MINISTERIAL MEETING ON FORESTRY

FOR FIVE CONTINENTAL SOUTH EAST ASIAN NATIONS

FAO PRESENTATION PAPER

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MEETING OF MINISTERS OF FORESTRY FOR CONTINENTAL SOUTH-EAST ASIA

Your Excellencies, Distinguished Guests,

I must apologize for the inability to attend by the A/D-G for Forestry, Mr. David Harcharik and A/D-G for FAO RAP Mr. Obaidullah Khan. However they wish the meeting every success and look forward to hearing of the results.

The FAO Representative for Vietnam, Dr Messier has suggested that I present several points for discussion, based on experience gained within the FAO STRAP Project, which has operated in Myanmar, Laos and Vietnam for the last three years. I have decided on three points and submit them respectfully to your Excellencies. They are aspects which I believe are important in the region and I think that in discussion you may care to consider them and what action you may like to request of FAO and other international and bilateral agencies. Perhaps there is scope for joint action by the five nations represented here. It is always better to have five voices than one!

The topics are **- fuelwood production,** the potential for **balancing forest production to meet demand** and examining **the potential for enhancing productivity of plantations. I** will deal with each in turn,

FUELWOOD PRODUCTION

The great bulk of tree production and tree biomass in the region goes to people to burn for cooking food and `for heating homes during winters. FAO figures indicate that the estimated volume used each year as fuelwood and charcoal in the five countries is 94 Mm3.

For these people this is the cheapest fuel available now and for the foreseeable future. There will be a continuing demand at least at this level and FAO estimates that it could grow and by the year 2010 it could be 105 Mm^3 for the five countries.

These amounts dwarf the amount of timber used as production of pulp and paper, composite boards, sawn timber, veneer and plywood and timber used in the round. So what is being done about it? FAO and other organizations have been aware of this challenge for many years and the Regional Wood Energy Development Programme, funded by the Government of the Netherlands is into a third phase concentrating on improving databases, policies and strategies on wood energy and improving capacities of institutions to carry out these activities.

But if the amount of fuelwood being used is at the high levels stated and if the predictions are for even higher amounts required in the not too distant future - what other measures can be taken to improve the lot of the estimated 80% of the population of the region who rely on biomass for cooking and for heating?

Some questions must be raised regarding the effort put into this problem by international agencies. These are as follows.

How have the people using biomass fuels benefited from the work carried out over the last 20+ years? Have the people involved in the collection and utilization of the fuels been adequately consulted in working on the problem? Has the situation changed for these people over the last 20+ years and has it been an improvement? What do the collectors and users of fuelwood think would be solutions to their own supply problem? What are they prepared and able to do about the situation?

Is there scope for more efficient production methods and for better utilization of biomass fuels? Have the best species and provenances been tested in the production system? Have production systems been specifically designed with a fuelwood product in mind both in product size and in heating properties?

Are there realistic alternative fuels that are affordable for the population at large? What are they and how can they be harnessed? Are they a renewable resource?

I will not attempt to comment on each of these questions but select several in which I may be able to make a contribution. These are to do with the **selection of species/provenances** and the development of **systems designed specifically for fuelwood production.**

Selection of species/provenances

I believe there is considerable scope for improvement based on what I have seen and heard of species presently used for fuelwood in the region. A considerable number of both indigenous and exotic species are used ranging from mangrove species of the delta forests, to hardwoods and conifers of the high altitude forests. Perhaps a thorough listing of these species would be interesting, if accompanied by comments on their silviculture and quality as a fuel. Another listing could be of exotic species which have quality fuelwood characteristics and could grow in the different ecological zones of the region. Emphasis could be directed to the areas of greatest need concentrations of population and where forests have been seriously degraded by continuing harvesting of litter, branches, leaves, wood and anything that will burn. A selection of just a few species could be made for each zone and then` their silvicultural characteristics compiled. Information would be required on availability of seed, ease of propagation and planting, and requirements for good management. Information also needs to be collected on potential exotic species for each of these zones, with particular emphasis on those which are N-fixing. It is also likely that in the areas of greatest need, environmental conditions will have deteriorated to the extent that species will have to be selected which can tolerate such conditions. Quite often this means the introduction of species in the genera *Pinus, Eucalyptus, Acacia, Melaleuca* and *Casuarina.* The best species in terms of performance and product need to be selected, within each of these genera for the sites under consideration. As the species are being selected specifically for poor people, no species should be denied access by them, if it has the capacity to reduce their burden of hardship.

The possibility of developing hybrids and genetically engineered `genotypes' specifically for a particular ecological zone needs to be evaluated. Gains in production could be significant and would be directly beneficial to the farmers. Genetic engineering has to date been directed towards agricultural varieties and strains of major crop plants and some of the high-value horticultural or forestry species. There needs to be careful consideration of the potential for benefits of this technology on the 80% of people in the region who are dependant on biomass fuels. Undoubtedly progress on this topic could make a big contribution for all of these people in **reduction of their level of poverty.** If production could be enhanced by 10% through these approaches, the benefits would be noticeable and appreciated by many rural families. Genetic engineering has been responsible for much larger gains in production, so when added to sound species/site matching, gains in production could be in the order of 30-40%. This would be of tremendous benefit for rural families. If genetic engineering could also provide optimum biomass production together with N-fixation to improve sites, then benefits for the rural poor would be very noticeable.

Fuelwood production systems

Some key considerations in developing systems specifically for fuelwood production, are whether it is possible to have a sustainable system, as well as one which is highly productive. In developing a system specifically for fuelwood production, it is necessary to decide on the ideal size of the material. In discussions with farmers in various countries, there seems to be interest in trees of about 4-6 cm in diameter at ground level. Such a size

is easy to harvest, carry and split for use in cook stoves. However it is necessary to investigate the ideal size of material in each of the ecological zones. When that has been decided, tree density trials can be initiated to determine the best spacing to be used. It is likely to be in the order of 2000 - 2500 stems ha-' for many species but needs to be determined carefully in each ecological zone and with each species. These trials should utilize the best available genetic material - that is from the best individuals of the best provenances and genotypes recommended for the zone. Besides selection of provenance, there are many other aspects which require careful attention. These are good nursery practice, appropriate site preparation, adequate nutrition and good maintenance.

Selection of species which coppice is also be a very important consideration. Ratoon crops can be contemplated while successive harvests remain high but when it drops to an unacceptable level, that is the time to replace the root stock with new genotypes.

It is very important to ensure that the nursery stock is raised in such a manner, that there is a good ratio of lateral roots to tap root and that the root/shoot ratio is acceptable. Air pruning of roots will ensure development of lateral roots and nursery nutrition must not be neglected. Site preparation must be such that roots can develop laterally and vertically, without meeting soil horizons which impede root elongation. Ripping will be necessary on some sites and ploughing adequate on others. Each of these operations should be the subject of a cost/benefit analysis to ensure economic efficiency.

The addition of fertilizers should also be subject to a series of trials to allow cost/benefit analyses. Only after these analyses, will it be possible to decide whether certain operations are worthwhile considering or not.

Management is essential to ensure success. Grazing must be controlled. At the time of harvest, it is very important to modify the amount of material collected from the site. Traditional removal of everything - stem, bark, branches, twigs and leaves removes too much nutrient from the site and will reduce the productivity of later rotations. Leaves, bark and twigs should be retained on site, as they contain a much higher percentage of nutrient than wood. It is also important to leave this material in small pieces and in contact with the soil to promote rapid incorporation into the soil.

An added benefit of this approach is that the stumps are then in full sunlight and receiving adequate light to promote prompt and vigorous coppice. Additional fertilizer may be beneficial and cost/benefit analyses on this operation necessary.

There may also be some potential for mixed species plantings which include a N-fixing species to improve the sites used for fuelwood production. Maintenance of site quality is essential in aiming at sustainability, which should not only be an aim for native forests and long-term plantation forestry, but also an aim of short-term fuelwood plantations.

FOREST PRODUCTION - DEMAND AND SUPPLY

Area of natural forest in the five countries has been reduced significantly over the last 20 years and it is still being reduced through conversion to agriculture, shifting cultivation, harvesting of timber and other forest products (legal and illegal), water reservoirs and other land uses for development purposes. This change swings the forest production emphasis for some of the countries in the region, heavily towards plantation forestry, as the means of supply of forest products to satisfy within-country demand. There is also demand from outside each of the countries and this can be met by some, but cannot be supplied by native forests from others.

It is clear that world-wide availability and supply of timber from native forests will reduce substantially from about the year 2010. About 20 years ago, there were in excess of 30 tropical and sub-tropical countries exporting timber. It is anticipated there will only be about 7 still in the exporting business by the year 2000. There is considerable potential to increase productivity of the logged, degraded and exhausted native forests by enrichment planting and active support to natural regeneration. Involvement of the rural population and in particular the shifting cultivators could be particularly beneficial to forest, environment and communities.

It is apparent that the value of timber will increase as availability diminishes. Any country that can lock up natural forest now as a resource, will reap much higher returns in the future. The level of return will be increased, if international rules on Certification of Sustainable Management have been complied with in management of the forest.

Consideration needs to be given to conservation of the genetic resource within the few remaining areas of natural forest in the region. Figures recommended for conservation range from 5-10% of a country, but perhaps this needs to be considered from a regional viewpoint. Support for this initiative could be sought as compensatory plantation programmes and additional funding for areas of prime forest `locked away' in perpetuity. Programmes such as these have been successfully implemented in South America and should be investigated for this region.

With the native forests of the region no longer able to supply enough timber to satisfy regional demand, there is a very urgent need to move into a plantation establishment programme which can cater for national and regional demand. There is also the potential for attractive export markets for quality timbers such as teak. FAO and other international and bi-lateral agencies have a number of regional and national projects which are operating specifically on topics relevant to plantation forestry 1 will just mention several of the FAO projects. FORTIP has the task of assistance in selection of species/provenances for plantation programmes and STRAP for determining the problems and opportunities for plantation forestry. A Second Phase for STRAP was aimed at ensuring quality plantation and native forest demonstrations to up-grade productivity. Both of these projects are vital for plantation activities, especially when aligned with FORSPA which supports very necessary forest research in the region. APAN incorporates agroforestry approaches, which will be of major importance for smallholders to broaden their range of products and spread their risk and investment.

Per capita consumption of timber in the region is low on international standards and a very large percentage of that consumption is fuelwood. Total and per capita consumption are anticipated growing to cater for increased populations and an increased standard of living.

Data on production and consumption in each country needs to be collected and an analysis of future supply compared with estimated demand.

ENHANCING PLANTATION PRODUCTIVITY

Activities within the STRAP Project in three of the countries (Myanmar, Laos and Vietnam) over the last three years have identified topics in which plantation production can be improved. The following are rather general comments which may have to be modified for particular situations in each of the countries. STRAP staff have also not had experience in two of the countries Thailand and Cambodia.

If one commences with the premise that plant (tree) growth requires three factors - light, water and nutrients; the region has, in many parts, an abundance of each. Consequently there is potential for high growth rates of trees. Another factor which can lead to competitive advantages compared with other regions of the world is the comparatively low wages of forest workers in each of the countries. When these factors are combined, plantations should be able to produce at rates which bring good returns to growers. The potential of involving rural populations in the process is particularly important. However it should be noted that there are many plantations in the region which are not performing, at their potential or anywhere near their potential. Reasons for this lower-than-possible potential need to be identified and when they have been, there is a need to research the possibilities for improvement in production. Some of the problems identified by the STRAP Project are discussed below.

A holistic approach to plantation establishment

When a forest product has been identified for a location, it is important to then evaluate the potential species for use on the soils available and then carry out some very necessary testing. This testing should include all available provenances of the potential species. At the same time, trials on site preparation methods should be installed to check on the treatments needed to ensure good establishment and high survival. It will also be necessary to examine whether any nutrients are in short supply, so that fertilizer applications can be made which include the nutrients required and in the correct forms and ratios for healthy growth. Cost/benefit analyses are necessary for each of these operations to enable economic analyses of establishment to be made and then discounted to the end of the rotation.

Another key item is to ensure that genetically superior seed is used to raise planting stock. The nursery techniques must also ensure that a fibrous root system is produced and that there is a good root/shoot ratio. A sturdy plant should be raised which is vigorous and ready for rapid growth and successful establishment following planting. Fertilizers will be needed in this early period and preferably on the day of planting, to provide the plant with the necessary nutrients for rapid development of a good lateral and taproot system. Failure to apply fertilizers at this stage, will lead to `planting shock', which is a condition which could last for some months

and cause the plant to sometimes miss growth in the first growing season in the field.

Management after establishment is necessary to ensure that the plantation does not suffer from serious competition from weed growth and is protected from grazing, illegal removals and from fire.

Comments on plantations visited

- In many plantations visited, species/provenances were not well matched to site. Further testing of species and provenances needs to be carried out to ensure correct matching.

- Sites used were often very degraded and the potential for the tree species to become well established was hampered by inadequate site preparation or fertilization.

- Planting stock was often spindly with a large top and a small root system. There was often an absence of lateral roots and the tap root was often J-shaped. This latter condition can lead to unstable trees and the potential for toppling in strong winds.

- Tending was often carried out in a square around the trees with the surface soil scraped away from the tree. Besides destroying some of the lateral and fine roots, this leaves the bare soil open to full sunlight and the possibility of very high temperatures, which in turn can be harmful to root growth. It is a better practice to pull out competing weeds and then leave this material as a mulch around the tree. This practice conserves moisture, moderated temperature and promotes beneficial micro-organism activity.

- Work norms in practice are set for regular treatments often in set months of each of the years following planting. This takes inadequate notice of the development of the plantation. Norms need to be modernized and allow flexibility of operation for field staff to make decisions on when the operations should be carried out and the time and costs involved. Some of the operations carried out were not necessary or could be modified to be more cost-effective.

- There is potential for increasing plantation productivity by a factor of 50% in many plantations. This can be reached by application of the suggestions made above.