From Farmers to Farmers, the Seeds of Empowerment: The Farmers' Self Governance in Central Lampung

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Introduction: Crafting Social Institution

Various problems in resource management, such as environmental degradation and pollution, emerged as a result of complex inter-related factors. Many ecosystems having the characteristics of open access resources, experienced severe problems of degradation due to the difficulty of governing and managing the resources in a sustainable manner. These difficulties relate to the problem of controlling users or of excluding beneficiaries. As a consequence of this problem, the potential for competition among users emerges (see Berkes 1994; Feeny 1994; Ostrom 1999; Williams 1998). Many scholars argue that the most appropriate and effective way to solving these problems is by enhancing the likelihood of users organising themselves, so as to allow a collective self-control (Feeny 1994; Ostrom 1992; 1994; 1999). Neither the state nor the market, as Ostrom says (1994) would be effective in solving the problems, because of their inability to govern resources in a sustainable manner.

Sustainable resource management is also far from reality in cases of private property resources. In this case, individuals are assumed to be self-interested, concerned only with their own welfare and that of their families. In some cases, individuals also attempt to be ' free riders' (see Sabatier in Ostrom *et al.* 1993). The question is, how would self-governing institutions among the ' private land owners or users' be effective in assisting people to manage their environment in a sustainable manner? The promising solution is, according to Sabatier (in Ostrom *et al*. 1993:xx), to alter individuals' 'decision situations' since '…the same individuals will behave differently in different decision situations.' Developing self-governing institutions is seen as an alternative in

playing a critical role in defining those decision situations. To what extent would this solution be effective in affecting individuals' behavior?

In developing countries such as Indonesia, the problem is more complicated because of imposed external intervention by the authorities into the individuals' decision situations. The agricultural development in Indonesia through the Green Revolution is a good example of such an intervention in which the government introduced technology and modified social institutions. The government' s intervention has also heavily affected the environment, as well as the people' s practices, structure of farmers' organisations and agricultural methods (see Winarto 1996; Winarto, Maidi and Darmowiyoto 1999). As a result, not only do problems in environmental conditions persist, (see e.g. Conway and Pretty 1991; Fox 1991, 1993; Shiva 1988, 1991, 1993), but so does the loss of people's dignity, creativity and ability to manage their environment using their own knowledge of local conditions. As expressed by an elderly rice farmer in Java: '…the government nowadays governs everything: what to plant, when to plant and how to plant' (Winarto 1996). The people have lost their ' own niche' , the place where they could exercise their own decision-making, strategies and management to achieve their dreams of producing good yields from their own choice of crops. This reveals how the government has exercised its power of control over resource management. It is as if ownership and productive use of resources falls within the hands of the bureaucrats. Not only that, the government acquires power through its control over people and exercises it on the lives of the people (see James 1999).

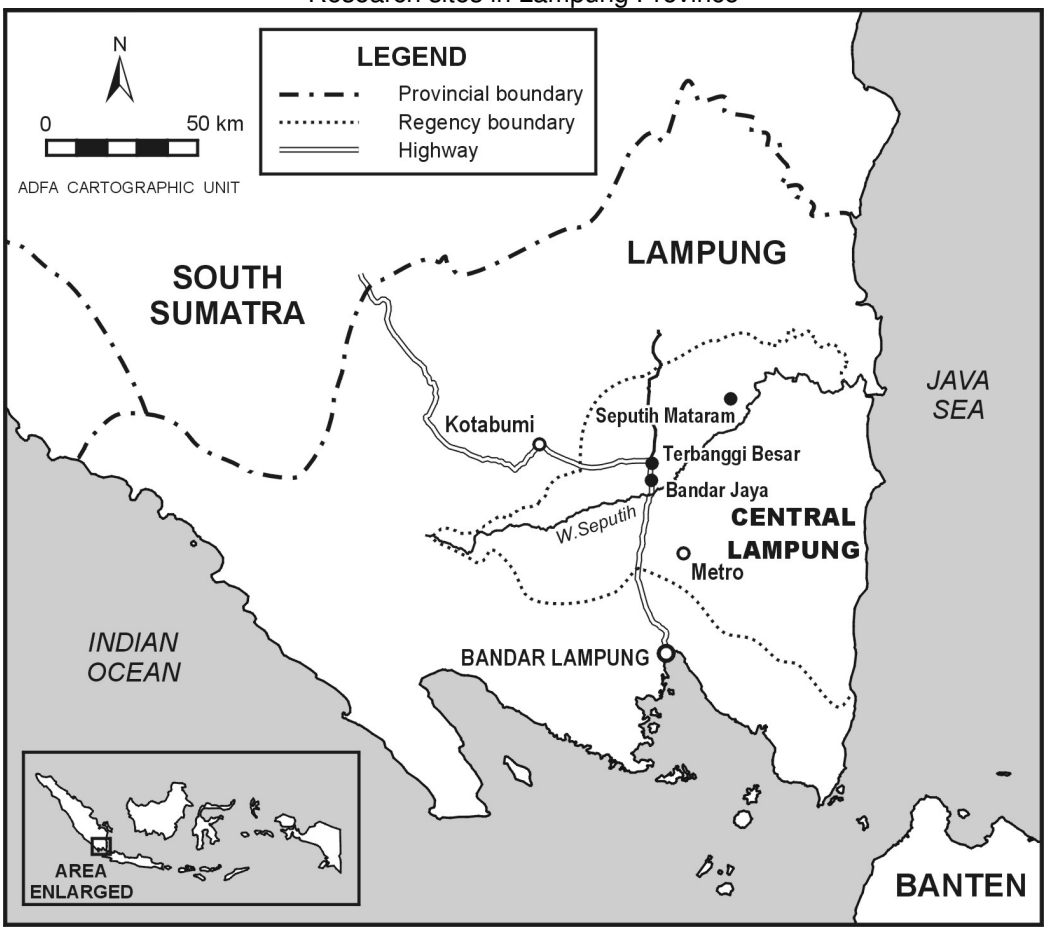
However, in the current environment of the food crops intensification program, where the government and other stakeholders still have great interests in determining the ways and results of managing resources, would it be realistic to return opportunities back to the people? If yes, how and to what extent would that effectively helps the people to produce more sustainable and equitable resource management?

In this chapter I will present the case of the Indonesian National Integrated Pest Management program introduced from the early 1990s, which

has success stories of enriching farmers' knowledge, changing farmers' practices in pest management and increasing their ability to govern (e.g. see Dilts and Hate 1996; Busyairi *et al.* 1997; Kenmore 1997). I will argue firstly that a group of farmers in the subdistricts of Terbanggi Besar and Seputih Mataram in the Regency of Central Lampung (see Map **X**) demonstrates that farmers gained the advantage of having intensive facilitation and support from a Non-Government-Organisation (NGO). Within less than a decade, they have been able to self-govern by creating mechanisms and infrastructures that allow them to creatively develop ways that will help them to be masters of their own land. The case shows that without serious effort in facilitating the farmers to strongly organise themselves collectively, it is questionable whether the sustainable practices would be established widely and persistently after a long period of centralised control of knowledge. Through the case study of empowering farmers, my chapter will contribute to exploration of socio-political context in which regional autonomy is successfully implemented.

Map **X**

Research sites in Lampung Province



Secondly, the organisation for private property resource management has to recognise and appreciate the individuals' rights to pursue decision-making in managing his/her private property. By referring to the eight design principles proposed by Ostrom (1992; 1999) for long-standing common-pool resource institutions,[i] I argue that some of these principles can also be applied to develop the social institution for private property resources management. In this chapter I will explore how farmers in my research sites have developed awareness and appreciation of each other while improving their skills and knowledge of governing their own properties. I will also examine to what extent farmers were also able to alter the culture of growing crops within their communities through my case studies of the farmers' organisation in Central Lampung, which has accommodated the objectives of the National Integrated Pest Management (NIPM) and developed their own strategy.

Weakness in the Government-supported Farmers' Organisation

From the time the government introduced various food-crops intensification packages in the early 1970s, it has defined appropriation rules restricting time, technology and level of input. With the high level of input and intensive technology, the costs significantly increased. The government had calculated the benefits in relation to the costs, and since the farmers would not be able to afford the costs through their own resources, the subsidised credit scheme was the solution. The provision of these new rules resulted in them being enforced, which in turn disempowered the farmers. The farmers' organisation known as *kelompok tani* was set up to ensure that farmers would follow the rules, including the implementation of the technological packages and the credit scheme (*kredit usaha tani*). It was not of great concern to the authorities whether there was a true collective-choice arrangement by the participants where each farmer could participate in defining and modifying the appropriation rules. The reality was that the farmers' participation was limited or even had no choices. Farmers were able to pursue their own trial-and-error situations in modifying the rules to meet their own resource conditions within the context of the ' imposed rules' by the government. Even though farmers realised later that '...

many more illnesses still attacked their plants despite using more "medicines"', they felt powerless in changing the ' rules[ii] .

In light of the account which highlights the powerlessness of farmers above, we need to ask who has the responsibility for monitoring agricultural technology and providing sanctions. In this program the government was responsible for monitoring whether the food-crop intensification packages were properly implemented by the farmers. The farmers' organisation (*kelompok tani*) did not function effectively in assisting farmers to solve their problems because of external regulations imposed by the government (see Winarto 1996; Winarto *et al*. 2000).

IPM program and its difficulties

The National Integrated Pest Management program was introduced to the farmers in the early 1990s[iii] by the government which tried to correct and change the appropriation rules by facilitating farmers to modify the technology, in particular in managing pests/diseases and in growing ' healthy' crops. Reducing unnecessary use of pesticide was expected to reduce the costs of the farmers and to conserve their environment. This needs a shift in direction of managing pest/disease: from ' killing' pests to managing the ecosystem in order to grow healthy crops (see Dilts and Hate 1996; Kenmore 1997).

Under the Integrated Pest Management (IPM) program farmers who were used to ' killing' pests in order to ensure the harvest, were urged to change their perspective into growing a healthy crop by using the agro-ecosystem analysis.[iv] However, the IPM program was primarily defined to shift the paradigm through the Farmers Field School[v] to train them to become IPM experts. Usually the national IPM program had its own trainer who is responsible for disseminating IPM in that region. IPM trainers are graduates of one-year IPM course organised by the National IPM program. Once qualified and assigned to a location, the IMP trainer commutes to a location to run a weekly training for local farmers for a short period of time. One visit a week was not intensive and effective enough to enable the trainer to become a part of the community. He was not able to facilitate farmers outside the Farmers Field Schools. In the latter

years, there was a program to select a few IPM farmers from each locale for training to be farmers' facilitators. However they were returned to their homes with no long-term support program of how to improve and facilitate them further in their work despite the fact that the role of a farmer's facilitator has been considered crucial by farmers.

Kelompok tani was used as the ' door' to recruit participants for the Farmers Field School and to introduce new ideas and strategies to parts of its members, but many cases reveal that *kelompok tani* was not a solid basis from which a series of changes could occur. Hence, when the IPM training was over, no significant changes took place in the working rules or rules-in-use to organise continuous activities that supported the implementation of the new appropriation rules.

I argue that in the context of private property resource management, building social institution is necessary, especially where the appropriation rules were determined by external authorities. However the program did not succeed in developing social capital through the formation of social institutions (see Winarto *et al.* 2000).

In relation to this, the case of the *Lembaga* in Central Lampung was significant where they decided to move away from the National IPM Program' s weaknesses in building social institution and organisation.

Lembaga and its development

The farmers' organisation popularly known as as Lembaga, a shortening of Lembaga Swadaya Masyarakat (NGO) in Terbanggi Besar and Seputih Mataram (Central Lampung) was formed by their own efforts with the main objective to carry out the IPM program.[vi] The personnel of an NGO called Yayasan Desa Bahagia, which was under an Islamic organisation authority, initiated contacts with the farmers in Terbanggi Besar and Seputih Mataram subdistricts to form a farmers' organisation. The goal of this organisation was to facilitate farmers to form a ' cooperative'organisation (*koperasi*), and to develop husbandries. In 1993, a staff member of World Education approached

farmers in two districts in Central Lampung. The main goal of the organisation then shifted to introduce and disseminate the IPM principles.

'To be independent as a farmer' was the motto of the Lembaga. To be free from the ill-chosen and enforced recommendations of the government was the objective of the farmers' self-pursued plan. Farmers had to overcome inappropriate recommendations of using pesticide, which is classified as ' poison' *racun*) they had received in the past (Winarto 1998). At the Lembaga farmers therefore chose which ' appropriation rule' to use to obtain yields in a sustainable manner by reducing the costs of production as I explain below.

Shifting the culture of growing crops from the management strategy ' with pesticides' to ' without pesticides' requires improving their knowledge and practices. How to start gaining such knowledge and practices needs external help. In the beginning, the collaborating-NGO invited an IPM trainer to live in a community as an IPM facilitator. For almost three years accompanied by his family, he stayed with the farmers and became one of the local residents.

This case of a live-in facilitator contrasts significantly from that of other IPM trainers from the National IPM Program who only came to visit and assist the farmers weekly. By staying within the community, the first facilitator was able to work much more effectively in assisting the farmers. Not only that, the farmers who were assisted by the NGO, decided to send several farmers to join training as facilitators outside their area, either run by the government or another NGO. In light of this, the first IPM graduate facilitator had to withdraw, to provide room for the farmers to be facilitators in their own community. However, he kept maintaining his relationship with the farmers and visited and joined them in some activities where his presence was needed. The selection mechanism and criteria to be facilitators, plus new rules about having to assist their fellow farmers after returning home, were put in place. This agreement on how to select the farmers, on what criteria to use and on what a facilitator should do afterwards, is an example of how the farmers themselves were able to establish the ' working rules' .

The establishment of these working rules was an indicator of how the farmers were able to form the ' institution' . Ostrom (1992:19) says:

> *…institution is simply the set of rules actually used (the working rules or rules-in-use) by a set of individuals to organise repetitive activities that produce outcomes affecting those individuals and potentially affecting others.*

Recruiting facilitators was not a one-off process. They realised that improving the skills of the facilitators and recruiting the new ones had to be part of their continuous program. And, by making them follow the rules to facilitate farmers, this started the ' ball' rolling for the running of the IPM schools. Without facilitators, how could they carry out the training needed to reach thousands of farmers in their area? However, recruiting farmers as facilitators was only one rule to follow among the other sets of rules. How an IPM school is planned and set up, who is responsible for organising the ' schools' and/or monitoring the facilitators' work, how to evaluate the results, and even to facilitate the graduates further, was all being set up by the farmers' organisers in collaboration with the NGO staff. The structure of the organisation and the division of labour among the organisers were both agreed upon, including the rights and obligations of each staff member. During my research period in 1998-99, the staff decided to change and modify the structure in order to improve its efficacy in meeting the increased demands of facilitating a growing number of farmers.

Such a change indicates, again, the farmers' ability to evaluate their own work: whether it to be in regard to the rules they agreed upon on how to divide the jobs, or on how to evaluate and monitor one another's work. The evaluation went on. This, in principle, is an indicator of the farmers' ability to monitor what they had agreed upon, the monitoring principle in Ostrom's design (Ostrom 1992, 1999). The opportunity for the farmers to evaluate, talk and discuss the problems in their work was fostered by the organisers' decision to rent a place to be their working office. This office is actually part of one of the farmer's facilitator's (*petani pemandu*) house. This office was primarily used for administrative work, to have meetings, to discuss daily issues and problems, to plan new programs, and to hold meetings between the farmers, etc. This is the place where the ' seeds' of creating the social institution grew.

This case reveals the fact that by having appropriate facilitation, farmers in Central Lampung were not only able to form an organisation, define their own programs, carry out activities in order to improve their knowledge and cultivate crops ' free of pesticides' ; but also they were able to become consultants to the other farmers. Fellow farmers thus became sources of information and support. They also became the motivators to speak against inappropriate government recommendation and policies,[vii] an indicator of being empowered.

Farmer-to-Farmer: the Seeds of Empowerment

'Empowering farmers', what does it mean? Various scholars have defined what empowerment means within different contexts (see James 1999:15-20). Within the context of ' development' , Singh and Titi (1995 in James 1999:19) say that:

> *The concept goes beyond the notions of democracy, of human rights, and of participation to include enabling people to understand the reality of their environment (social, political, economic, ecological and cultural)… and to take steps to effect changes to improve their situation… It gives people a true capacity to cope with the changing environment as societies and communities enter the transition towards sustainable development.*

Further on, by referring to Freire (1970 in James 1999), they argue that empowerment '…provides people with the capacity… to feel like masters of their own thinking and view of the world, and to achieve the desired level of well-being…' (James 1999:19).

The farmers in Central Lampung that I studied adopted the idea developed by the National IPM planners who referred to Freire and the andragogy concept of adult-learning process[viii] (FAO Indonesian IPM Program n.d.). By using the 'discovery experiential learning process' as the basis of the training, it is expected that farmers could gain the feeling of being ' masters of their own thinking and view of the world' . By facilitating farmers to carry out detailed observation as the basis of analysis and decision making, it is intended that they will be able to understand the reality of their environment, the ecological conditions of their habitat which will in turn enable them to take further action. The main aim was to make farmers IPM experts so as to affect changes on their habitat by avoiding the negative implications of using

pesticides. A better quality of environment and life was thus the objective of the program.

The farmers in Central Lampung realised, however, that these objectives were difficult to achieve through only one training course per planting season. For more than three decades the farmers have been practising the recommended technological packages with an increasing ignorance of the nature of technology they used (i.e. pesticides, chemical fertilisers) (see Winarto, Maidi and Darmowiyoto 1999). They did not see other alternatives besides ' growing crops with pesticides and chemical fertilisers' . Changing the farmers' practices, and enabling them to develop alternative strategies that can produce changes in their habitat were indeed the most challenging to achieve.

On the basis of this understanding, the farmer organisers, in collaboration with the NGO, designed longer-term training and facilitating activities. Since farmers in Central Lampung were also cultivating secondary crops such as soybean, and that soybean farming has experienced failures in producing yields due to pest outbreaks, the farmer organisers incorporated the soybean IPM ' school' into their program. Each farmer had to follow not only the IPM school for paddy, but also for soybean, and then a more advanced soybean/paddy course. The latter was designed differently from the first two ' schools' because of the need for greater emphasis on carrying out ' research' and ' studies' . Besides formal training, the farmer-organisers also designed various other activities as part of their continuous facilitation to the IPM alumni. Various kinds of farmers' meetings were considered necessary to stimulate and assist the farmers to plan for their collective activities, to report what had been done and achieved, and to evaluate what the organisers have gained and failed, as well as to draw further plans and actions. At the bottom of all these activities was the great interest of motivating farmers to become ' masters' and ' knowledge producers' through ' farmers studies' (*studi-studi petani*).[ix]

Examples of the farmers' studies include growing good quality of soybean seeds; determining the appropriate schedule of soybean planting by referring to their ' traditional' knowledge (the Javanese academic agricultural

calendar known as *pranata mangsa*); developing non-chemical pest management controls, e.g. by using nets, light-traps, hormones, and botanic pesticides and producing organic fertilisers from animal dungs, etc.

Research and studies have become the hallmark of the program. Farmer scientists, farmer researchers (*petani peneliti*) or even ' farmer professors' (*petani profesor*) (Winarto 1996), are the new identities emerging among the farmers besides the ' farmer facilitators' (*petani pemandu*), ' farmer organisers' (*pengurus Lembaga*) and IPM alumni (*alumni PHT*). These new identities, as well as the new-found confidence that they have in themselves has enhanced their perceptions, attitudes, and practices. The IPM alumni have gradually been recognised as being diligent enough to carry out more detailed observation and experiments as part of their farming practices. Those who knew about the novel practices but have decided not to follow in the steps of the IPM alumni, obviously said that they did not have time to carry out the studies. This was particularly expressed by some non-IPM farmers whose residences are along the main road and thus, considered themselves as *petani luar* (' outside farmers'), not as *petani dalam* (' inside farmers'). Having various other jobs besides farming, they consciously refused to follow what the IPM alumni did, which in turn meant that they did not want to practice the IPM strategies.

More systematic observation and trial-and-error directly in the fields, as well as a particular experiment held outside the fields, have gradually become part of the IPM farmers ' culture of growing crops' . ' Period of enlightenment and becoming clever' (*masa pencerdasan*) was the name they gave to the period after the introduction of IPM principles, in contrast to the ' period of stupidity' (*masa pembodohan*). The latter refers to the pre-IPM era when farmers were forced to implement the technological packages, together with the growing ignorance they had experienced (Winarto, Maidi and Darmowiyoto 1999). Discovery and invention have become the main mechanisms to alleviate ignorance, and to understand the reality of their environment. The most significant advantage is their ability to make decisions on the basis of their discoveries of what strategies would produce better benefits without degrading their environment.

Their success in producing good quality soybean varieties and gaining yields without the need to use pesticides was possibly their most important achievement and they were very proud of it. One of the varieties they were able to grow reached a height of three metres and was named: '*Amerikana*' , a reference to the tall American people. At the beginning various strategies of controlling soybean seed borer (*Etiella sp.*) without pesticides were developed in collaboration with the entomologists from the United States to avoid harvesting ' empty soybean seeds' *kedelai tanpa biji*). In later years, they themselves pursued various kinds of studies and practices to grow a healthy soybean. Their efforts to produce these strategies were motivated by the repetitive failures of the soybean ' crash program' for more than seven years. The national government introduced this crash program to increase production in the same way the Green Revolution for paddy was implemented with its unintended consequences of continuous pest outbreaks. As a result of the repeated failures the farmers decided to stop cultivating soybean. They named this period ' the seven years of sleeping period' (*masa tidur tujuh tahun*).

These stories show that at the individual level, those who decided to persistently practise various kinds of studies and experiments, felt a growing confidence and a feeling of becoming ' masters' of their own fields. The farmers' own organisation planted the seeds for empowerment. Such a situation where a growing and larger number of farmers felt free to decide and were involved in practising the novel strategy is a beneficial outcome for strengthening the belief, confidence, as well as the new knowledge they have been absorbing throughout the learning process. Such an external circumstance is an important factor in determining the extent to which changes are possible, and how such changes could be retained in individuals' minds (see Strauss and Quinn 1997; Winarto and Choesin 2001). But, again, they were still a part of the larger community of farmers who were considered by the government as the facilitators in improving food crops production for the benefits of the nation and the state. During my study in 1998-99, the Indonesian national government decided to carry out another crash program to increase the production of paddy, corn and soybean in order to alleviate the food crisis (known as *GEMA PALAGUNG*

2000: Gerakan Mandiri Padi, Kedelai, dan Jagung for the year 2000). A return of the ' pendulum' back to the previous Green Revolution example was on its way. The credit scheme was still considered the solution to assist farmers to procure a high-level of input, so as to ensure that farmers would implement the intensified cultivation packages (see Departemen Pertanian 1998; Winarto forthcoming). Even though the pesticide component in the credit scheme consists of the permitted brands, the farmers were still enforced to accept the whole complete package of the scheme.[x] By absorbing the new example of ' growing crops without pesticides' and having greater confidence and dignity as ' masters' of their own fields, they questioned the existing enforced scheme. However, they realised that their positions were still at the bottom-level of the whole hierarchy of authority in crop farming. Refusing the government's policy has still been a struggle (see Winarto 1996; Winarto, Maidi and Darmowiyoto 1999). Compared to the farmers' responses in other places in Central Lampung (e.g. in Batanghari), however, the farmers assisted by *Lembaga* were able to consolidate themselves and formed an alliance of the formal farmers' organisations (Gapoktan, Gabungan Kelompok Tani). The main objectives were to assist farmers in their efforts to find solutions to refuse the distribution of pesticide as part of the credit scheme, to have a reasonable price for fertilisers, and to request that the fertilisers be delivered on time. The price of fertilisers toward the end of 1998 increased dramatically, and in a short time, the fertilisers were completely unavailable in the market and absent from the credit-scheme's delivery. As a substitute for pesticide, the farmers requested money, which was of course refused by the external authority.

This is only part of the farmers' stories of their struggle against ill-founded government policies. Their struggles, however, reveal that to some extent, the self-governed IPM ' training' has strengthened their resolve to try changing their environment and to have a better life. But, this is only a part of the constraints the farmers have to face.

Conclusion: Benefits and Constraints

The stories of the farmers' non-government organisation in several places in Central Lampung is a clear case of the farmers' ability to self-govern. By having appropriate facilitative action and by external agencies, they were able to organise themselves and sustain their programs in disseminating new rules of cultivating crops, as well as to assist other farmers to become ' masters' of their own world. At the time I did my observations, the organisers' activities in drafting the plans, writing up the proposals, preparing the activities, implementing the programs, and monitoring and evaluating the results reveal their capacity to empower themselves to define their own ways of reaching prosperity. Their orientation was not only in facilitating their own community members, but also their neighbouring farmers, even those who received assistance from government authorities under the umbrella of the National IPM Program. They realised that without the ability to change the perspectives of the entire community, it would not be easy to pursue the implementation of the new strategy of growing crops. They cultivate their crops in the same areas, but each of them are managers of their own field. Hence, without similar understanding and action, the sustainable practices would not easily be put into an enduring cultivation strategy. Crafting social institution is thus also a need for those who have individual rights to utilise land, but who live in a community of practitioners where each persons' practices significantly affect not only their own productivity, but also their ecosystem sustainability.

However, looking at how they were able to carry out all the activities brought me to think of how they were able to survive in relation to financial support. One significant difference the farmer-organisers had from those assisted by the National IPM Program, was the continuous financial support they were able to gain from the international NGO (World Education). Even though the farmers themselves had to make the proposal to get the support, the World Education commitment to assist farmers was clearly the factor that explains that ability. It would be interesting to follow further what is going to happen if the farmers themselves have to finance their own activities, to pay wages to the full-time members of the committee, the farmer-facilitators, the field-coordinators, etc.

Another question that was always raised in the organisers' minds and discussions was how to assist a huge number of farmers spread over a very large region, while only having a small number of farmer-facilitators. If they keep disseminating the new paradigm by reaching more farmers, would that be effective in achieving the main objective of assisting the farmers to become IPM experts, and changing their culture of growing crops by really empowering them? The experiences they had validated their assumptions that achieving these objectives was not easy under the conditions where each farmer has already absorbed the ' conventional way of growing crops with pesticides' . Moreover, under the condition where the top-down paradigm of introducing recommended technological packages is still persisting and, therefore, so is the introduction of various brands of pesticide and chemical products. The burden of trying to reach both the quantity and quality of empowered-farmers as IPM experts is still likely to be part of the organisers' concern in the future.

This brings us back to the question of how to build up strong self-governance within the context of private property resource management, which is under heavy influence from the central authority. The farmer-organisers were only able to stimulate, assist, facilitate farmers to adopt the new appropriation rules, while also showing them how to improve their knowledge and practical skills as a basis for more sustainable crop cultivation strategies. But, they are not in a situation where they can implement sanctions on those reverting to their ' old conventional way of growing crops' , neither on those who refuse to adopt and implement the new rules. Each individual farmer is a master and a manager of his/her own field. Now is the right time to think of an alternative and more effective way of facilitating a larger number of farmers. This is one of the questions which needs to be addressed by the state agents. Could the bureaucrats withdraw their strong influence on the farmers' lives and adopt the role of ' facilitators' more rather than the ' rulers' ? The question also needs to be directed to the other stakeholders of how to shift their perception of farmers as the ' marketing targets' to that of being their ' counterparts' . By adopting the partnership relations, the facilitation should also focus on social institution development instead of focusing only on enriching local knowledge or

transferring technology. The external circumstances should be created such as to enable the farmers to develop their rules-in-use in a sustainable manner.

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Acknowledgement

This paper is prepared to be presented at the Panel*: Local Identities and Regional Resources*, ASAA Biennial Conference, University of Melbourne, 3-5 July 2000. I am grateful to Dr. Minako Sakai, the Program Coordinator of the Indonesian Language and Cultural Program, and Prof. Bruce Bennett, the Head of Department of Language, Literature, and Communication, University College, The University of New South Wales, at the Australian Defence Force Academy, Canberra for inviting and assisting me to be able to participate in the conference. My sincere thanks also to the Indonesian FAO Inter Country Program who supported my research in Central Lampung in 1998-99 and to my colleague: Ezra M. Choesin and my research assistants: S. Darmono, Fadli and A.S.H. Ningsih.

Notes

[i] The eight design principles proposed by Ostrom (1992; 1999) are: 1) clearly defined boundaries; 2) congruence: proportional equivalence between benefits and costs; 3) collective-choice arrangements; 4) monitoring; 5) graduated sanctions; 6) conflict resolution mechanism; 7) minimal recognition of rights to organise; 8) nested enterprises where appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organised in multiple layers of nested enterprises.

[ii] The term ' medicines' was introduced to the farmers by the agricultural officials to refer to pesticides. Farmers adopted this term metaphorically as if the pesticides have the same function as medicines for human health, to cure or prevent people from getting sick. In this interpretation, pesticides are perceived as medicines that could prevent or cure the paddy from any illnesses, including pest infestation (also see Winarto 1996, 1998).

[iii] In the early 1990, the Integrated Pest Management program was first introduced in six provinces of Indonesia (North Sumatera, West Java,

Central Java, Yogyakarta, East Java, and South Sulawesi). This program was introduced in the province of Lampung (the most southern province of Sumatera) in 1993.

[iv] If unnecessary, they do not need to use pesticide.

[v] The Farmers Field Schools (FFS) was named by the planners as the ' schools without walls' to characterise its distinctiveness from the ordinary formal schools carried out inside the class. In this schools, the farmers were trained to absorb the integrated pest management principles and strategies by carrying out direct observation, experimentation, analysis and decision making of what the best management strategies to implement on the basis of their own discoveries. The agroecosystem analysis and the prey-predator dynamics were the core of the lessons. The training methodology was based on the andragogy method and the discovery experiential learning by farmers themselves. The farmers have a regular weekly training for the whole planting season which lasts up to 10-12 weeks, facilitated by several facilitators of either the agricultural officials, or farmers who have been trained as facilitators.

[vi] The official name is Tim Pengendalian Hama Lampung or IPM, an abbreviation of Ikatan Petani Mandiri (the Association of Independent Farmers). Lembaga was established among the descendants of the Javanese migrants who originally came from various places in Central and East Java and were settled in several villages in Central Lampung by the Dutch in the 1940s.

[vii] See Winarto (1996) on the actions of ' voice' and ' exit' by the farmers on the north coast of West Java, referring to Hirschmann (1970)' s ' voice, exit and loyalty' responses to the decline in firmsørganisations, and state.

[viii] Andragogy is a special term for themethod of leaning by adults based on self-learning from direct experience.

[ix] Various kinds of studies have been carried out by individual or group of farmers (see Winarto *et al*. 2000).

[x] The credit scheme consists of various components, i.e. seeds, fertilisers, foliar fertilisers, herbicides, pesticides, and some cash for labour works. The whole bundle of components were considered as a ' complete package of the scheme' .