Chapter Seven
Science in policy making: The eucalyptus debate and villagers in Thailand

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Abstract

In policy making, different actors in various cases compete over distinct interests and values. Particularly in cases where problems and goals are ambiguous, the policy process is prone to manipulations in order to control outcomes. How are scientific debates utilized in the manipulation process? What are the missing elements in such a process? Given that science is not neutral, how can we more wisely involve science in the policy making? This paper tries to answer these questions by examining the case of the "eucalyptus debates" and the policy of industrial plantation in Thailand. Facing severe protests sparked by land conflicts, the state and private industry introduced a "farm-based" production system by rearranging the institutions, policies and strategies regarding eucalyptus planting. At the same time, they created an official discourse that claimed that eucalyptus itself had no ecologically harmful effects. Through de-contextualization and legitimization, science contributed significantly to this discourse and was manipulated to sustain conclusions beyond what it could support. Nonetheless, the villagers' negative views toward eucalyptus production and ecological problems still persisted, despite the state's efforts to emphasize the harmless nature of eucalyptus. As this case demonstrates, science is vulnerable to politicization in policy making, particularly when its goals and methods are unclear and power relations among actors are biased. Nevertheless, the author does not deny the important role of science in making better policy. In order to avoid the problems identified in this paper, scientists should make efforts to recognize and integrate different "rationalities."

1. Introduction

In policy making, different actors in various cases compete over distinct interests and values. In such cases, science or the scientific way of thinking tends to play a key role in the process by putatively providing neutral or objective judgments. However, recent studies on science, technology and policy issues suggest that science is neither neutral nor objective but instead creates certain political discourses (e.g. Hajer 1995, Forsyth 2003). Some authors also criticize the top-down nature of science and scientific studies for neglecting the standpoint of less-advantaged citizens, such as women and the poor in the third world (Harding 2008).

Furthermore, scientific implications are sometimes interpreted differently by each party in the policy making process and deviate from the direction that scientists originally intended. Particularly in cases where problems and goals are ambiguous, the policy process is prone to manipulations in order to control outcomes (Zahariadis 2007). How are scientific debates utilized in the manipulation process? What are the missing elements in such a process? Given that science is not neutral, how can we more wisely involve science in the policy making?

Forest and natural resource management policy in developing countries are good cases for considering the questions above (e.g. Forsyth and Walker 2008). This paper tries to answer these questions by examining the case of the "eucalyptus debates" and the policy of industrial plantation in Thailand. In Thailand, as in other places, forest and natural resource management policy seek dual goals: attaining sustainable resource use—often meaning sustainable industrialization—and improving

people's welfare. These goals are sometimes not achievable simultaneously and are often at odds; achieving both is sometimes not possible. There are also competing explanations for the cause of resource depletion problems as well as proposals for solutions. The problems over eucalyptus planting are not exceptions. There have been continuous social conflicts and ecological debates over the use of eucalyptus trees to reforest Thailand.

In the following section, the author first overviews the history of the introduction of eucalyptus in Thailand, the accompanying social conflicts and subsequent policy changes. Second, the author highlights the ecological debates over eucalyptus—one of the major battlefields in the disputes—and examines how the state created official framing of the debates by employing a supposedly scientific way of thinking characterized as "de-contextualization." Third, based on field observations and interviews, the author introduces farmers' attitudes on eucalyptus trees as a different rationality. Finally, the prospects to move beyond polar rationalities and a potential role of science are briefly discussed in the conclusion.

2. Eucalyptus Planting, Social Conflicts, and Policy Change in Thailand

Eucalyptus is a genus of tree that is naturally found in Australia and its neighbors. It is fast-growing, regenerates by coppice and is a source of raw material for various industrial products such as pulp and paper, timber, fiberboard, plywood, fuelwood, oil and others. The recorded introduction of eucalyptus in Thailand was in 1941 (Pousajja 1996). After long years of growth tests, the Royal Forest Department (RFD) decided to promote *Eucalyptus camaldulensis* since it can adapt to diverse environments in Thailand. Therefore the word "eucalyptus" or "*yukaliptat*" in Thai generally refers to this species.

During the 1980s and 1990s, the planted area of eucalyptus in Thailand rapidly expanded, particularly in the east and northeast regions. The production has been utilized primarily as raw material for pulp, while a part of it is used in the urban construction pole market. The total planted area in the country increased remarkably from 62,000 ha in 1985 to 350,000 ha in 1995. [See Uraphiphathanaphong *et al.* (undated) RUAB and FRC (1997), for the total area and the area planted by private sector in 1985, and the total area in 1995, respectively. Unlike other agricultural commodities, there are no official statistics on eucalyptus plantation area which include villagers' spontaneous plantations.] Planting by peasants has been especially vigorous. Some reports claim that small farmers have planted over 64% of the total eucalyptus area (Barney 2005).

Plantations of eucalyptus have been targeted as a major battlefield by many NGOs and grassroots organizations. This is largely because of land conflicts between RFD and villagers. In Thailand, forests belonged to the state and were managed exclusively under the legal system. As a result of the rapid designation of national parks and national forest reserves (NFRs) on one hand, and the commercial crop boom during the 1960-1970s on the other, millions of villagers came to live in the NFRs or national parks, and they were viewed as "forest encroachers."

Facing rapid forest depletion, the policy makers drew up the National Forest Policy in 1985. Its aim was to recover 40% of the total land area as forests, consisting of 25% as production forests and 15% as conservation forests. In order to reforest the country, it encouraged the private sector to participate and establish production forests. Degraded NFRs were leased to private companies at a reasonable rate. As a result, many pulp and paper companies rushed into the reforestation businesses by acquiring as many degraded NFRs as possible. When the reforestation plan was implemented, villagers were immediately treated as illegal forest encroachers. Their land for cultivation or communal land was seized for eucalyptus planting, and in the worst cases, they were scheduled for eviction. The government supported this process both implicitly and explicitly. These hard-line approaches sparked strong resistance among villagers and NGOs during the late 1980s and early 1990s.

These social protests forced the government and private firms to reconsider both their strategy for supplying raw material and the underlying forest policy. A cabinet resolution of May 15, 1990 blocked the leasing of NFRs for tree planting by private firms. In the Seventh National Economic and Social Development Plan (1992-1996), the reforestation target of the 1985 National Forest Policy was revised to 25% for conservation forests and 15% for production forests. Furthermore, on September 8, 1992, another cabinet resolution specified five conditions for tree planting in NFRs by the private sector, which included a restriction on the total area covered by planting plots to less than eight ha per household (Hatakeyama 1993). Under these conditions, the government finally included eucalyptus in the list of eligible tree species for promotion in September 1993 (Kuaycharoen 2004).

Consequently, the government came to promote small-scale tree planting by villagers, while it trod warily on large-scale tree planting by private firms. The firms also switched from a

plantation-based strategy of establishing their own large-scale plantations to a farm-based strategy under which villagers were either encouraged to plant raw material or wherein it was simply bought from them.

3. Ecological Debates over Eucalyptus by the State

Apart from land disputes mentioned above, there was another important debate about ecological impacts that affected policy on eucalyptus planting. At the time, there was a broad discussion on these issues not only in Thailand but in other countries, such as India (Raintree 1991). It was said that there are some ecological risks posed by the cultivation of eucalyptus trees (Shiva and Bandyopadhyay 1987). Their high water and nutrient consumptions may affect crops nearby, and in more harmful cases, lead to soil degradation and a drop in groundwater level (FAO 1988). These considerations added an important question of the socio-ecological costs in eucalyptus planting, particularly in large-scale plantations. However, others experts, while admitting that there are ecological risks under certain conditions, counter-argued that there was not enough scientific evidence to support such claims (Davidson 1985).

Studies in Thailand also showed mixed results. For example, Craig *et al.* (1988) reported significant crop losses near eucalyptus trees in paddy fields in northeast Thailand. On the other hand, the RFD insisted that such effects were minimal and did not differ from other tree species. According to the report by the working committee on research on this issue, a study by the RFD research team shows that there was no significant difference in terms of the effects on soil and water conditions in the initial phase (0-4 years) between *Eucalyptus camaldulensis* and another fast-growing tree species (*Acacia auriculiformis*) (RFD undated: 12-15). It argued that eucalyptus planting is less ecologically harmful than cassava cultivation, a competitive crop to eucalyptus. It even pointed out that eucalyptus planting can be ecologically beneficial on degraded land, although the report admitted some ecological risks of eucalyptus planting under specific conditions and the need for some care (RFD undated). These conditions include planting too close to cultivated crops, which may lead to crop losses, or too close to water sources, which may cause water level to drop, or under dry conditions with annual rainfall less than 750 mm, which inhibits infiltration of allelopathic chemical in its dead leaves (RFD undated: 32).

In response to settle such polarized arguments, the Food and Agricultural Organization of the United Nations (FAO), Regional Office for Asia and the Pacific held a consultation with experts on this issue in 1993 at Bangkok. This was done on a purportedly scientific basis with forestry experts. According to the participant list in the report of the consultation, there were 82 total participants of the consultation, from 15 countries in Asia and the Pacific plus from international organizations, of which 29 were from the state forestry offices and researchers in universities, 14 from state/private companies, eight from international/bilateral aid organizations not including FAO, 13 from FAO offices and projects, two from mass media, and 16 from NGOs and others (White et al. 1995: 159-170). Biophysical, environmental, social and economic impacts of eucalyptus planting and policy issues were discussed thoroughly for five days.

As a result, the participants acknowledged some of these negative impacts. These include 1) nutrition, water competition and allelopathic effects with crops nearby under dry conditions of less than 1,200 mm annual rainfall, particularly that of less than 400 mm, 2) social and economic injustice against villagers, 3) loss of villagers' benefits e.g. non-timber forest products from degraded forests by their replacement to plantations, and 4) loss of biodiversity compared with natural forests. Many of these, particularly 2-4, are according to Kashio (1998), not specific problems of eucalyptus itself, but of tree plantations in general or socioeconomic conditions which the country faces. At the consultation, several recommendations were made by the experts: the need for more participatory approach to plantation management; the need for forest policy reforms and considerations of existing land tenure; the importance of special attention to water competition, soil nutrients and allelopathic effects under dry conditions and soil erosion; the importance of not replacing undisturbed natural forests, yet the recognition that eucalyptus plantations have higher biodiversity than many types of degraded lands. Finally, the report concluded with the following statement on the root cause of the eucalyptus debate:

> "There is now recognition by all who attended the consultation that the problems and conflicts formerly blamed on species of the genus *Eucalyptus* arise more from the intensive application of government policies on afforestation and from social justice than from the eucalypts (*Ibid.*: 148)."

This statement might be reasonable from a scientific point of view. However, beyond the scientific arguments, the consultation was important in the following two senses. First, it provided a profound base of legitimacy for state agencies,

private companies and aid organizations to further promote planting eucalyptus. For instance, shortly after this consultation, the internal committee of the Japan International Cooperation Agency (JICA) reached a similar conclusion on this issue and gave a green light to continue support for planting projects (JICA 1993). [See Kami Parupu Syokurin Mondai Network (1994) about the Japanese NGO's critics to this response.] Similarly, the attitude of RFD on eucalyptus (RFD undated) was reinforced by the statement from the consultation, even though the statement ostensibly implied more policy reform. In fact, risk factors that the consultation pointed out did not seriously affect their promotion policy. For instance, no cautious comments are written in the RFD's homepage on eucalyptus planting, part of RFD's private reforestation division homepage. In effect, the consultation simply endorsed existing strategies.

Second, the above statement was the product of de-contextualization of eucalyptus from its broader social, economic, and political context. Ecological factors are separated from the other factors and independently examined. The scientific way of thinking by the experts, particularly reductionism, did matter. Interestingly, one of the FAO officers at the time who was actively involved this consultation made a reflection on the matter:

> "If someone argues for a ban on knives because they can kill people, everybody gets angry as this is an absurd remark. Planting eucalyptus also has some elements that offer some socioeconomic demand. We should not exclude rational thinking to utilize its advantage and overcome its shortcomings." (Kashio 1998: 244, translated by the author)

Though it might be scientifically rational, this metaphor of the knife clearly shows the effect of de-contextualization. By disconnecting eucalyptus from its social, economic and political issues, the pros and cons of eucalyptus were scientifically rationalized factor by factor, thereby successfully creating a set of policy recipes that conferred legitimacy on eucalyptus planting. Furthermore, cautions or warnings about eucalyptus were not included in the promotion activities since the problems were determined not to be because of eucalyptus itself but part of the socioeconomic structure. In this way, the state and the industry created an official ecological discourse on eucalyptus planting. This was in line both with the existing policy and strategic move toward a farm-based system of production. Together with planting techniques, this knowledge was included in the RFD's training programs for villagers.

However, using the same metaphor of the knife, one may argue that the employment of the knife, i.e. when, by whom and where the knife can be used, greatly depends on the situation and context that the potential user faces. In fact, Raintree (1991: 30), one of the participants of the consultation, rightly pointed out that what was needed was "a much expanded repertoire of tree growing practices and the recognition that what we are dealing with are always the attributes of a particular *species* in the context of a particular *technology* intended for a particular *user* within a particular *socioeconomic setting* in support of a particular development strategy" (emphasis in original). The question remains, however, whether combinations of these elements really create a greater repertoire or not.

In the real world where many factors are interwoven, reductionism does not necessarily obtain a socially optimal set of choices. Moreover, there should be an understanding of the different types of rationalities held by the relevant actors. An analysis of the villagers' point of view is valuable in this regard and follows.

4. Villagers' Attitudes and Scientific Explanations

As a result of policy and strategic change toward "farm-based" systems, eucalyptus planting was accepted by many villagers during the 1990s. Furthermore, the stagnating price of cassava and a wage hike drove many villagers to plant eucalyptus trees even outside the policy and contract farming scheme. However, planting eucalyptus did not mean that the villagers came to hold positive perceptions of the ecological aspects of eucalyptus. On the contrary, many villagers believed that eucalyptus affects the water table and damages nutrients in the soil, despite the state's continual efforts to emphasize eucalyptus' harmless nature.

In contrast to the scientific discussions by the state and the industry, villagers' judgments were based on their own direct field observations or indirect information from their friends and neighbors. For instance, they heard that a crop nearby had been negatively affected. They witnessed that eucalyptus was fast-growing and very tough. Once planted, uprooting eucalyptus was very hard task because the roots grow deep, making it difficult to change crops. They claimed that weeds did not come up after trees were planted. In addition, poor growth performance, fire damage, lower profits than expected and the decreasing trend of eucalyptus price in real value after the economic crisis might have exacerbated their persisting perceptions of agro-ecological impacts.

Such information was quite common and felt reliable to villagers. In contrast, scientific information on eucalyptus provided by the state

seemed unreliable to them. For example, when asked about effect on crop yield, one grower in Chaiyaphum province who took a training course on tree planting by the RFD, anxiously replied that, "According to the training course…eucalyptus is not harmful…" (author's interview, June 2000).

The scientific way of thinking may indeed provide explanations for villagers' observations and claims. However, scientific debate most needed with regard to eucalyptus is not to identify pros and cons of it, but to provide scientific explanations of why and under what conditions villagers recognize negative ecological effects. For example, narrow tree spacing, 2m by 2m, which most villagers apply, may be one of the reasons for the absence of weeds. Improper site selection can also cause this effect, and simple crown closure can inhibit the growth of weeds. Moreover, the absence of weeds may not necessarily indicate the deterioration of soil and water. By comparing with *ceteris paribus* factor by factor, we may identify causal factors for weed absence. Such analyses, however, are almost impossible in the actual settings. More importantly, factor by factor analysis may underestimate composite effects of these factors. In contrast, villagers' rationality is more holistic, site specific and experience-based. Even though the state makes a serious effort to present scientific evidence, it would be unreasonable for villagers to consider these contingent situations. Therefore, it is hard to alter the villagers' perception by simply declaring that eucalyptus is harmless, because in this situation different rationalities are competing with each other, as Beck (1992: 29-30) argued in his analysis of a risk society.

5. Conclusion

This paper demonstrated how the state created an official ecological discourse on eucalyptus in policy making by employing science and scientific thinking; yet this discourse was at odds with villagers' experience-based knowledge.

Facing severe protests sparked by land conflicts, the state and private industry re-arranged the institutions, policies and strategies regarding eucalyptus planting. At the same time, they created an official discourse that claimed that eucalyptus itself had no ecologically harmful effects. Science, or the scientific way of thinking, contributed significantly to this discourse and was manipulated to sustain conclusions beyond what it could support. First, de-contextualization was used to separate the ecological nature of the tree from its socioeconomic context. Second, it provided the state and aid agencies with scientific legitimacy for existing projects, while acknowledged risks were not presented in the actual eucalyptus planting promotion efforts. In the discourse, the positive aspects were emphasized, while risk factors were largely eliminated.

On the other hand, the villagers' negative views toward eucalyptus production and ecological problems still persisted, despite the state's efforts to emphasize the harmless nature of eucalyptus. This was due to a distinct quality in the villagers' rationality, which is based on individual and collective experiences. As a result, the state and industry did not succeed in creating discourses that penetrated the whole production system, while they succeeded in rearranging production to some extent by introducing "farm-based" production system.

As this case demonstrates, science is vulnerable to politicization in policy making, particularly when its goals and methods are unclear and power relations among actors are biased. Nevertheless, the author does not deny the role of science in making better policy. Scientists should make efforts to provide explanations for the phenomena that villagers witness as negative ecological effects of eucalyptus. Furthermore, some of the problems villagers faced were caused by inappropriate site selection and other techniques that were partly introduced by the state promotion program. This implies that the existing scientific way of promotion is still very weak, and some of these problems may be mitigated by introducing appropriate techniques or integration into existing farming systems and villagers' rationality. For example, the tree spacing technique promoted by the RFD (2m by 2m) may provide neither good production nor be ecologically sound. There is also room for improving productivity and sustainability by combining tree planting with existing farming practices. For example, paddy-bund planting is one of the practices that can commonly be observed in northeast region. This allows entry to smallholders with lower opportunity costs and fewer negative ecological disturbances. The authors' interviews with the villagers also indicate higher satisfaction rate with lower gross profits (Ubukata and Akarapin 2007). Technological developments that support such low-cost-low-risk strategies are likely to bear more fruit than current high-cost-high-risk approach.

Thus, if we are fully aware of the embedded nature of science and technology, the author does not deny the de-contextualization of knowledge itself. If it can be re-contextualized in certain directions, such as empowerment of people, it may create previously unrecognized combinations of a repertoire of tree growing practices. In that sense, science is not dangerous, but can be useful in policy making. Finally, the author concludes with the following: "scientific rationality without social rationality remains *empty*, but social rationality without scientific rationality remains *blind* (Beck 1992: 30 emphasis in original)".

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