WHAT DOES IT TAKE?

THE ROLE OF INCENTIVES IN FOREST PLANTATION DEVELOPMENT IN THE ASIA-PACIFIC REGION

by

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Introduction

What does it take to effectively involve the private sector in forest plantation development? Governments and their respective forestry agencies are increasingly asking this question. Although the potential role that forest plantations can play in supplying wood, non-wood forest products and environmental services sustainably has been recognized, understanding the policy instruments that successfully encourage investments in plantations remains weak in many countries in the Asia-Pacific region.

Historically, public sector agencies have dominated forest plantation development in the same way as they have controlled the management of natural forests. With regard to plantations this pattern has changed in many countries over the last 10 to 20 years for three main reasons. The first reason falls in the broad category of devolution of forest management, which seeks greater involvement of communities and the private sector in forest management. Second, the performance of public sector plantations – with few exceptions – has been disappointing. Third, budget constraints make it impossible for most forest departments to devote as many resources to forest plantations as they have in the past. Hence, governments are increasingly looking toward alternative actors and policy instruments that stimulate interest in growing trees.

Direct and indirect incentives are among the policy instruments stimulating investments in plantation establishment and management. Empirical research on the impacts and effectiveness of incentives on plantation development is scarce and even where it exists, it is often impossible to clearly identify a direct relationship between incentives offered and the behavioral response by small and large-scale investors.

To date, there has been no comprehensive study of policy instruments, especially incentives that encourage plantation establishment in Asia-Pacific countries, despite the region leading the world in plantation development. The existing body of analysis is both small and fragmented and generally conclusions are preliminary in nature. As a result, countries of the region have not benefited from the existing experiences.

The Asia-Pacific Forestry Commission (APFC) responded to this knowledge gap by commissioning a regional study that assesses the impact of incentives on forest plantation development. Although it is recognized that people grow trees for many reasons, planting of trees on larger areas – more than one hectare – is usually related to income generation and financial returns are the overriding motivating factor and indicator of success. The regional study therefore focused on policy instruments directed at achieving financial goals, while recognizing that forest plantations can also be established to meet environmental objectives. The discussion below draws predominantly on country studies that were prepared in 2002 covering Australia, China, India, Indonesia, Sabah (Malaysia), New Zealand, Philippines, Thailand and the USA.[1]

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This paper summarises the key findings of the APFC regional study. It begins by outlining some of the special features of plantation investments that may make incentives necessary. A working definition for incentives is introduced to set boundaries for the discussion. A justification for providing incentives and the spectrum of policy instruments for inducing specific behavior is outlined, before the effectiveness and impacts of incentives are assessed. The paper concludes that universal principles or general guidelines, as a blueprint for successfully providing incentives, do not exist, although as Williams (2001) has pointed out, an important measure of success appears to be a diminishing need for continued subsidization.

The peculiarities of investing in forest plantations

From a financial perspective plantations are long-term investments with a large proportion of capital expenditure occurring in the first several years of the production cycle. The major share of revenue is generated only at the time of the final harvest, which in most cases is between 20 to 40 years, although fast-growing species may be harvested in slightly less than 10 years. This long duration, potential difficulties in quitting the investment before maturity, the lack of knowledge about future input and output prices and marketability of the final products make plantations a risky investment and increases the costs of raising equity. Due to progressive income tax systems and the large and infrequent returns from a single tree plantation, individual investors are subject to the highest marginal income tax returns if deduction provisions have not been put into place. The minimum size of a commercially viable investment in a plantation is also likely to be large relative to that for an alternative investment in agriculture on the same land, although recently an increasing trends in establishing partnerships under contractual arrangements between landowners and investors and marketing cooperatives overcome some of the constraints. Notwithstanding these recent developments, and some very positive features that may make plantations an attractive investment to some investors, there remain numerous reasons to shy away from investing in plantations and to defend calls for more assistance and more effective incentives.

The concept of incentive

While there is no dearth of definitions for incentives, a single agreed definition does not exist (Meijerink, 1997). Sargent (1994; cited in Tomforde, 1995) defines incentives as signals that motivate action. Other definitions refer to the "incitement and inducement of action" (Enters, 2001). Although within the context of development projects, incentives have been described as "bribes" and "sweeteners" (Smith, 1998), ultimately they should be understood as policy instruments (Enters, 1999). To be of interest and to have an impact, incentives need to improve the relative attractiveness of plantation development. Hence, in the context of the regional study, incentives can be defined as "policy instruments that increase the comparative advantage of forest plantations and thus stimulate investments in plantation establishment and management." This definition is broader than the more narrow definition for subsidies that are viewed as payments or services provided to reduce the costs or raise the returns of an activity. The broader definition includes research and extension, which are important elements in supporting plantation development[2]. It also includes sectoral and macro-economic policies which, as will be argued below, create much of the general investment climate and heavily influence the economic behavior of individuals and corporations. Consequently, the spectrum of incentives can be considerably broadened compared with what is commonly understood as "incentives".

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[2] Extension, awareness raising, and public investments in education and research have been described as social instruments (Enters 2001) but can also be subsumed under the category of "enabling incentives".

Direct incentives include inputs such as seedlings and fertilizers, specific provision of local infrastructure, grants, tax concessions, differential fees, subsidized loans and cost-sharing arrangements. While the distinction between direct and indirect incentives is somewhat blurred, the former influence returns to investment directly, whereas the latter have an indirect effect through setting or changing the overall framework conditions within and outside the forestry sector. For example, tax concessions for plantation investors are a direct incentive, whereas general tax reductions for fuel are considered indirect incentives as they lower production and transport costs within as well as outside the plantation sector. Indirect incentives can be divided into *variable* and *enabling incentives*. Variable incentives are economic factors that may be shifted to affect the net returns that producers earn from plantations. They include factors such as prices, exchange rates, trade restrictions, interest rate policies, and general taxes (e.g. income tax) and subsidies. Enabling incentives are elements in the broader environment that affect decision-making. They include land tenure and resource security, socio-economic conditions, producer support services and infrastructure (Table 1). Enabling incentives determine to a considerable extent investment risks and information on these needs to be constantly updated to guide investors.

Table 1. Distinguishing variable from enabling incentives

Variable incentives		Enabling incentives
Sectoral	**Macro-economic**	
Input and output prices	Exchange rates	Resource and land security
Subsidies	Interest rates	Accessibility and availability of basic infrastructure (ports, roads, electricity etc.)
Tariffs	Fiscal and monetary measures	Market development
		Credit facilities
		Political and macro-economic stability
		National security
		Research and extension

Justification for providing incentives

What is the rationale for providing incentives to potential investors in forest plantation development? Why should taxpayers be interested in supporting the economic activities of others? If potential investors are dissatisfied with the low returns on their investments in plantations, would it not be more appropriate to leave them to invest in a more profitable land use or make alternative investments?

Meijerink (1997) argues that incentives should only be applied for public goods. Where plantations provide environmental services such as watershed protection and carbon sequestration, incentives are appropriate because private net returns are often lower than social returns. Real world incentives that fall into this category include those offered under the Soil Bank Program, Agricultural Conservation Program and the Conservation Reserve Program in the USA, the "Grain for Green Project" and the Great West Development Program in China, the landcare deductions for capital expenditures on soil conservation, prevention of land degradation and related measures in Australia, the Green Isarn Project in Thailand, and benefit-sharing arrangements under joint forest management in India. In each of these cases, incentives bridge the divergence between public and private goals and support activities that are primarily in the public interest. Incentives are not needed when the private returns from plantation management exceed those from other land uses (Haltia and Keipi 1997; Williams 2001). In this case, the provision of incentives translates into a misallocation of public sector resources, merely enabling investors to earn "above normal" returns.

While addressing environmental concerns is an important justification others include the goal of generating employment, particularly in less developed rural areas, and to jump-start the development of national forest industries in countries with comparative advantages such as Indonesia and Chile (Williams 2001). Incentives may be particularly justified to increase the pace of plantation development where a developing industry requires a minimum supply of raw material (Scherr and Current 1999). A rapid increase in scale is especially critical in commodity industries like pulp and paper, where economies of scale are essential for competitive operation (Clapp 1995).

The study countries

The impact of incentives on plantation development depends on numerous issues. What works in one country does not necessarily achieve the same outcomes in another country, even if situations are seemingly similar. The APFC regional study examined the use of plantation incentives in nine countries, and found that experiences differ markedly, often despite significant commonalities. Basic economic and forest-related indicators for the study countries are provided in Tables 2 and 3. The tables clearly indicate that the countries where plantation development is often cited as being "model" (Australia, New Zealand and the USA) offer natural and socio-economic advantages. All are economically developed countries where population pressures are low and populations are predominantly urban.

What the figures do not show is that the importance of agricultural production has declined markedly in Australia, New Zealand and the USA in recent decades. This has made, especially marginal, agricultural areas more readily available for growing trees. In the other six countries, with perhaps the exception of Malaysia, land availability remains a severe constraint. Even in Peninsular Malaysia, potential investors perceive land shortages as a constraint to tree growing (Krishnapillay and Ong 2003).

Table 2. Basic data on countries

Countries	Land area	Population				Economic indicators	
	Total, 1999 (?000 ha)	Total, 1999 (Thousands)	Density, 1999 (Population/km^2)	Annual rate of change, 1995-2000 (%)	Rural, 1999 (%)	GNP Per capita, 1997 (US$)	Annual growth rate of GDP, 1997
Australia	768,230	18,970	2.4	1.0	15.3	19,638	1.7
China	932,742	1,274,106	136.6	0.9	66.2	668	8.8
India	297,319	998,056	335.7	1.7	71.9	392	5.2
Indonesia	181,157	209255	115.5	1.4	60.8	1,096	4.9
Malaysia	32,855	21,830	66.4	2.0	43.5	4,469	7.8
New Zealand	26,799	3,828	14.3	1.0	13.3	15,233	2.4
Philippines	29,817	74,454	249.7	2.1	42.3	1,170	5.2
Thailand	51,089	60,856	119.1	0.9	78.8	2,821	-0.4
USA	915,895	276,218	30.2	0.8	23.0	28,310	6.9

Common in all countries is that forests have been, and in some countries (e.g. Indonesia and Malaysia) still are, viewed as a considerable land reserve for agriculture and industrial development. Forest conversion rates were high in all countries as populations expanded and as long as agriculture was a considerable contributor to national development. At the same time, forests were viewed, overtly or intuitively, as standing capital to be liquidated to fuel economic development. As long as natural forests were extensive, there was no apparent reason to plant trees. In fact, forests were – and in some countries still are – viewed as barriers to development without due recognition for their environmental and other values

Table 3. Forest resources

Countries	Land area (?000 ha)	Forest area, 2000 (or more recent figures)				
		Total forest (?000 ha)	Percentage of land area	Area per capita (ha)	Forest plantations (?000 ha)	Plantation area per capita (km^2)
Australia	768,230	165,896	22.0	8.7	1,569	827
China	932,742	163,480	17.5	0.1	45,083	50
India	297,319	64,113	21.6	0.1	32,578	330
Indonesia	181,157	104,986	58.0	0.5	9,871	470
Malaysia	32,855	19, 292	58.7	0.9	1,750	800
New Zealand	26,799	7, 946	29.7	2.1	1,542	4,030
Philippines	29,817	5,789	19.4	0.1	753	100
Thailand	51,089	14,762	28.9	0.2	4,920	810
USA	915,895	225,993	24.7	0.8	16,238	590

Over recent decades, this view has slowly changed and the widening gap between demand and domestic supply (the fear of a timber famine) stimulated significant activities in the plantation sector in the USA, Australia and New Zealand as early as the 1920s. Notwithstanding the land shortage, in many countries, the plantation area has grown considerably and there has been a pronounced shift from public to private sector involvement. Does this mean that the conditions for plantation development have become more encouraging and/or that governments have selected the right, or the right mix of, incentives to turn an inherently risky investment into a lucrative venture?

Use of incentives in the Asia-Pacific region

A variety of incentives have been used throughout the Asia-Pacific region. Comparisons in the study countries necessarily can be only broad, since invariably there are significant differences in details of schemes that are generically similar. As a most simple example, there is little potential for analysing the "price sensitivity" of plantation growers to various cash grant schemes, since circumstances in different countries (and over time in the same country) vary markedly. Similarly evident is the incompatibility for analysis of various tax concessions offered in countries. Nonetheless, it may be possible to make some comparisons of the relative success of generic incentive packages.

An overview analysis of the development of incentives in case study countries suggests that there is a broad evolutionary hierarchy in the types of incentives offered at different stages of plantation development. In almost every country, the State has initiated plantation development on any significant scale. This tends to support the argument that the development of critical mass is necessary to ensure private sector involvement in plantation development. Once private sector involvement is sought there appears to be a gradual progression from first providing free inputs, to grants and loans, to tax incentives, to joint venture arrangements and finally to a focus on creating an enabling environment and removing structural disincentives (Table 4).

Table 4. Plantation development and incentives in the study countries (reported examples)

	State planting	Low cost seedlings	Land grants	Nursery subsidies	Survival incentives	Grants to growers	Concessionary loans	Tax concessions	Joint venture arrangements	Research and extension	Resource security	Focus on enabling incentives and removal of structural constraints
Australia	►						►	►	►	►	►	High
China	►	►				►	►			►	►	Medium
India	►	►	►	►	►	►	►		►	►		Low
Indonesia	►					►	►	►		►		Low
Malaysia	►							►		►		Medium
New Zealand	►	►	►			►	►	►	►	►	►	High
Philippines	►		►				►	►				Low
Thailand	►	►				►	►			►		Low
United States	►	►	►			►		►	►	►	►	High

Early efforts to engage the private sector in tree-planting tend to focus around the provision of physical incentives. In frontier countries, such as the USA and New Zealand, one of the earliest incentives was grants of land on which to plant trees. As long as governments maintained extensive land banks in sparsely settled regions this was a relatively low-cost incentive, which

promoted both tree planting (not necessarily very effectively) and settlement. More recently, free or subsidised seedlings constitute physical incentives. These practical incentives have appeal in less developed environments, where more bureaucratic incentives (e.g. grants), requiring completion of forms and paperwork, may intimidate especially small-scale investors in tree growing. However, they may not necessarily have the desired effect.

In Thailand, for example the Royal Forest Department provided small numbers of free seedlings (up to 500) to farmers between 1975 and 1989. Plantation establishment under this scheme was negligible. By comparison, a Rubber Replantation Aid Fund which offered generous financial grants to growers assisted in establishing an average of more than 40,000 hectares of rubber plantations per annum throughout the 1980s.

The Thailand example is interesting at a number of levels. Firstly, it is indicative of a move to a more sophisticated level in the incentive hierarchy – from physical incentives to financial incentives, including cash grants and loans. Secondly, it demonstrates the effectiveness of financial grants in stimulating the planting of rubber trees, particularly because most grants are financially more attractive and provide more flexibility than free – and at times bulky – inputs (but also because there are established markets for rubber products). And thirdly, it shows that incentives for tree growing are unlikely to be effective if more attractive incentives are available in other sectors (e.g. rubber). A similar situation exists in the European Community, where attractive plantation subsidies are often outweighed by more generous agricultural subsidies. Note that the Thailand rubber incentives were effectively offered as an industrial incentive for latex production, with the more recent utilisation of rubberwood timber being a windfall for investors.

Significant cash grants and concessionary loans have proven popular in most of the study countries. Significant planting has been engendered in China in response to such financial incentives. In Thailand, on the other hand, the effectiveness of grants was rather mixed. In a number of the study countries, these more direct financial incentives have preceded a more complex approach – namely, offering of tax concessions on plantations. Tax concessions occur in an array of different forms but often focus on the long period between expenditure and revenue generation implicit in plantation investments. Changes in tax regimes have proven highly successful in many of the more developed study countries as means of generating plantation establishment, including, Australia, New Zealand, and the United States.

Most recently, these developed countries have paid specific attention to enabling incentives. That is, rather than offering a tangible encouragement, the focus has shifted to removing structural constraints and creating an attractive environment for plantation investment – the so-called "climate of enterprise". The emphasis here is on **specific attention** to enabling incentives, which are at the top of the broad hierarchy of incentives.

Direct incentives – what can they achieve?

Assessing the impact direct incentives in isolation from indirect and enabling incentives is very difficult and produce misleading results. In an environment characterized by serious disincentives (e.g. complex requirements to obtain permits for cutting, transporting and processing wood, low timber prices, inconsistent policies, high fire risks, high land prices, high interest rates, uncertain marketing opportunities), direct incentives may have only marginal effects. In the worst case scenario, they will even lead to misallocation of funds, trigger investments in plantations that are ultimately not viable and have long-term negative impacts on any interest in growing trees. If investments in forest plantations yield insufficient returns to the investors, it may be very difficult to convince them to return to plantation investment.

Although one must be cautious of generalizations, available evidence suggests that when the general investment climate is favorable and demand for wood increases, a number of direct incentives can draw the private sector to forest plantation investment. In the APFC study countries, the most effective direct incentives included the tax concessions and favorable capital

gains treatment. Loan and grant schemes achieved mixed results – some were obviously more generous than others – and favored predominantly large-scale investors.

There are five caveats to this general assessment. Firstly, direct incentives are difficult and costly to administer, and it is questionable whether the high transaction costs they incur make them an efficient tool, particularly for attracting small-scale investors. Second, tax concessions can only have an effect, if investors actually pay taxes. Third, due to a lack of monitoring it is difficult to establish to what extent direct incentives have accelerated plantings. Extensive areas have been planted without direct support, which has led critical voices to claim that funds have been unnecessarily misspent. Fourth, direct incentives are easily abused. Free seedlings are resold, loans are used for other purposes[3] and corruption is virtually impossible to control. Finally, direct incentives are frequently designed according to the interests of the provider, i.e. the government, rather than with the needs of the recipient in mind. However, many investors are guided by other signals. The available evidence indicates that variable and enabling incentives play a much bigger role in encouraging investments than direct incentives. Perhaps the most attractive and tempting recent stimulus for many investors in Asia-Pacific was the global price hike for wood in 1993 and 1994, which triggered a planting boom in many countries.

Indirect incentives – or what drives the trees into the ground (and what doesn't)

The history of plantation development in Latin America shows that key factors for obtaining significant levels of forest investment in plantations were macro-economic, political and institutional stability, access to land and clear resource tenure arrangements (Haltia and Keipi 1997). Plantation development in the Asia-Pacific region also provides evidence that these factors, as well as additional ones that help to create an enabling environment, are more important than direct incentives. Although it is difficult to disentangle specific causation from the overall investment environment, it is clear that investments are forthcoming when risks are perceived to be low and governments send out unambiguous signals in support of private sector involvement in plantation development (Clapp 1995).

A crucial factor is **tenure security**. The decollectivisation of land and forest tenure in China, beginning in 1978, provides an excellent example of the importance of respected and protected property rights. The principal goal of the reform was to encourage farmers to manage forest resources sustainably and to plant trees. The reform has been neither smooth nor uniform and forest tenure arrangements often vary even among townships. Consequently, not all collectives have been equally enthusiatic. A clear pattern is discernable: where decollectivisation has gone furthest there have been significant increases in investments in tree growing (Lu *et al.* 2002). As much as clear tenure arrangements have underpinned the success of plantation development in Australia, New Zealand and the USA, so too have blurred and uncertain tenure slowed investments in Indonesia, Thailand and the Philippines. In extreme cases, tenure and land-use conflicts have resulted in the destruction of plantations and equipment, which is certainly a situation that investors will shy away from.

As commercial investments in forest plantation development aim to maximize financial returnes, **high timber prices** have triggered investments in tree growing from time to time. Similarly, when prices are low, plantation investments have been sluggish. A number of examples can be cited:

- price controls, as they existed in New Zealand until 1965;
- depressed timber prices due to cheaper imports (e.g. Canadian imports to the USA);
- a policy of cheap raw material for the wood processing industry (e.g. in Indonesia); and
- illegal logging (e.g. in Indonesia and India).

[3] For example, the Ministry of Forestry in Indonesia has recently revoked the timber concessions of 15 companies due to their failure to develop required industrial timber plantations. Companies had been awarded a total area of 989,079 hectares, but developed only 188,950 hectares, despite the government providing them with loans for the purpose (Jakarta Post, 12 November 2002).

Each of these examples has dampened investor interest and reduced the impact of available incentives. While prices do not necessarily have to be high, they need to be reasonably predictable and make returns to investments comparable to investments in similar land uses (e.g. oil palm, rubber or pastoral farming). In Malaysia, returns to investment in oil palm are considerably higher than for fast-growing trees. In Thailand, financial support through the Rubber Plantation Aid Fund for the replanting of rubber amounts to approximately US$1,000 per hectare, whereas the Private Reforestation Extension Project offers less than half that amount for timber plantations. If goverments are serious about augmenting wood supplies, then this substantial difference provides the wrong signal to investors. Alternative investment opportunities will always compete with forestry and even where the plantation sector is well established some investors may switch to other land-based investments such as dairy farming, as was indicated by Terry McFadgen, the former chief executive of Fletcher Forests Ltd. in New Zealand. In early 2003, he warned that "if the forestry industry continues to perform at its current level and if dairy continues to perform better, then yes there will be some conversions" (Graham 2003). There never appears to be much room for complacency, even in a "success-story" country such as New Zealand.

In New Zealand, the **development of infrastructure** (e.g. roads, railways, modern port facilities, hydro-electric power stations) by government paved the way for large-scale processing initiatives based on plantation-grown timber. These public sector investments provided a tacit assurance to potential planters that the government was serious in developing a viable plantation sector including processing industries. Similar developments can be found in Australia and the USA. These were complemented by increased **efforts in research, development and extension**, which reduced risks, increased yields and, especially, lowered the costs of plantation establishment. While linkages between plantation growers and research and extension activities are still weak in many Asian countries, extension programs played an important role in disseminating research findings to plantation foresters in the Australia, New Zealand and the USA. However, many policies and programs continued to be narrow and favored industrial forest managers and large-scale owners. For example in Australia, the National Forest Programme (1987) and the Plantations for Australia: the 2020 Vision have been criticized for being too narrow in their focus on industrial plantation forestry, without taking sufficient account of the different needs and motivations of farmers (Donaldson 2001).

In recent years, falling agricultural commodity prices coupled with increasing labor costs, and **various outgrower and joint venture arrangements** have increased interest by small-scale investors in tree-growing in a number of countries. However, success in drawing private landowners to plantations will continue to depend on the total expected net returns from growing trees in comparison to alternative land uses, overcoming the cashflow constraints inherent in a plantation investment, and continued confidence in being able to market final products. Market uncertainties are key disincentives and a major barrier especially for potential small-scale investors.

In several countries, it can be observed that policies are in place to encourage plantation development, but little is done to translate them into action on the ground. It is critical to follow up supportive policies with **strategies and actions** that provide the necessary support to investors. This may include examining incentive structures across all sectors of the economy to ensure plantation forestry is not inappropriately disadvantaged, i.e. that plantation investment occurs on a level playing field. The role of the public sector as a forest owner and manager should also be examined to ensure that public sector plantations are not unfairly competing with, and crowding out, private sector investments. Public sector plantations are affected differently by taxes and land prices, and often, as has been the case in Australia, determine log prices and log allocation. In addition, the rates of return from public sector plantations may not reflect the market cost of capital. **Removing impediments** to plantation development means reducing or eliminating subsidies in other sectors of the economy, especially in agriculture. **Creating a level playing field** may also include relaxing restrictions on foreign investments and, in general, moving towards free market policies and liberalizing trade.

A key point is that **policies need to be consistent** over time. Frequent policy changes translate into increased risks and provide a climate of insecurity for investors. In the Philippines, for example, the political landscape during the past 20 years has been turbulent, and this lack of stability has hampered plantation development. The dictatorial Marcos regime (1965-1986) operated under martial law for much of the era – with massive deforestation in the Philippines a legacy of political and economic misgovernment. Marcos was succeeded by Corazon Aquino in 1986, herself surviving seven coup attempts before handing the reins to Fidel Ramos. Ramos was succeeded by Joseph Estrada (impeached for accepting bribes) and most lately Gloria Arroyo, the current President. Many of these regimes have implemented forestry plantation programs – often backed by significant direct incentives, but with rules changing frequently, high levels of corruption, and no guarantee of retaining control of plantations for harvest, planting has generally fallen short of targets. The Philippines is increasingly leaning towards Community-based Forest Management as a means of revitalising forest development.

In most countries, the expansion of plantations has been to some extent paralleled by increasing objections over the use of natural forests. As concern over the fate of natural forests increased, decision-makers passed a variety of harvesting restrictions in many countries (Brown *et al.* 2001). While this provided a window of opportunity for investments in plantations, **environmental concerns** – later also **social concerns** – over monoculture forest plantations also translated into a worry for investors. In Thailand, environmentalists warned that, "commercial eucalyptus plantations are incompatible both with forest conservation and with village livelihood(s)" (Lohmann, 1990, p. 9; see also Lang 2002). In Indonesia, forest plantations have displaced many smallholders, which has led to disputes and, in several locations, to the destruction and theft of timber (Kartodihardjo and Supriono 2000). While it is recognized that forest plantations generate employment this may be outweighed by job losses in agriculture at local levels and the costs of significant restructuring in local economies (Tonts *et al.* 2001). In New Zealand and Australia, social and community concerns have been noted and are dealt with to mitigate the social and economic impacts of plantations and to maintain a favourable investment climate.

Finally, the question needs to be asked, whether incentives in any form are justified on societal grounds. Where this is not the case, the **private sector** and particularly the processing industry has an important role to play in motivating landowners to plant trees. In India, land ceiling laws prohibit private companies from establishing large-scale plantations. To overcome this constraint, private companies have offered a number of incentives, including technical assistance and buy-back arrangements. Similar arrangements have been put in place in other countries (e.g. Australia, New Zealand and Thailand), which indicates that private companies may be in a better position than governments to reach small-scale growers through out-grower schemes (Desmond and Race 2000).

Conclusions and recommendations

The roles played by the private and public sectors in plantation development have experienced major changes in the Asia-Pacific region, although the level of success in involving private investors varies considerably. The available evidence suggests that plantation development can be divided into three stages, namely initiation, acceleration and maturation stages. In Australia, New Zealand and the USA, interest in the plantation sector has a long history and by the 1990s these three countries had reached the maturation stage. On the other hand, most Asian countries find themselves still in the initiation or early acceleration stage.

Direct incentives are most likely to be important in the initiation stage to raise awareness and to increase the pace and scale of plantation establishment to augment supplies for a developing processing sector. These should be replaced by variable incentives and social services such as research and extension during the acceleration stage. A good measure of an incentive's success is if it becomes obsolete in the maturation stage.

There is broad agreement that high social returns, coupled with insufficient or even negative private returns, are a rational justification for offering incentives to investors. However, in many cases the social returns are neither clear and explicit, nor is tree-growing inherently unprofitable. Applied economic analysis that comprehensively considers beneficial social outcomes, and weighs the costs of providing incentives against the perceived societal benefits, is rarely used to assess whether a particular level of support is justified. This, of course, is not surprising since obtaining broad agreement on how societal benefits should be valued is even more elusive. Thus, incentives tend to be implemented in response to less well-defined "perceptions", as political gambits and in some instances "cronyism". An assessment of alternative courses of action or alternative mechanisms for achieving societal goals is also lacking in most countries. A lack of information makes it extremely difficult to assess whether incentives have been provided efficiently and to what extent they have achieved intended objectives.

Indirect or enabling incentives such as good governance, clear tenure arrangements, national security, research and technical assistance, and well-established markets often have a greater influence than direct incentives such as free seedlings, subsidized credit or cost-sharing of planting expenses. In countries with a long history of providing incentives it has also become clear that to successfully engage the private sector in plantation development requires incentive systems that are timely, targeted and flexible.

In the countries that have reached the maturation stage, it has been recognized that key measures to maintain private sector interest and investment in plantation development are related to reduction of barriers and removal of structural impediments and operational constraints. Some issues such as adequate tenure arrangements are difficult to tackle, but crucial to success. Others such as unnecessary regulations and bureaucracy (licencing and permits) and tax reforms are just as important (Keipi 2001) and much easier to address.

In deciding on measures that increase the interest of private investors it is vital that consideration is given to factors that motivate people to invest resources in planting trees, rather than focusing on the needs and objectives of governments and their respective forest agencies. While there is no single road to success it is possible to outline some guiding principles that will contribute to achieving a viable plantation sector.

GUIDING PRINCIPLES FOR PLANTATION POLICY

DO

1. **Provide a stable and coherent forest policy** that is supportive of economic activities and creates an environment that is encouraging and enabling for the forest sector.
2. **Ensure that other (non-forestry) policies are aligned** so that plantation investment can occur on a level playing field.
3. Develop **research capacities and a strong extension** program to disseminate research findings and report back on field experiences.
4. Develop **strong industry clusters** including supporting infrastructure, a competent labour force, as well as appropriate practices and technologies.
5. **Develop high quality resource information** for policy-making, forecasting, planning and monitoring and make independent and objective information easily accessible and available.
6. **Encourage a healthy debate and discussion** on the merits and reasons for offering particular incentives.

DON'T

7. **Promote inequitable land-use policies** that favour, for example, agricultural land uses over forest plantations.
8. **Persist with export or import controls** that hinder development of efficient wood processing and/or forest plantation establishment.
9. Implement plantation policies that **promote detrimental environmental and/or social impacts**, for example policies that will put private companies, communities and environmental groups at loggerheads.
10. **Crowd out private sector investment** in plantations by maintaining a large public sector involvement, and especially don't allow public plantations vast privileges that ensure the private sector cannot compete.
11. **Persist with policies and incentives beyond their "use-by" date**. Keep in mind that the most successful incentives are those that can be phased out.
12. **Maintain disincentives** that directly or indirectly reduce returns to investors.

These guiding principles are not meant to be a step-by-step procedure promising success if strictly followed. They are meant as points to take into account when pondering policy instruments for encouraging investments in plantation development.

Most people appear to agree that forest plantations can offer significant potential for meeting the future increases in demand for wood. However, there are two caveats to this general statement, which need to be considered. First, the question "What does it take?" is not only asked by those interested in seeing plantation areas expanded. The agricultural sector has its own advocates, as well (e.g. the expansion of oil palm plantations in Malaysia and Indonesia). One reason for the success in plantation development in Australia, New Zealand and the USA has been a concurrent decline in marginal returns to agricultural products. The past may be a poor indicator of the future. Where land availability is a constraint, proponents of forestry need to recognise that alternative land uses may offer similar benefits to society. At the same time, these alternatives may be more rewarding to investors. Under such circumstances it may be pointless to advocate incentives for plantation development, since it may be more economically efficient to make alternative investments rather than growing trees.

Second, although concerns over timber shortages and famines have dominated discussions, recently there have also been warnings on global wood supply outstripping demand and a timber glut. Promoting too many plantations may result in a rude awakening for investors and those who encouraged them.

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