather with others that are similar in age, belong to the same farmer group, and have similar sized land holdings.
- Simply asking village members for the names central farmers is not as cost-effective as collecting full information about social structures within a village to identify central farmers.

# Do Indonesian Consumers Value Organic Rice?

## Evidence from an Incentive-Compatible Willingness-to-Pay Experiment

With a rising awareness of the adverse environmental and health effects that come along with conventional farming, the Indonesian Government and various non-governmental organizations have started to promote organic farming in Indonesia. Most of the efforts concentrate on the supply side, i.e. train farmers in organic production practices such as the utilization of organic fertilizer and organic pesticides. But are local consumers prepared to adopt organic products? The knowledge of organic products and the awareness of their potentially positive effects on health and the environment seem to be still at a very low level among consumers. IndORGANiC, a German-Indonesian collaborative research project explored consumers' willingness-to-pay for organic products in order to make an assessment of the market potential and to formulate recommendations how this potential can be further developed. This policy brief summarizes the main findings from this study.



### Topics

- Willingness-to-pay for certified organic rice
- Factors influencing demand for organic products

## 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 Pertanian Bogor (IPB) and Alliance Organic Indonesia (AOI). AOI is an umbrella organization for organic agriculture in Indonesia.



## An Incentive-Compatible Willingness-to-Pay Experiment

The experiment was implemented in urban and semi-urban areas in and around Yogyakarta city. The consumers' willingness-to-pay (WTP) has been 'elicited' through a variant of the Becker-DeGroot-Marschak (BDM) method which confronts participants with a real purchase decision as they are invited to submit a price bid for 1 kg of certified organic rice. Only those participants who bid an equal or higher price than a randomly drawn price get the rice at the cost of the drawn price, thereby providing an incentive for consumers to make a bid that corresponds to their true preference for the product. Box 2 provides a graphical example using dragon fruits instead of rice to illustrate the experimental procedure. Moreover, participants were randomly assigned to either a treatment or to the control group. There were two different treatment groups. One treatment group was provided with information on health benefits of organic consumption, whereas another treatment group was informed about the environmental benefits of organic consumption. For this purpose, both treatment groups were exposed to a short video. The control group in contrast was only briefly introduced to the basic principles of organic farming but was not shown a video. The hypothesis was that providing participants with information about the benefits of organic consumption could increase the WTP of respondents. The experiment used a local rice variety. The authenticity of the organic rice was proven to the respondents with the national certificate 'Organik Indonesia'.

## Results

### *Willingness to Pay for Organic Rice*

Participants of the experiment were willing to pay on average a price of IDR 13,771 for 1 kg of certified organic rice. This compares to a market price for 1 kg of conventional rice of IDR 11,475, i.e. organic rice gets a price premium of about 20%. 66% of the study participants submitted bids above or equally to the randomly drawn price and hence purchased the rice. The outcomes by treatment groups are summarized in Figure 1. Comparing the WTP among different treatment groups shows a higher WTP for both treatment groups compared to the control group. However, the difference is not statistically significant.



Asking respondents what they perceive to be the benefits of organic rice, almost 80% of respondents state that they perceive organic food to be healthier, regardless of their treatment group. 58% of respondents report to have bought organic rice at least once before. Among those, the WTP is on average IDR 1,693 (13%) higher than of respondents who never bought organic rice before. This difference is significantly different (at the 1%-level). This might be a pure selection effect, i.e. consumers, who bought it before, did so because they have a higher preference for organic rice. Or it might be an experience effect, i.e. consumers who purchased organic rice before are better informed about the health benefits.

**Figure 1.** Willingness to pay in IDR by treatment group

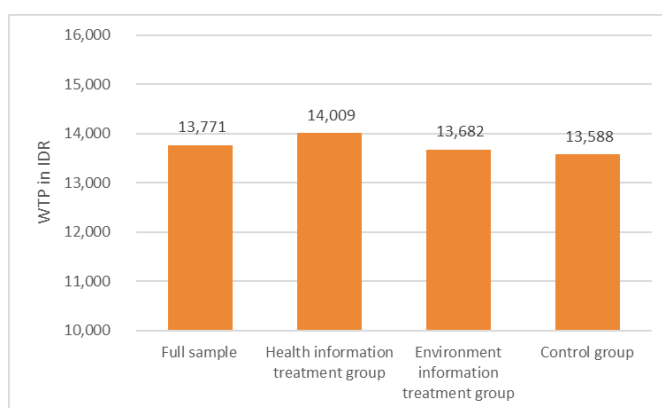


Figure 2 shows the ‘demand curve’, i.e. the share of respondents that would buy organic rice given a certain market price. As expected, this share is the lower the higher the market price. The actual market price for certified organic rice directly purchased from the farmer lies at IDR 15,000 per kg. A price of IDR 15,000 would result in an uptake rate of 44% among the respondents of this study. Market prices for certified organic rice purchased from the supermarket are at least IDR 25,000 per kg, which only one person in this study offered. This would imply an uptake rate below 1%. An uptake rate of 80% would require that the price of organic rice falls below IDR 11,000. Since the WTP does not just depend on how much someone values the product but also how much he or is able to pay for the product, it is also not surprising to find that the WTP increases with the respondents’ households’ income level. Respondents were asked to group themselves into three categories, i.e. a household income of below IDR 2,000,000, a household income between IDR 2,000,000 and 5,000,000, or a household income above IDR 5,000,000. A higher household income level increases respondents’ WTP by 8 to 16% on average.



### The Becker-DeGroot-Marschak Approach

In contrast to simple survey questions where the stated WTP remains without consequences for the respondent, the BDM approach incentivizes respondents to report their true WTP as consumers have to buy the product if their bid is equal to or higher than the drawn price. Accordingly, respondents offer higher prices the more they value the certified organic rice (and the more they are able to pay). Furthermore, the estimated WTP is more flexible compared to survey questions, as no fixed categories are used. Eventually, this yields more precise data which allows to draw a more detailed demand curve.



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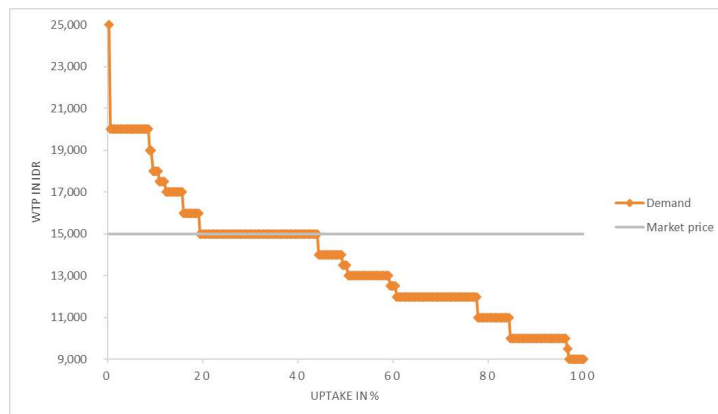
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**Figure 2. Demand Curve**



## Key Messages and Policy Recommendations

- People are on average willing to pay a premium of 20% for certified organic rice compared to the price they usually pay for conventional rice.
- However, the estimated WTP is relatively low compared to the actual market price of organic rice. Not even half of the respondents would be willing to purchase organic rice at the actual market price level of IDR 15,000.
- This uptake rate decreases further considerably for higher market prices, which are for example prevailing in supermarkets.

Based on these findings, several policy interventions to increase the demand for organic rice could be tested. The most obvious might be price subsidies, yet this might not be sustainable and may harm producers of conventional rice. Although our information treatments were not effective in the experimental setting, it is very likely that awareness of the potential benefits is an issue, especially, because those who have some knowledge about organic products *do* highlight potential health benefits. Possibly the videos used in the experiment were not detailed and informative enough, so that longer and better conceptualized videos would have larger effects. Many respondents did also not follow the videos very carefully, so a calmer setting might be helpful too. Yet, there definitely seems to be less awareness for the environmental benefits. Hence, future awareness campaigns could aim to raise more attention for these aspects.