The Struggle of Organic Rice in Thailand: A Multi – Level Perspective of Barriers and Opportunities for Up Scaling

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Abstract

Thailand has been experiencing agrochemical-based commercial rice production for several decades now. Until recently, organic rice production has survived, but with little expansion. The present study applies a Multi-Level Perspective (MLP) to analyze the composition of the related socio-technical system, from macro to micro levels, to cast a light on both the large picture and niche operations. This research used mixed methods comprising documents and interviews, while compiling secondary statistics to analyze the establishment and dominance of commercial or mainstream rice, as well as the emergence of organic rice as an experiment. When analyzing information at multiple levels, it was found that the agrochemical-based commercial rice regime has become a dominant socio-technical regime comprising; interwoven power of government policy, commercialized agro-businesses, markets, industry, technology and Thai cultural dimensions. Furthermore, government policy has been responding to the increasing landscape changes, it has simultaneously created barriers for organic rice production. The development of organic rice as a niche experiment was partly due to landscape changes but also due to NGOs, farmers and academic leaders, often as a reaction to the negative impacts of agrochemical-based commercial rice. This in-depth study has found that if intensive promotion is applied, organic rice could become quite successful in terms of production and marketing. Until now, its expansion has been very minimal due to government regulations and policies, along with fewer business supports. Therefore, there have been limitations in the up scaling of such experiments.

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Thus stronger attempts are needed to overcome resistance from the dominant regimes rather than focusing at the farm levels as has been the case.

Key words: Struggle/ Organic rice/ Multi-level perspective/ Up scaling

1. Justification of Analytical and Conceptual Framework

Rice production plays a key role in the economy and livelihood of the Thai people. Due to the progressive achievements made by the Green Revolution and the efforts to increase rice yield for export (Siamwalla, 1979; Forssel, 2009), the government had built up a policy to support extensive rice production and network marketing. This led to a regime of rice production through the expansion of rice growing by investing in irrigation systems, infrastructure, and other pro-rice projects. Support from the World Bank further enabled the construction of dams, canals, and other infrastructure. Farmers and merchants have benefitted from the advantage of the new rice varieties, strains and fertilizers, apart from other technological advances (Perehudoff, 2007; Forssel, 2009). The International Rice Research Institute (IRRI) in The Philippines have also been disseminating knowledge, technology, providing new rice strains, and other information to rice producers in Thailand. The rapid growth of commercial rice production all over the country, is proof of the successful effort of government and business sectors and this has influenced both social and technological aspects of farmers and farm workers alike (3.7 million households representing 17 million people in agriculture) (Issavilanonth, 2009). By the year 2011, Thailand had become the sixth largest country of rice production in the world with a total of 456.3 million tons following an increase of 23.3 million tons(5.1percent), and became the top rice exporter with 9.5 million tons per year, accounting for 29.8 percent of the world market share of 31.9 million tons (USDA, August 2011).

Due to global rice exporting competition, there has been a negative impact on food safety owing to the intensive application of pesticides and fertilizers. In particular, there have been such negative impacts as degradation of ecosystems and natural resources, including the contamination of water

sources (Prapamontol *et al.*, 1999), soil (Praneetvatakul.*et al.*, 2003; Mingtipon and Keawtien, 2006), food residues (Prapamontol *et al.*, 2006, ; Russamee, 2001; Thapinta, Hudak., 1998), and farmers' health and socio-economic conditions (Kerdnoi *et al*, 2006; Atisook *et al*, 2003). Thus the emergence of organic rice production as an alternative to the mainstream rice production came into being. However, although there are NGOs and leading farmers who have the capacity to produce organic rice, the expansion has been very minimal. The area of organic rice farming in 1998 was 6,281.41 rai, and 77,005.03 "rai" in 2007 (Panyakul and Pichpongsa, 2007).

Despite the fact that organic food production is in great demand now and the practice has become quite sustainable, its expansion has been very limited. Several researchers have tried to identify the causes of the problem and have suggested solutions, without much avail though. In searching for deeper underlying factors, this research applied the so-called Multi-Level Perspective (MLP) to be able to picture the development and the transition of major changes in society, which include the relationship between socio-technical regimes and other elements at micro and macro levels.

MLP, is now a widely accepted tool used for the analysis in transition research. It was developed through a large number of case studies on historical transitions intending to understand the longer-term socio-technical changes (Geels, 2007). The pathways of transition are connected with the processes and relationships of multiple systems at three levels: the innovative practice (niche experiments), the structure (also referred to as the regime) and long term exogenous trends (also referred to as the landscape) (Schot, 1998; Rip and Kemp, 1998; Geels, 2005). These pathways represent functional relationships between actors, structures and working practices that are closely interwoven (Grin *et al.,* 2010).

The MLP and its methods, enable in a conceptual and empirical manner, (1) why the existing socio-technical system, or the regime becomes stable to the strong dependencies; (2) an analysis of the entire life cycle of system innovations and transitions; (3) and it enables how, under landscape change, an investigation of how the regime responses and the novelties emerge at the niche level; moreover (4) it enables the synthesis of the interaction between the regime and the new

experiments. If an experiment is strongly supported by several actors, transition will be evident. The MLP makes it clear that transitions are brought about through the interactions between processes at different levels. Niche-innovations are important because they are the seeds of transition. However, novelties may remain in niches for a long time. As long as the existing regime remains stable, novelties have little chance of breaking through (Grin *et al.,* 2010). The regime concept is often used in a negative way to explain why new innovations do not break through. Regimes may thus pose barriers and limit diffusion of niche-innovations (Raven and Geels, 2010).

In view of the above, this research is applying MLP as a conceptual and analytical tool to better visualize and confirm the actual situation through the following main research questions. A.) How has the commercial rice regime (at the macro level) transformed and adapted itself and become a barrier to the expansion of organic rice production (as a novel experiment at the micro level)? B.) Also, and more specifically, 1) How, has the commercial rice production regime transformed and adapted to the landscape change and made an impact on the micro level? 2) How, amidst all these changes, has the organic rice production, as an experiment, emerged? 3) What has been the interaction between the commercial rice production regime and the niche organic rice experiment at the micro level, and to what extent has organic rice production been struggling to increase its scale?

2. Methodology

In order to collect and analyze information, a mixed method was applied in this research. In particular use was made of; 1) The socio-technical development data of the commercial rice regime were collected by a) a large number of documents and secondary statistics from national and international sources, such as research reports, journal publications, academic seminars, books etc. b) Interviews with two businessmen, three academics and two agricultural officers;2) The landscape impact on regime and niche emergences as reported in research reports and documents, statistical data and publications from national and international sources; 3) Organic rice production as a niche development and its struggle for up scaling as reported by a) several previous research documents, publications,

statistical data about organic rice production from government and NGOs including national and international sources etc. ;b) A case study in Phrao District, Chiang Mai Province where organic rice production has been very active. In sum, this empirical study consisted of in-depth interviews with four organic activists, five organic rice producers, three academics two agricultural officers, and included field observations. All data were analyzed using the MLP as a conceptual framework. Firstly, to describe historical development of the commercial rice production system and it becoming the dominant socio-technical regime. Secondly, to investigate landscape changes and their impacts on (a) adaptation of the regime which later became structural barriers to emerging alternative rice production and (b) opportunities that enable organic rice production at the niche to start up. Thirdly, to analyze situations, conditions, practices, and particularly the limitations for breaking through of organic rice production. Finally, linking all of the above analyses to empirically synthesize the interactions of the regime and the niche, for the conclusion of this study.

3. Results

In applying the MLP conceptual framework, the research rendered the following results:

3.1 Development of Socio-Technical Regime of Commercial Rice

The development of the commercial rice regime was due to government policy, which implemented operational activities comprising of a budget supported by international organizations and government itself for continual reinvestment. Ever since the progressive achievements of the Green Revolution and the efforts to increase rice production for export (Siamwalla, 1979; Forssel, 2009), the government devised a policy in support of extensive rice production and its marketing. Specifically; 1) policies supporting the expansion of rice growing by investing in irrigation systems, infrastructure, and other pro-rice projects, 2) policies supporting production, trade, consumers, and business networks. This had an effect on the role of rice on the Thai economy and world food production. Rice also had stakeholders at multiple levels, such as politicians, traders, producers, and consumers in the domestic and

international markets. Thailand built networks of businesses and supported commerce with deferred tax payments, for reasons such as; (a) entrepreneurs of the agrochemical industry and the production of agricultural machinery, (b) entrepreneurs of mills and rice transportation, (c) the commercialization and businesses of rice moving from community level toward export and (d) industry and businesses that are somehow involved in rice and rice products. The rice production and commercialization became embedded into networks of production systems, chains of businesses and commercialization both in domestic and international markets. Consequently, the momentum of commercial rice production has been continually growing. For instance, during the years 2000 to 2010, the area of rice cultivation has increased to approximately 62 million rai (IRRI, 2000; FAO, 2011). The volume of rice production is now approximately 25 million tons, which accounts for 19.0 percent of the Gross Domestic Product (GDP) in the agriculture sector (Office of Agricultural Economics, 2012).

3.2 Socio-Technical Landscape Change

The socio-technical landscape literally means something around us that we can travel through and, metaphorically, something that we are a part of and sustains us (Grin, 2010). The landscape concept also applies to man-made environments such as urbanization, globalization, environmental problems, and macro-cultural changes which form an exogenous environment that usually changes slowly and influences niche and regime dynamics.

The socio-technical landscape has an impact on the production of Thailand's commercial rice regime due to global rice exporting competition, an increased awareness on food safety and green environment, have eventually forced the regime to adapt itself. The Thai government and rice industries have, on the one hand, introduced regulations complying with world organic agricultural standards, whilst inducing farmers' productivity and enhancing export systems, with the intention of maintaining the regime‘s dominance. The landscape changes have also created opportunities for innovation, allowing organic rice production to emerge as a niche experiment.

3.3 Development and Struggle of Organic Rice Production as a Niche Experiment

The landscape changes together with the negative impacts of the dominant rice production system, specifically relating to ecology, economy and health, have created conditions for an alternative approach, innovation through organic rice production. Thailand has the potential to increase the high quality of its rice products, in particular organic rice that appropriately meets the standards of food safety and ecology of the farmlands. However, government has not pushed the emergence of organic rice, but it started from the co-evolution of NGOs, academics, and individual farmers who had suffered from the impact of pesticide use, and a small group of people who called for a natural agriculture system for safe food, and environmental protection.

In order to get a clearer picture with empirical data of organic rice production at the niche level, a case study was undertaken in Phrao District, a fertile area in northern Thailand considered to be one of the best in terms of rice production. The project there was fully supported by NGO activists. This case study shows that organic rice production could be developed through the cooperation of the actors who supported organic rice as a sustainable product, and as a food security for farmers. The success of this case relied on working together and exchanging knowledge and technology to develop an organic rice production process that would meet organic standards of the IFOAM (International Federation of Organic Agriculture Movements, is an internationally applicable organic standard that can be used directly for certification. It offers a global platform for organic standard setters to discuss standards and create synergies for standard development and harmonization at the global level.) and the EU (European Regulation on organic food, all food products sold as organic must by law follow certain standards (both European and national) and have to be regularly inspected and certified by approved certification bodies. These regulations for organic production in Europe set out objectives and principles of organic production, as well as practices and inputs that may be used in farming and growing and processing.), including farm management, inputs, yield development, and marketing products. In addition, the key factors of success were co-working with a staff who supported organic rice

producers together with land fertility, the local wisdom of rice cultivation and the inspiration to escape from mainstream production.

This research confirmed results from the past which the farmers had to struggle during the process of production through to the marketing of organic rice production. For instance, at the beginning of the experimental phase, farmers faced many obstacles in the production system, like the degradation of soil caused by the intensive farming and usage of chemicals. The organic farmers had to fight against the technical knowledge of the production system and farm practices. Other obstacles included the need for soil restoration, the quality of rice seed, weeding and pest management, off-farm work and the perceptions with regard to organic agriculture (Pattanapant A. *et al*., 2009). Moreover, the struggle of socio-economic conditions can also be seen in the adoption of family labor when there was a decrease in rice yields and less income for family expenses. Primary assistance was given by NGOs that offered knowledge of organic techniques and skills through various sources, (Pattanapant A. *et al*., 2009; Vandergeest P., 2009). Specifically, it was found that there was a lack of support in the form of policy for organic production in many aspects, such as promoting consumer awareness, organic regulations and standards, which were unclear for both farmers and consumers (Limnirankul B. *et al*., 2010).

4. Discussion

Analysis of the empirical data renders the following.

4.1 Dominant Regime and its Interaction with Organic Rice Production

The dominant regime of commercial rice production, specifically the National Policy and the related commercial support, are mostly to blame for the barriers of organic rice production. However, the opportunity for organic regulations, which strengthen niche markets, can support organic rice only for those farmers who adopt them, as shown in Table 1

Table 1: Dominant Regime and its Interaction with Organic Rice Production

Socio–technical component of organic rice production and interaction with commercial rice regimes	**Emerging phenomena affecting organic rice production**	**Factors affecting organic rice production from up scaling**	
		As opportunities	**As Barriers**
Roles / Impacts of Regime			
a) National Policy	Main Policy: To emphasize commercial & export rice production with major support of mainstream rice production, minor support of organic rice production.	None	Focus is mainly on export, with lack of support for organic rice production.
	Intermediate Policy: [1]Rice Mortgaging	None	Rice Mortgaging Policy destroyed small organic rice producers and limited the transformation and expansion due to high mortgage prices and its focus on quantity, which is not in favor of organic rice farmers.
b) Commercial support	Large network of commercialized rice mills and exporting businesses supporting mainstream rice production, leaving a small portion for organic rice production.	None	Commercialization and businesses obtained money and profit from mainstream rice but organic rice is a low level business.
c) Regulations	Emergence and enforcement of IFAOM, EU to comply with international food safety schemes.	Rice production entrepreneurs run their businesses.	Strengthen niche markets that support organic rice, only for the farmers who adopt the organic regulations.

[1]The rice mortgage policy was a "Pheu Thai" campaign platform that helped push the party to victory in the 2011 general election. According to Prime Yingluck Shinawatra, the pledging price of white rice at Baht 15,000/ton and Thai jasmine rice at Baht 20,000/ton[2]. This high price challenge farmers to produce intensive commercial rice more than organic rice.

Source: http://www.thaigov.go.th/en/news-room/item/61372rice-mortgage-scheme-to-start-7october. [Accessed on 25 May 2014].

4.2 Development of Organic Rice Production at the Niche Level

The development of organic rice production emerged from the awareness of NGOs, leading farmers, and academics who realized the impact of the commercial rice industry that relies on agrochemical-based inputs such as pesticides and fertilizers. Analysis of the factors affecting organic rice production reveals that the academic institutions involved, GOs, NGOs, and leading farmers used opportunities of organic rice production at the niche level, each at their own capacity, facing many barriers from the dominant regime thus preventing them from reaching larger scale operations, as shown in Table 2 below.

Table 2: Situation and Roles of Key Actors Supporting Development of Organic Rice Production at the Niche Level

Situation and Role of Key actors	**Emerging Phenomena Affecting Organic Rice Production**	**Factors Affecting Organic Rice Production from Up scaling**	
		As Opportunities	**As Barriers**
a) Situations: Crisis from commercial rice production	Impact on health, debt, and production costs	NGOs and serious leading farmers need to avoid using chemical agriculture products.	Farmers cannot manage problems by themselves. They need the support of technology, knowledge and marketing from NGOs.
Marketing	Awareness of food safety among the middle class	Small and scattered pockets of organic food in urban area markets.	Awareness has not yet been strong enough to stimulate organic consumption and sources of products are very limited.

Table 4.2: (continues)

Situation and Role of Key actors	Emerging Phenomena Affecting Organic Rice Production	Factors Affecting Organic Rice Production from Up scaling	
		As Opportunities	As Barriers
Agricultural production	Awareness of alternate agricultural methods.	Small and scattered experiments of sustainable agricultural, and organic agriculture at the niche level.	More ideas are needed in management in practice. The farmers want to change, but with limited support, commerce is still dominant.
b) Role of academic institutions	Produced research in support of organic agriculture.	Push toward the reduction of chemical use in production.	Not powerful enough to lead to further changes in policy.
	Raising awareness among consumers and farmers for the consumption and production of safe food, seeking solutions to reduce chemical usage.	None	Could stimulate a need for consumption and production of safer food but lacks support in the form of change in policy and community perception.
c) Role of GOs and NGOs	NGOs play a key role in supporting the knowledge and technical training, services for certification and standardization, inputs credits and marketing mechanisms.	Intensive and complete support from leaders and farmers who wish to avoid using chemical substances.	Could only work with small groups because the staff would have to participate and adjust their ideas and production processes together with the farmers, especially in the beginning.
Provincial and Local Government	Provide assistance through practical demonstrations on the adoption of organic agriculture, and training on planning policies and budgets.	None	Lack of monitoring and continuous support from bureaucracy, dependent upon policies and budgets that are more oriented towards mainstream production.

Table 4.2: (continues)

Situation and Role of Key actors	Emerging Phenomena Affecting Organic Rice Production	Factors Affecting Organic Rice Production from Up scaling	
		As Opportunities	As Barriers
d) Key Role of Leading Farmers	Production: Produce organic rice using on-farm resources and local wisdom through trial and error.	Starting and becoming an example for practical organic rice production	Lack of support or subsidies for organic rice production, lack of knowledge and technology, post-harvest management and marketing.

4.3 Operations and Struggle for Up scaling of Organic Rice Production

Organic rice production struggles as a small operation in comparison to commercial rice operations due to inherent production and farm practices, harvesting, yield management, and marketing. These factors are dependent on the capacity of farmers, such as their local wisdom, on-farm resources and the training approaches of NGOs *(As they said: "To promote the production only officials of Green Net Foundation which share in function. No government official comes to promote. New knowledge derived from watching TV, listening to radio, exhibition booth and sometimes has to inform new knowledge to officials": coding from in-depth interview with famers in Phrao: 1 April 2013*). But most of the constraining factors were bigger issues, such as the development of knowledge and technological support of organic rice production, business investment of organic inputs, machinery and mills *(As they said: " need funds to support the activities of the group and remove the purchased paddy from members" " need warehouses for storing paddy purchased of members" "Constraints of organic rice production: The government policy support high price for commercial rice, so organic rice farmers turned to growing rice by chemical use instead . Methods of chemical use for rice cultivation is easier than producing organic rice": coding from in-depth interview with famers in Phrao: 21 March 2013)*, promoting awareness to consumers and the distribution of products. As shown more details in Table 3

Table 3: Operation and Struggle for Up scaling Organic Rice Production

Socio –technical Components of Organic Rice Production	**Emerging Phenomena Affecting Organic Rice Production**	**Factors Affecting Organic Rice Production from Up scaling**	
		As Opportunities	**As Barriers**
1)Means of production a) Land	Small farms, located between chemical rice production and a need for pollution prevention zones.	None	Buffer zone management for chemical and biological contamination protection.
b) Capital, Labor and Machinery	Organic inputs, family labor, tractors and combine machines shared with chemical rice production.	Natural resources for organic inputs with local wisdom.	No investors for fertilizer, organic substances, or machinery to support organic rice production.
2) Farm Practice a) Soil	Soil fertility improvement and preparation with natural substances.	On-farm resources and local wisdom	Lack of technological and knowledge support for soil quality revival and increased nutrients for organic rice plantation.
b) Water	Water supply from both rainfall and sharing with chemicals rice production.	Natural water resources and local wisdom management.	Need of water retention and having to manage and protect from toxic contamination from chemicals.
c) Seed	Seed quality selection and preparation for agronomy, no pesticide use for pest protection	Could select suitable rice breed for organic production.	Lacking research and development for seed quality improvement.
d) Pest &weed control and production quality	Pest and weed management with traditional methods and on-farm resources. Buffer- zone protection	Exchange knowledge and technology from training and local wisdom.	Lacking organization for developing standardized quality substances for pest and weed control, and standard ingredient for different period of growth.

Table 3: (continues)

Socio –technical Components of Organic Rice Production	Emerging Phenomena Affecting Organic Rice Production	Factors Affecting Organic Rice Production from Up scaling	
		As Opportunities	As Barriers
3) Harvesting and yield management	The sharing of combine harvesting machines which risk chemical and biological contamination.	None	No machinery exclusively for organic rice harvesting, causing an increased workload in order to prevent risk of chemical and biological contamination.
Milling	Machines, tools and equipment are reliant on organic standards.	None	No standard mill or storage support for organic rice in community.
4) Marketing a) Domestic market	Shrinking market: limited producers, areas of production and awareness of consumers. Marketing promotion: Limited advertising, channels for selling, places, price, quality control, and packaging	Awareness of food safety by middle class consumers.	Lack of advertising and no available channels for selling organic rice because commercial rice is embedded in channels marketing and selling.
b) Export market	Organic Regulations: IFAOM and EU have high standards, from farm practices to post harvest production, for protection of chemical & biological contamination. Competitiveness: Business investments for exporting organic rice.	NGOs and private enterprises have the capacity to approach importing countries where consumers have more awareness of food safety and environment.	High requirements for organic certification, a need for intensive support of knowledge and technology of farm practices and official support for standardizing certification processes together with maintaining international accreditations and developing more areas of organic rice production.

From the tables it emerges that the production etc. of organic rice, at the niche level, does not have the support and subsidies from government for all components as, the commercial rice regime is embedded in all socio-technical components of production, even though there has been NGOS and farmers who tried to support and produce to their capacity.

5. Conclusions

MLP analysis reveals the components that create barriers toward organic rice production up scaling. An overview from this study is shown in Figure 1.

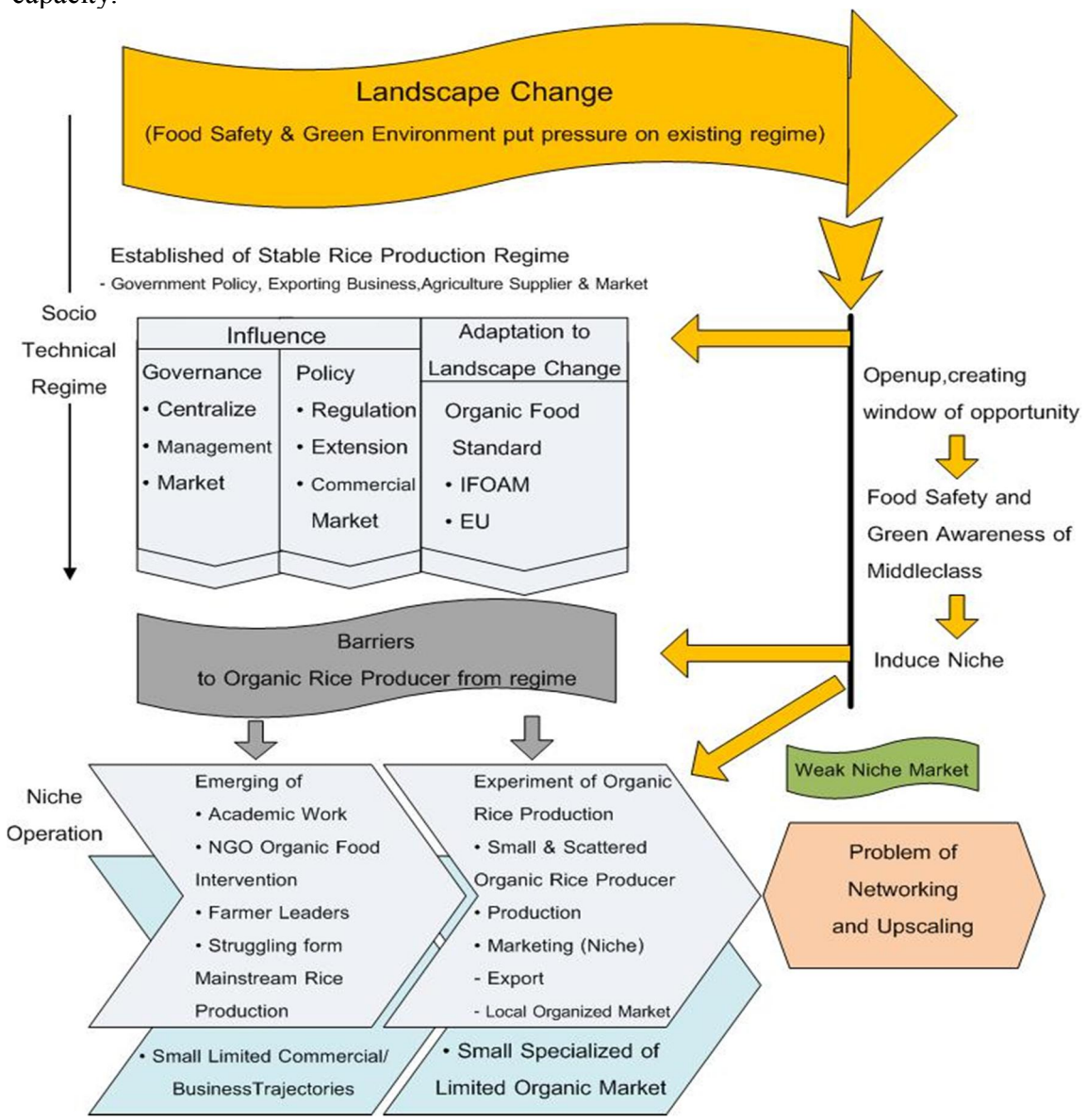

Figure 1: Organic rice production and its struggle for up scaling

Figure 1 renders answers to the research questions referred to above, as follows:

1. The commercial rice production regime is a co-existing phenomenon of government policy and the networking of businesses and commercialization, specifically with regard to; a) export policies, agricultural extension, and infrastructure, b) agricultural technology suppliers, c) the established marketing networks that led to rice production as a socio-technical regime, which have influenced governance and policy. Furthermore, the regime could adapt to the landscape changes of food safety and green environment such as setting up organic food standards that have become an obstruction for organic rice production and it's up scaling in the niche experiments.

Moreover, the socio-technical system of the regime is interwoven with the power of government policy, commercialized agro-business, commercial support, industrial suppliers and marketing. In addition, the strong support through government policy, political views, and boosting Thai economic growth, has transformed to be the existing regime. However, landscape change, which occurs worldwide, specifically regarding food safety and environmentalism, has impacted the Thai commercial rice regime. Meanwhile the regime is trying to reassure the consumers and society that commercial rice production should be of no concern regarding food safety and care for the environment.

2. On the contrary, organic rice production, which emerged from landscape change, was started by NGOs, leading farmers and academics, but was not endorsed by the regime and has thus experienced limited growth. As became clear when using the MLP, it has small and limited elements of support, such as business investment, marketing and input supplies. In addition, government policies that are specific with regard to food standards have pushed down organic rice production. These become small and limited socio-technical components of organic rice production, together with the backing of the commercial rice regime. These descriptions of economics, marketing, ecology have been argued about in the past.

3. The up scaling of organic rice may fluctuate with the interactions between the commercial rice regime and the niche experiment of organic rice as follows:

1) The mainstream, commercial rice regime is influenced by government and policy, commercialization and businesses involved in the production such as the agro-chemical industry, machinery, mills, and rice trade industry, the transportation sector, processing plants and rice yield management. These components have a network of connections that cover a large regime, which makes it difficult to change to a new system, and they have become the barriers at the niche level limiting production increases. For this reason, organic rice, which fills a need and intends to expand, faces many farmers outside the control of government so that it remains only a fraction of the total market. Consequently, organic rice cannot compete with the mainstream market because the consumers lack awareness.

2) The commercial rice production system and production factors do not leave enough space for businesses and investors to support organic rice production. Moreover, a powerful distribution channel has covered the marketing and promoting of mainstream rice, thus there is a serious need to create space for the organic rice market.

This research is an endeavor to show a new view, different from others that just mention weaknesses of farmers purportedly because of the lack of knowledge and declining ecosystems in use by them. Past research was focused on the operational level but did not cover the massive super structure. Use of the MLP helps creating a better understanding of the visuals of commercial rice regime interaction, which does not seem to play a very good role at the moment. Therefore, it is important to adopt a holistic view by trying to understand the whole system of the regime including the problems facing new experiments of organic rice production. Furthermore, it is hoped that the findings of this research reflect the role of the middle class, which should be THE driving force to support the up scaling of organic rice production for the market.

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