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**GOVERNMENT AND PRIVATE SECTOR JOINT  
VENTURING IN NATURAL RESOURCE DEVELOPMENT:  
THE QUEENSLAND PLANTATION FORESTRY JOINT  
VENTURE SCHEME<sup>1</sup>**

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This paper examines the role of joint ventures between government and resource owners to develop natural resources, with particular reference for forestry plantations. Findings of a survey of landholders participating or expressing interest in the Queensland Plantation Joint Venture Scheme are presented. Joint venture arrangements are found to overcome investment constraints, particularly with respect to capital, technical knowledge and resource security. Complementarities between resource supplies of joint venture partners lead to increased output relative to wholly owned investments. Participants expressed a high degree of satisfaction with this program, although making some suggestions for changes in arrangements. Plantation joint ventures can contribute towards timber self-sufficiency and to ecologically sustainable land-use. Opportunities exist for joint ventures between government and private firms with respect to other natural-resource-based enterprises where market failure is apparent.

## 1. INTRODUCTION

Development in natural-resource based industries requires capital and risk taking, is often long-term in nature, and raises issues of ecological sustainability and

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environmental management. Joint ventures in which the resources of two or more independent firms or agencies are pooled, are one means of overcoming resource constraints. A vast literature exists on international joint ventures, especially as a means of gaining market entry in developing nations, and in particular China. For some resources, domestic joint ventures between resource owners and government or industry are becoming increasingly important. This is the case for forestry in Australia, where all states have introduced joint venture plantation arrangements.

This paper reviews the role of joint ventures for the development of natural resources, drawing on the Queensland Plantation Joint Venture Scheme (PJVS) as a model. The next section examines the role of joint ventures in natural resource developments. Benefits and equity sharing of such arrangements are then examined. Plantation joint ventures are reviewed. The arrangements under the Queensland Plantation Joint Venture Scheme are then outlined, and findings of a survey of participants are presented. Finally, some conclusions are drawn as to the desirability of such schemes and of potential improvements.

## 2. JOINT VENTURES IN NATURAL RESOURCE DEVELOPMENT

Joint venture investments involve two or more independent firms or agencies implementing an agreement to undertake a project on an input and profit sharing basis. The rationale for joint venture investments is summarised by Tisdell (1989, p. 2): "All must gain more by cooperation than by going it alone and each should not get less from the joint venture than could be obtained from the next best alternative institutional arrangement or investment". This implies the cooperation should be synergistic, with the aggregate gain greater than in the absence of cooperation. Typically, the synergy arises because of complementarity of resources between the partners. That is, joint ventures are viewed as a mechanism for access to capital, new technology and markets and a means of risk sharing with regard to major projects. Applications are typically in areas such as manufacturing and resource processing, where large investments and advanced technology are required.

International joint ventures are used in a variety of ways:

1. developed countries providing assistance to developing countries, often in the form of "tied aid". Australia has provided considerable joint venture finance in the South Pacific (Parry, 1987). Such assistance may have a strong environmental component, e.g. Doelle, 1996).
2. closely related to (1), developed countries gaining market access in developing countries. This can be critical where language and legal and institutional factors provide a barrier to entry. Much of the foreign investment in China has been of this type.
3. developed countries gaining access to resources of developing countries, e.g. Japanese access to fisheries in the Solomon Islands (Meltzoff and LiPuma, 1983).
4. developing countries obtaining access to resources of developed countries, or a commercial investment on the part of the developing country, e.g. China's equity investments in the Channar iron mine in Western Australia and Coastal Corporation for oil refining and marketing in the USA (Tisdell, 1989).

Domestic joint ventures are often used to finance major capital expenditure on resource development and processing. Examples of joint ventures with respect to natural resources include aluminium (Stuckey, 1981, 1983), energy (Robson, 1982), fishing (Gallagher, 1981; Meltzoff and LiPuma, 1983; Doullman, 1989), paper pulp (Castle, 1990), and wildlife (Heitmeyer, 1989; US Fish and Wildlife Service, 1989; Kresl et al., 1995). Within Australia, governments have at times invested in resource companies, sometimes with the objective of keeping a struggling firm in operation so as not to lose the employment and foreign exchange earnings it generates, e.g. the joint venture between the Queensland government and Greenvale Nickel.

Joint ventures may be viewed as an extension of partnership arrangements, where individuals pool resources (both financial and human capital) for mutual benefit. While governments adopt various industry assistance measures, the extensive use of joint ventures between the state and small firms for long-term resource development is relatively new. For the small firm, this provides an alternative to a wholly-owned investment with borrowed finance. For the government, it provides a means to expand output and correct market failure. The move of government towards user-pays for agricultural extension, and to resource and environmental management rather than farm support, make technology access more difficult and expensive for landholders, and probably favour joint venture arrangements.

### 3. JOINT VENTURE SYNERGY AND EQUITY SHARING

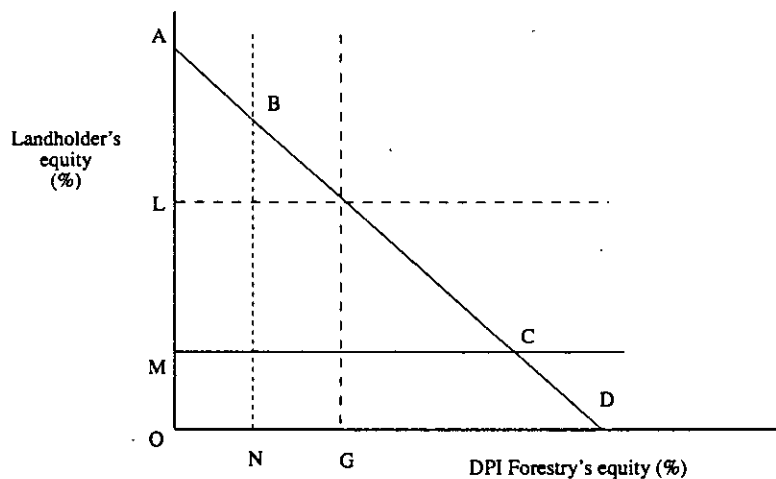
The total production from a joint venture will depend on the inputs of the partners and the complementarity between them, while equity shares will depend on negotiation and institutional arrangements. Diagrammatic representation sheds light on these issues. Suppose a state forest service and a landholder have agreed to a forestry joint venture. The relative equity shares in the plantation are illustrated in Figure 1. Here AD (with a slope of 45 degrees) represents the total payout to the joint venture partners, i.e. the net present value of the forestry investment. OL and OG are the landholder and government equity percentages, summing to 100. OM and ON are the respective minimum equity shares agreed for landholder and government, and BC represents the range of negotiation. This "negotiation" concerns the discretionary inputs of the landholder, subject to approval and valuation by DPI Forestry. One possible solution is OL = 60 % and OG = 40%.

Working together in a joint venture may increase net revenue compared to what either partner could earn in a wholly-owned venture. This can be illustrated by drawing AD as aggregate plantation NPV, in absolute rather than percentage terms<sup>2</sup>, as in Figure 2. If the government were to "go it alone", they would need to acquire land, say by purchase or long-term lease, which could greatly reduce profitability of the investment. If the landholder were to undertake a wholly-owned

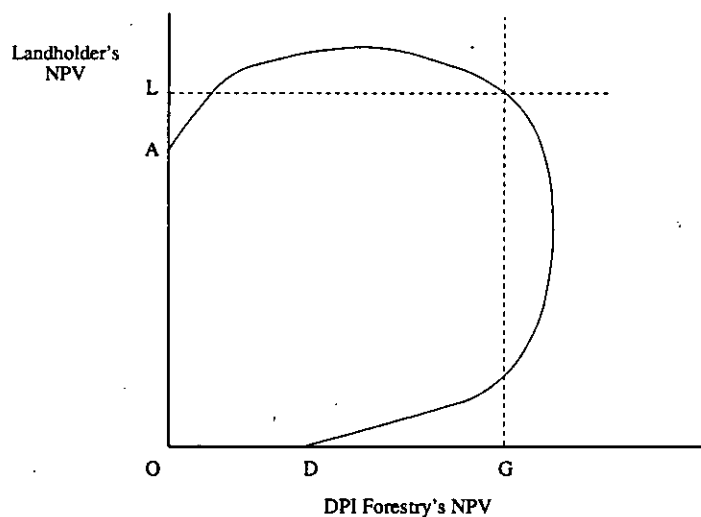
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<sup>2</sup> A similar diagram is to be found in Tisdell (1989), but in terms of annual income rather than NPV.

**FIGURE 1**  
**RELATIVE EQUITY SHARES BETWEEN LANDHOLDER**  
**AND GOVERNMENT**



**FIGURE 2**  
**ABSOLUTE JOINT VENTURE PAYOFF SHARES WITH SYNERGY**  
**BETWEEN PARTNERS**



venture, profitability could be low due to lack of silvicultural and marketing skills. The NPV from a wholly-owned venture would not exceed the larger of OA and OD. By joining forces, both can increase their revenue, e.g. equity shares could be such that the landholder would obtain OL and the government OG.

#### 4. FORESTRY INTERVENTION IN AUSTRALIA

It is perhaps curious that Australia, described by our politicians as the "clever country", with relatively abundant land resources and a tradition of strong rural industries, should spend of the order of \$1b a year on timber imports. This concern can only be heightened when the well-accepted environmental benefits of forestry – such as land and watershed protection, wildlife habitat and carbon sequestration – and the employment generation of forest industries are considered. However, it is notable that Australia is both a timber exporter and importer. Large quantities of woodchip are exported, while the major import items are paper and pulp (IC, 1993, p. 40), and not hardwood timber. In any case, self-sufficiency in forest products is not necessarily a rational objective.

A variety of impediments to farm forestry have been noted for Australia (e.g. IC, 1993) and for Queensland and north-east NSW (Harrison et al., 1996; Harrison et al., 1998). Various government intervention measures have been adopted to promote forestry on private land, on the grounds that low planting levels are a case of market failure, and that social returns from greater forestry activity would exceed private returns. The evolution of these schemes is summarised by Byron (1987a):

- firstly, seedlings were provided at subsidised prices
- when this had little impact, technical advice and assistance with management planning were provided
- when these were ineffective, capital was judged to be the constraint and grant and loan schemes were introduced
- subsequently uncertainty about markets was judged the constraint, and sales agreements were devised
- uptake remained slow, and annuity schemes were introduced.

Byron (1987b) and Boutland et al. (1991) summarise assistance programs which have been introduced to promote farm forestry. Some more recent measures, such as the Community Rainforest Reforestation Program, Landcare support and modern joint venture programs are discussed by Harrison, Herbohn and Hill (1998), who contrast the constantly changing support structure in Australia with the fine-tuning of long-term support programs in the UK.

It is uncertain whether the negative views of Byron about adoption of private forestry remain true today. In the last decade, there has been great interest in farm and other small-scale forestry, with large attendance at field days and conferences, and private forestry organisations such as Australian Forest Growers have become more active. Much more experience has been gained in techniques for growing native trees. Considerable forest land has been lost to the timber industry through National Parks, World Heritage Areas and the Comprehensive Regional Assessment/Regional Forest Agreement process. State forest services – which are price leaders – have greatly increased royalty rates for Crown forests. However, a sobering note

is that since World Heritage Listing and exclusion from logging of 0.9m ha of rainforest in north Queensland in 1988, there has been little price increase for rainforest cabinet timbers.

Expansion of plantation areas by state forest services has become increasingly difficult. Under the National Forest Policy Statement to which all states are signatories, "Governments will adopt the policy that further clearing of public native forests for non-forest use or plantation establishment will be avoided or limited ..." (Commonwealth of Australia, 1992). This and other clauses in the Statement have been taken to mean that native forest is not to be cleared for plantations. Since forests are most productive on high-rainfall moderately fertile coastal lands which are of high value, acquiring additional land for plantations is of doubtful economic viability, hence the interest in joint ventures on private land.

Substantial areas of degraded private farm land suitable for forestry exist in eastern Australia, sometimes growing unproductive or pest plant species (e.g. camphor laurel, lantana, bracken fern, blady grass, groundsel bush). The opportunity cost of this land for forestry would be low. During the 1990s, joint ventures have been increasingly favoured as a means to overcome constraints in farm forestry, particular with respect to capital tied up in a long-term investment, silvicultural skills in producing high quality timber, security of harvest rights and lack of market power of small-scale producers when dealing with timber millers.

## 5. FORESTRY JOINT VENTURES

Forestry is an industry where joint ventures have considerable attraction, in part due to the long payback period. As noted by Spencer (1994, p. 92), plantation joint ventures are "an excellent opportunity for farmers with degraded land to establish a plantation. Farmers short of capital, machinery or skills can enter the joint venture with no cash outlay".

Forestry joint ventures are well established in New Zealand (e.g. McKenzie, 1984; New Zealand Ministry of Forestry, 1984), but with an emphasis on private rather than government investment. Advertisements are frequently placed in newspaper to attract forestry equity investment. Entrepreneurs have established a role in setting up and managing plantations with capital input from a number of small investors. This is a more attractive investment in New Zealand than Australia due to the shorter rotation length, of about 22 years for *Pinus radiata* plantations. The assets are readily saleable (though it is not clear whether a secondary market has developed), and even superannuants are investing in forestry.

In Australia, forestry joint ventures are well established (Dargavel and Semple, 1990; Lyons, 1994; Spencer, 1994). APPM Forests Pty Ltd introduced a softwood sharefarming joint venture in Tasmania as far back as 1950, and a eucalypt joint venture scheme in 1970. One of the longest running and most successful forestry joint venture schemes in Australia is that of Australian Newsprint Mills (ANM) in Albury, which incidentally is a private sector program. Sharefarming arrangements were introduced by the Department of Conservation and Land Management in Western Australia in 1985 to produce eucalypts for pulpwood for export to the Japanese and Taiwanese markets. Kimberley-Clark Australia Pty Ltd has instituted

agreements for growing *Eucalyptus globulus* in South Australia and Victoria, with guaranteed prices for all suitable timber. State Forests of New South Wales introduced a eucalypt joint venture scheme with landholders (including local authorities) in 1994.

Particular characteristics of these ventures are that they are typically domestic (rather than international), one partner is a small business (the landholder), the investment term varies from short rotation pulpwood to sawlog rotations of up to 40 years, and issues of market failure and environmental and social benefits are involved. The objectives of joint venture plantings can be expected to be a compromise between that of the joint venture partners. In that they are a commercial arrangement between government and landholders, it could be expected that considerable emphasis would be placed on profitability, rather than on environmental objectives.

## 6. THE QUEENSLAND PLANTATION FORESTRY JOINT VENTURE SCHEME

The Queensland Plantation Joint Venture Scheme, administered by the Department of Primary Industries, Forestry (DPI Forestry), was devised on the basis of accumulated experience from other states, and particularly NSW. Three regions in the state have been selected for planting, viz. the south-east (based on Brisbane), central (Mackay) and northern regions (Cairns).

Joint ventures are implemented only on sufficiently fertile land, with average annual rainfall above 900 mm and slope of less than 20 degrees. Land parcels are required to be located within 200 km of the above centres, preferably near existing government plantations. The minimum area is 10 ha per landholder. Recruitment is by inviting landholders to make an expression of interest in a plantation joint venture, then assessment of the site for suitability by a DPI Forestry officer. A joint venture deed is signed between the landowner and the Primary Industries Corporation. It is a requirement that the landholder remove any existing vegetation on the site, ensure road access and construct fences to exclude livestock during the establishment period. Some grazing is possible after about three years. As with some plantation joint venture schemes in other states, forest management training for landholders is provided for participants in the scheme, e.g. subsidised workshops at the Forestry Training Centre at Gympie.

Equity shares depend on relative inputs of both parties, but with the constraint that neither party can have greater than 80 per cent share. The land is valued by an independent valuer, and 5 per cent of the plantation land value up to a maximum of \$150/ha is regarded as an input of the landholder each year, to represent the rental value of the land. The land value is indexed according to the annual rise in the Consumer Price Index. Due to land rent and discretionary inputs of the landholder, equity shares vary over time, with that of the landholder tending to increase.

A narrow list of species (native eucalypts and one native conifer) is used, individual plantations normally being of a single species judged most suitable for the site. DPI Forestry is the sole judge of what constitutes proper forest management. Tasks such as weed control, fertilizing, thinning and pruning can be carried out by

the landholder (if DPI Forestry considers the work would be carried out to a satisfactory standard) or by contractors, and in the latter case payment may be by government or the landholder, with equity shares adjusted accordingly. The agreement includes details of site restoration after final harvest. The landholder may retain up to 25 per cent of the timber after final harvest, provided this does not exceed their equity share.

Revenue is generated from commercial thinnings and later harvests, and products include poles and sawlogs. Harvesting is to be directed and controlled by the State (DPI Forestry, 1996), and no guarantee is given of the saleability of any produce or of royalty rates.

Since recruitment of landholders only commenced in 1995, with first plantings in 1996, it is early days to make estimates of profitability to the joint venture partners. A variety of physical risk factors exist (of poor establishment, slow growth rates, and damage by pests, diseases, fire and windstorm) such that prediction of mean annual increment (i.e. timber yield) is difficult. Also, timber price and hence stumpage value many years into the future is uncertain. Capital requirements for a 10 ha planting could be expected to be of the order of \$20,000. Miamo (1997) estimated a NPV of \$4,300/ha, assuming a harvest age of 40 years, MAI of 20 m<sup>3</sup>, stumpage price of \$60/m<sup>3</sup>, and adopting a real discount rate of 5 per cent per annum and annual increase in timber price of 1.3 per cent in real terms. This NPV has an annual equivalent value of \$250.60/ha, which in general is well above the agricultural income generating capacity of the land. The yield and price assumptions of Miamo's NPV calculation are probably optimistic, although there is an expectation that "poles and peelers" may be produced, which are considerably more profitable than sawlogs.

## **7. LANDHOLDER CHARACTERISTICS AND PERCEPTIONS ABOUT THE PROGRAM**

A survey by Miamo (1997) provides insights into which landholders are interested in the Queensland PJVS, and of their impressions of the scheme. Questionnaires were mailed to 95 landholders who had responded to an invitation to submit an expression of interest in the scheme, and 57 of these completed the questionnaire. Most were sole owners or partners, although 15 per cent were companies. 37.5 per cent had operated their properties for less than five years, and 82.5 per cent for less than 10 years. 41 per cent of properties were less than 40 ha. 23 per cent of properties were involved in crops or dairying, the majority being extensive grazing. Only 26 per cent of respondents described themselves as farmers, compared with 47 per cent in trades or professions. 35 per cent reported taxable incomes of over \$50,000 a year.

A question asked "How important are the following as obstacles to your growing trees for profit", with a list of 14 possible constraints and a five point Likert scale ranging from no importance to very high importance. Responses indicated that greatest concern was over harvest rights, followed by capital availability, long wait for returns, flexibility of future land use then labour required.

Landholders were asked "What do you see as the main strengths of the



Plantation Joint Venture Scheme?", and invited to list up to five items in order of importance. Responses are summarised in Table 1. The most important item is provision of technical expertise in growing trees by DPI Forestry, followed by the opportunity to generate financial returns then the input of capital by DPI Forestry. Other significant items are landscape amenity and conservation benefits, and to a lesser extent land rehabilitation and enterprise diversification. Supply of labour was rarely mentioned, although access to external capital would allow funding of contract labour. Surprisingly, the flexibility of the joint venture contract under which landholders can elect how much of the expenditure they wish to finance was not highly ranked, nor was the marketing capability of DPI Forestry; it is possible that these will be accorded greater recognition as plantations progress.

**TABLE 1**  
**PERCEIVED STRENGTHS OF THE PLANTATION**  
**JOINT VENTURE SCHEME**

Feature of scheme	Number of times ranked:		
	First	In first three	In list of five
Conservation benefits	3	4	11
Landscape amenity	2	3	15
Financial returns	7	14	24
Land rehabilitation	3	5	9
DPI Forestry capital input	8	12	15
DPIF silviculture expertise	12	21	24
Product marketing	1	4	6
Enterprise diversification	1	5	9
Contract flexibility	0	2	4
Supply of labour	0	0	2

As pointed out by an anonymous referee, the ranking of items in Table 1 may reflect the newness of the scheme, where members are concerned about tree establishment. Where joint venture schemes have existed for over 20 years, landholders become more concerned about who will purchase their timber, and favour programs with assured marketing contracts.

A question was also included asking "What do you see as drawbacks to the Plantation Joint Venture Scheme?", and asking for up to five items to be listed in order of importance. Responses to this question, as summarised in Table 2, were sparse, but a number of drawbacks were identified, of a legal and financial nature, which were ranked approximately equally. These include sharing of equity with government, long period in which land is committed to the investment, caveat on the land title and uncertain profit level. Interestingly, environmental issues also arose, including the limited choice of tree species, the need to clear existing vegetation during land preparation and the use of agrochemicals for pest and weed control. Removal of stumps at the end of the tree rotation was of concern for cropping land.

**TABLE 2**  
**PERCEIVED DRAWBACKS TO THE PLANTATION**  
**JOINT VENTURE SCHEME**

Drawback	Frequency of listing first	Frequency of listing first or second
Uncertainty of profit	7	8
Limited number of species included	5	10
Minimum planting area requirement	0	1
Caveat on land title	4	9
Long period of investment	8	9
Requirement to clear existing vegetation	3	4
Use of chemical herbicides	0	3
Government equity in the venture	6	12
Post-harvest land restoration	0	4

### 8. CRITICAL EVALUATION OF THE SCHEME AND POSSIBLE IMPROVEMENTS

Many reforestation promotion programs have been trialled in Australia over the last 50 years, none with conspicuous success or longevity, and the question to be asked of any new scheme is whether it will prove effective and enduring. It could be hypothesised that plantation joint ventures will have a number of benefits, of an economic and environmental nature, some of which are now examined.

- *Contribution to timber supplies.* Joint venture arrangements will assist in overcoming constraints to timber production on private land, contribute to knowledge about how to grow native trees in plantations, and provide a demonstration to other landholders on forestry as an enterprise. However, the direct contribution to meeting Australia's timber needs will be small. The initial rate of adoption of these schemes appears to have been below target (Spencer, 1994), and whether they will attract large-scale plantings remains to be seen. Joint ventures could stimulate other plantings, e.g. after a time landholders could consider they have gained sufficient information from their own or neighbours plantings to proceed with wholly-owned forestry investments. Here again, anecdotal evidence from Victoria and Tasmania suggests uptake without joint venture partners will be slow.
- *Farm diversification and increased income.* From the landholder's viewpoint, joint venture plantings can be expected to assist in overcoming constraints on capital, risk bearing and silvicultural skills. In the longer term, joint ventures could provide a significant contribution to landholders' incomes. Trees typically are planted on the less fertile or steeper grazing land, and hence do not compete strongly with other farm production. It is notable that many of the landholders entering joint ventures are not traditional farmers, and many are professional people with moderate to high incomes.
- *Reduced logging pressure on native forests.* Hardwood plantations may be viewed as an alternative timber source to native forests, and a step towards

confining all logging to plantations. However, if timber milling and processing are geared to native hardwood species, demand and prices for timber from these species will be relatively high and there will be strong temptation to augment supplies by harvesting native forests.

- *Other environmental benefits.* Particularly where plantations utilize degraded farm land or replace undesirable plant species, an improvement in land and watershed protection, habitat and aesthetic values can be expected. Use of native species contributes to these objectives, although restriction to single species plantings attenuates this benefit. While protected forests tend to have a zero carbon balance, trees grown for timber for long-term use provide considerable carbon sequestration benefits. These benefits could be partially offset by removal of vegetation and habitat to establish plantations. There is some uncertainty as to whether repeated timber crops are ecologically sustainable, particularly where short-rotation eucalypts are grown for pulpwood on infertile soils. In general, plantation forestry is viewed favourably by the environmental lobby, and participation by landholders provides a community support base for joint venture plantations. Use of timber rather than metal or concrete for poles, house framing and other building purposes is generally considered environmentally favourable.
- *Other benefits.* Joint venture plantings will have higher labour requirements than grazing enterprises they replace hence generating employment. In that limited research has been carried out into growing native species for timber in Australia, the PJVS can be expected to yield research information supporting more productive use of these species in the future.

Achievement of the above goals will be advanced by increased uptake of the joint venture scheme and by measures to promote environmental goals. The stated drawbacks give pointers to making the scheme more attractive.

- In terms of legal and financial aspects, the issues raised are basic to joint venture arrangements, and overcoming them would probably involve alternative intervention methods such as tree planting grants and extension measures.
- In terms of financial issues, one suggestion is to pay landholders an annual cash rental for use of their land. This is attractive to landholders, who are not out of pocket for such a long time, although there is a compensating loss in equity in harvested timber. The Western Australian CALM scheme includes annuity payments, which appear to have been a key ingredient in the scheme's success, and cash payments have been proposed for the Queensland program.
- With regard to the environmental issues raised, there is some scope for modification of the scheme, such as leaving more existing vegetation (often native regrowth), and allowing landholders choice of species (perhaps including mosaic or mixed species planting). Of course, these measures to enhance plantation biodiversity could be expected to incur some yield and revenue tradeoff.

Extension of the locations where plantation joint ventures can be carried out would lead to expansion of the program, but profitability could fall in locations with greater transport costs or lower rainfall. Research is now underway on growing native species in plantations in lower rainfall areas in Queensland, and promising species have been identified. A reduction in the minimum area planted would also increase demand for joint ventures, but may not justify transactions costs of the joint venture partners and could reduce economies of scale, particularly with respect to harvesting and marketing.

Overseas experience suggests that the attitude of local government to joint ventures appears to be somewhat ambiguous (Hayton, 1996). Certainly, scope exists for local authorities to become involved in plantation joint ventures, particularly for special purposes such as waste water disposal and landscape amenity.

A number of general forestry reforms could also make joint ventures more attractive. One is the separation of land and plantation ownership. Clare (1997, p.25) argued that "many potential growers could see advantage in having the option to sell the asset they have created ... as a growing crop. ... Conversely, some farmers may wish to retain ownership of the timber asset they have grown (perhaps as a form of superannuation) whilst allowing the farm to be sold or passed to their children. ... The financial risks for potential timber growers and their credit providers could also be reduced by addressing the current inflexibility in ownership and titling. ... Investors interested in participating in a joint timber growing venture on another's land can be put off by the absence of ownership rights to the trees...". Separation of ownership of trees and land is now possible in Victoria under the *Forest Rights Act 1996* (Clare, 1997). Other reforms include relaxation of sawmill licensing provisions (to allow greater competition in milling) and relaxation of restrictions on log exports. Should carbon sequestration credits be made available by government when striving to meet international commitments to greenhouse gas reduction, large companies could become interested in similar joint venture arrangements. Wider access to pulpwood markets could increase profitability and reduce the payback period, making these a more attractive investment.

## 9. CONCLUDING COMMENTS

The Queensland Plantation Joint Venture Scheme, like similar initiatives in other states, is potentially an effective way to increase timber production without the substantial subsidisation component of most earlier forestry assistance programs. To date, joint venture arrangements between landholders and government or private sector partners have made only a modest contribution to timber production throughout Australia, in terms of direct output and stimulation of farmer-initiated plantings. However, there is a high level of interest in farm forestry, and potential to extend joint venture programs to new areas including those traditionally considered marginal in terms of rainfall levels.

Joint venture arrangements overcome the difficulty of land access for state forest services, and the capital, technology, harvest certainty and marketing constraints of landholders. Early indications from the Queensland program are of

a reasonable uptake rate and high satisfaction level by adopters (not confined to farmers). The scheme should contribute to meeting the objective of ecologically sustainable development, although the focus is clearly on production rather than environmental plantings. As further experience is gained, the scheme will no doubt be refined.

These observations prompt the more basic question of whether government should be involved as a joint venture partner in farm forestry. There would appear to be considerable synergy between resource availability of joint venture partners. But why doesn't the government enter in to joint ventures with respect to say wheat, dairying or tobacco farming? And why is there an absence of private joint venture partners in Queensland, like APM, Amcor and ANM in southern states? Perhaps the explanation is that the government is attempting to correct a market failure, associated with low or unproven profitability of small-scale forestry based on native species. Scope appears to exist for introduction of similar plantation joint venture arrangements for corporate landholders. Also, joint ventures with government could play a greater role in overcoming constraints on development of water, minerals, ecotourism areas and other natural resources, in an ecologically sustainable manner.

### REFERENCES

- Anon (1984), "Joint Venture Forestry: something well worth looking at", *New Zealand Journal of Agriculture*, 148(5): 2-4.
- Boutland, A., Byron, R.N. and Prinsley, R. (1991), *Directory of Assistance Schemes for Trees on Farms and Rural Vegetation*, Bureau of Rural Resources and Greening Australia, Canberra.
- Byron, R.N. (1987a), "Rethinking Private Forestry in Australia: 1. Strategies to promote private timber production", *Australian Forestry*, 50(4): 236-244.
- Byron, R.N. (1987b), "Rethinking Private Forestry in Australia: 1. Strategies to promote trees on farms", *Australian Forestry*, 50(4): 245-252.
- Castle, C.R. (1990), "New mills, formed by joint venture, can be built with project financing", *Pulp-Pap*, 64(2): 184-186.
- Clare, G. (1997), "Policy issues for farm forestry/private sector timber growing", in *Managing and Growing Trees*, A. Grodecki, J. Aitchison and P. Grimbeck eds., *Managing and Growing Trees Training Conference in Bundaberg*, Department of Natural Resources, Brisbane, pp. 23-28.
- Commonwealth of Australia (1992), *National Forest Policy Statement: A New Focus on Australia's Forests*, Canberra.
- Dargavel, J. and Semple, N. (1990), "Prospects for Australian Forest Plantations", Centre for Resource and Environmental Studies, Australian National University, Canberra.

- DPI (Department of Primary Industries) Forestry (1996), Private Forestry Plantation Joint Venture Deed: Covenants and Provisions, Brisbane.
- Doelle, H.W. (1996), "Joint venture capital investment for clean technologies and their problems in developing countries", *World Journal of Microbiology and Biotechnology*, 12(5): 445-50.
- Doulman, D.J. (1989), A Critical Review of Some Aspects of Fisheries Joint Ventures, mineo, South Pacific Forum Fisheries Agency, Honiara, Solomon Islands.
- Gallagher, N.A. (1981), The Joint Venture: How to Ensure Expectation Eventuate in Commercial Fishing, *Australian Fish*, 40(11): 17-19.
- Harrison, S., Eono, J.-C., Herbohn, J. and Sharma, P. (1996), "Attitudes to Tree Planting and Assistance Schemes by Queensland Landholders", in *Managing and Growing Trees*, A. Grodecki, J. Aitchison and P. Grimbeck eds., Training Conference in Bundaberg, Department of Natural Resources, Brisbane, pp. 127-136.
- Harrison, S., Herbohn, J., Emtage N. and Smorfitt, D. (1998), Landholder Attitudes to Farm Forestry and Incentive Schemes in North Queensland, Managing and Growing Trees Training Conference: Farm Forestry and Vegetation Management, Kooralbyn Resort Hotel, 19-21 October.
- Harrison, S., Herbohn, K. and Hill, P. (1998), Reforestation Incentives in the UK and Australia: A Comparative Evaluation, First World Congress of Environmental and Resource Economists, Venice.
- Hayton, K. (1996), "Encouragement or Prohibition: Local Authority Involvement in Joint Venture Companies", *Regional Studies*, 30(1): 78-84.
- Heitmeyer, M.E. (1989), Agriculture/Wildlife Enhancement in California: the Central Valley Habitat Joint Venture, *Transactions of the North American Wildlife and Natural Resource Conference*, 54: 391-402, Washington.
- IC (Industry Commission) 1993, *Adding Further Value to Australia's Forest Products*, Report No. 32, AGPS, Canberra.
- Kresl, S.J., Leach, T.J., Lively, C.A. and Reynolds, R.E. (1995), Working Partnerships for Conserving the Nation's Prairie Pothole Ecosystem: the US Prairie Pothole Joint Venture, *Transactions of the North American Wildlife and Natural Resource Conference*, 60: 363-372, Washington.
- Lyons, A. (1994), "Forestry on Farms in Victoria: Do Industry and Landholders See Farm Forestry through Different Eyes", Faces in Farm Forestry 1994 Conference, Launceston.
- McKenzie, G. (1984), "A Comment on Joint Venture Forestry", *New Zealand Farmer*, 105 (5): 80-83.

- Meltzoff, S.K. and LiPuma, E.S. (1983), "A Japanese Fishing Joint Venture: worker experience and national development in the Solomon Islands", ICLARM technical report, International Centre for Living Aquatic Resource Management, Manila.
- Miano, J. (1997), Evaluation of the Plantation Joint Venture Scheme between the State and Landholders in Queensland, MEM thesis, Department of Chemical Engineering, The University of Queensland, Brisbane.
- New Zealand Ministry of Forestry (1984), *Forestry Joint Ventures*, Wellington.
- Parry, T.G. (1987), "The Australian Development Assistance Bureau's South Pacific Joint Venture Scheme", *Journal of World Trade Law*, 21(3): 63-72.
- Robson, M. (1982), Co-ops and Canada Invest in Energy: Creation of the Cooperative Resource Project Co-Enerco, a Joint Venture between the Federal Government and Canadian Cooperatives, *Enterprise*, 42(1): 4-5.
- Spencer, J. (1994), An Evaluation of the Eucalypt Joint Venture Plantations Scheme Between State Forests and Private Landholders in the Northern Rivers Region of New South Wales, Honours Major Project, Southern Cross University, Lismore.
- Stuckey, J.A. (1981), *Vertical Integration and Joint Ventures across the Bauxite and Aluminium Markets*, Australian National University, Canberra.
- Stuckey, J.A. (1983), *Vertical Integration and Joint Ventures in the Aluminium Industry*, Harvard University Press, Boston.
- Tisdell, C. (1989), International Joint Ventures and Technology Transfer: Some Economic Issues with Reference to China, Discussion Paper in Economics No. 6, The University of Queensland, Brisbane.
- US Fish and Wildlife Service (1989), US Prairie Pothole Joint Venture Implementation Plan: A Component of the North American Wildfowl Management Plan, Washington DC.