FORESTRY PLANNING & DEVELOPMENT PROJECT
Government of Pakistan-USAID

CONSULTANT'S REPORT

ON

FARMER-MARKET LINKAGES FOR FOREST PRODUCTS

Submitted to:

FORESTRY PLANNING AND DEVELOPMENT PROJECT
Government of Pakistan/USAID
and
Winrock International

by
GARY G. NAUGHTON
Professor of Forestry
Kansas State University

11 Novemeber 1993

Winrock International
Technical Assistance Team
58, Margalla Road, F-7/2, Islamabad, Pakistan. Tel : 813262 -- 813272 ~~Tlx : 54252 WIFPD PK~~ Fax : 824519

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November 14, 1993

To: Abeedullah Jan, IGF
Kh. Hameedullah, Project Officer

From: Charles R. Hatch
Chief of Party

Sub: Gary G. Naughton's Consultancy Report on Market Linkages

Last Wednesday you attended Mr. Gary Naughton's exit seminar which concluded his 5-week consultancy on wood producer-wood user market linkages. Attach is the final copy of his written consultancy report. It more completely documents the issues and opportunities that were discussed during his exit seminar. I believe you will find it contains information that is important to the implementation of the Forestry Planning and Development Project and similar future programs.

CC: Rafiq Ahmed, DIGF
Dr. B.A. Wani, DIGF
Nasrullah Khan, DIGF
PDs(4)
Dennis Weller, USAID
John Swanson, USAID
TAT (4)

CRH:MAA:A:\

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CONSULTANT'S REPORT
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Gary G. Naughton

SCOPE OF WORK: This assignment covered a period of 30 working days from 9 October through 11 November 1993 serving the Forestry Planning and Development Project with headquarters at Islamabad, and travel within Punjab and NWFP Provinces of Pakistan.

PURPOSE: This consultancy was a continuation of the technical advisory role of the field demonstration and outreach forester position for the FPD Project, with particular focus on the strengthening of the wood producers - wood users linkages, and monitoring of the developing industrial demand for farm produced wood.

OBJECTIVES:

1. To collect current market demand information from the industrial wood users and to present it in workshop format to tree farmers and foresters in the project;

2. To identify new and/or unresolved technical problems in the market utilization of farm wood, and seek solutions;

3. To share harvesting, marketing, and utilization information with social forestry staffs, farmers and industrialists; and

4. To provide general technical advisory support to the FPD Project staff as needed.

ACTIVITIES:

1. Met with 13 private wood industries which are regularly buying the kinds of wood which can be supplied by tree farmers, and assessed the current status of their raw material demands and conditions.

2. Conducted an in-plant examination and evaluation of various grades of poplar logs from different field sources at the Orient Match Company in Lahore.

3. Conducted 4 tree marketing workshops for farmers and foresters, with a total attendance of 118.

4. Reviewed the PFI research trials with the solar dry kiln and offered suggestions for further kiln modifications and additional comparative studies.

5. Made the final re-measurement and calculations of growth on 2 sets of field demonstration growth plots at Burhan and Hazro (5th year data).

6. Assisted the NGO Grant Unit Manager in developing the program strategy for the next 12 months of operation.

7. Met with over 25 project forest officers, singly and in small groups, to discuss project field and outreach activities, especially those related to recent developments in the market for farmer produced wood products.

8. Met with representatives of 3 NGOs which have grants from FPDP (Pakistan Tree Farm Society, Pakistan Environmental Protection Foundation, and Agha Khan Rural Support Program) and offered suggestions on expanding their farm forestry activities and sustaining their programs. Attended the annual meeting of the Pakistan Tree Farm Society.

9. Advised the Pakistan Tree Farm Society on the placement, operation and management of the 3 Extension Foresters it will hire for the reinforcement of farmer-industrialist linkages under the new NGO grant from FPDP.

10. Attended the semi-annual meeting of the Extension Forestry Coordinators working group, at Mingora.

11. Made a final edit of the proceedings of the Extension Forestry Workshop which was held at PFI on 6-8 April 1993. This was a cooperative effort of the Malakard Social Forestry Project and the FPDP, and will be published as an FAO technical series publication, due for distribution in January 1994.

12. Presented a draft report on this consultancy in an exit seminar for the TAT, Government of Pakistan, and USAID.

OBSERVATIONS AND RECOMMENDATIONS:

1. Chipboard/Particle Board - There are now 24 plants in Pakistan manufacturing chipboard/particleboard, and producing between 12,000 and 14,000 sheets (4' X 8') per day, or about 210,000 tons per annum. The 1990 figures (National Management Consultants' report to FPDP) showed 16 plants and an annual production of about 131,500 tons. On the surface, this shows a large increase of 50% more plants and over 50% more production in only 3 years!

However, the "sister" industries - 5 hardboard plants - have been in gradual decline during the same period and some shifting of production from hardboard to chipboard has been going on; the 1990 combined annual production of both kinds was 215,000 tons, or essentially the same as the 1993 chipboard production estimates. Altogether, we can account for a net increase of 3 manufacturing

units in the combined industries since 1990. I was only able to identify 2 of these: Pakistan Laminates and Iftar Particleboard.

This shifting is the result of rapidly increasing acceptability of chipboard in the market and the corresponding increase in demand for it, coupled with a decrease in the demand for hardboard. In 1990 there was some export of hardboard to Iran and the Middle East, but that has dwindled since. Conversely, there is no "official" export of chipboard, and the domestic demand continues to increase.

At present, bagasse continues to be the **primary** raw material for this industry, with only 3 plants relying only on wood. Mango represents over 90% of the total wood used, although eucalyptus is making relatively fast growth in acceptability.

> Recommendation: The overview presented here is inadequate for the needs of any long range forecasting of wood demand in this industry. It is **very timely** for FPDP to consider commissioning an up-date study by National Management Consultants to assess the current situation in greater detail.

Pakistan Chipboard bought 1900 loads of wood in fiscal year ending 30 June 1993, of which only 80 loads (800 tons) were eucalyptus. Since the start of the current fiscal year, they have bought 6 loads in July, 18 loads in August, 48 loads in September (total of 72 loads in the 1st quarter). The price has ranged between Rs 36/maund and Rs 42/maund for this eucalyptus. The low amount bought in July was due to a heavy influx of flood timber which took up all of the storage space. During the current month (October '93), they receive eucalyptus almost daily and expect to have about 50 loads -- in addition to about 100 to 120 loads of mango in the same period. The current price for eucalyptus is Rs 38/maund, and it will reach Rs 42 during November. They expect that farm-grown eucalyptus will make up over 25% of this year's raw material purchases.

The mill is in the habit of dealing through a few contractors with which they can establish a firm price and a workable line of credit, etc. Because of this, they **prefer** to have the farmers deal with the same contractors at the farm end of the business. They will still take wood which is delivered directly by the farmers, but it somewhat of a nuisance for them.

Technical difficulties of using eucalyptus have been overcome so that no special problems now exist. The earlier technique was to run only eucalyptus, in a batch process, then switch back to mango. Later, they worked out a system for using eucalyptus as about 15% of the continuous process. Now, they simply take what is in the pile they are working from, and the wood is no longer strictly segregated in the storage yard. Market demand for their chipboard is high.

The veneer process continues to run at much higher efficiency as a result of the consultation last winter by Ted Swain, a retired American veneer company executive, through ISEC.

Recommendation: For the near future success of the eucalyptus market, it is essential to continue to maintain a close and cordial working relationship with Pakistan Chipboard. This is clearly the responsibility of the TAT and the Project Directors. However, **it is not prudent** to rely only upon this one source of market demand, and there is a clear need to continue the dialogue and contacts with other large industrial users which have tested eucalyptus but are not yet starting to use it regularly.

KDC Boards, Jhelum, continues to use small quantities of eucalyptus when it can be purchased at **low price**, but is showing no preference for it. This mill uses a large quantity of waste wood from its veneer and furniture production lines to produce a low quality chipboard, which is then used for production of ven-board. The ven-board is used on their own furniture production line or is marketed directly into the wholesale trade.

During the past summer, KDC bought over 50,000 tons of driftwood which was collected after the floods. This is distressed and low grade material, mostly of conifers, but is usable for the production of chipboard. KDC was able to take great advantage of this source of raw material because their plant has over 40 acres of surplus storage capacity. This flood wood is full of embedded rock, sand and grit, but this inconvenience is compensated by the low price which was paid.

KDC is faced with a price squeeze which has come about with the decreasing value of the rupee in foreign trade and a concurrent increase in the import price of Malaysian veneer logs. They were at the point of increasing their product prices recently, when one of their major competitors lowered his price, causing a lot of confusion in the wholesale veneer paneling market.

Recommendation: The FPDP staff needs to continue to maintain close contact and dialogue with KDC. It is not expected that KDC will be an active buyer of eucalyptus in the near future; but it continues to be an important user of shisham, and becoming more interested in poplar for the manufacture of blockboard.

Islamabad Board Mills has put a new plywood plant into production at their site in Haripur since mid-summer. They are producing rotary cut veneer from poplar and semal for the interior plies, and are importing some peelers from Malaysia for the finished surface. They inquired about the suitability of eucalyptus for core stock, and I told them that National and KDC were both using some eucalyptus short logs for the cross-grain plies, but have found that the logs must be fresh and that the heartwood was brittle so that the veneer production should be limited to the white wood in the log. It is not likely that this mill will be using eucalyptus in any important quantity during the next 3 or 4 years because they are only interested in logs of a minimum diameter of **15 inches**.

Only last year, this mill was considering putting in a wood

chipper and producing a portion of its chipboard from eucalyptus. However, they are getting adequate supplies of bagasse at reasonable prices, so they are not now interested in farm eucalyptus.

> Recommendation: Because of its **very favorable** location in terms of transport distance from some of the major FPDP farmer-producers, TAT should continue to maintain communications with Islamabad Board Mills.

2. Match Industries - Noor, Khyber, Mohsin, and Orient are paying about 15% more than last year for raw material, while the price of matches is about the same. This indicates that the cost of raw material is not as sensitive as the manufacturing costs in terms of the margin of profit available to the industry. These companies all generally agree that the **quality** of the poplar is better than it was 5 years ago. This is at least partly due to the fact that they are now buying on a **graded price** which pays a premium for the better material.

Current prices at Peshawar can be deciphered to be about Rs 1.6/Kg (range of Rs 1.5 for No. 2, up to Rs 1.75 for No. 1). The pricing structure is difficult due to the habit of most mills in this area to purchase on the "pacca" maund (50 Kg), while at least one purchases on the Indian or "chota" maund of 37.3 Kg. At Lahore (OMCO) the 40 Kg maund is used for "Grade A" at Rs 2.05/Kg and "Grade B" at Rs 1.9/Kg.

> Recommendation: TAT needs to keep abreast of this development in the graded pricing of match-stock poplar, and should try to develop a Tree Farmer's Guide which shows sketches of the different grades and relates them to the proper management and pruning techniques required to produce these better grades. Some of the criteria to be considered are: **roundness, straightness, amount and size of knots, amount of discoloration in heartwood, and minimum size requirements.** FPDP "Tree Farmer's Guide No.2" shows the proper **pruning** technique, but does not relate it to market grades of logs.

The match mills at Peshawar have experienced a noticeable reduction in poplar quality during spring (April, May, and June). This is related to increased twisting and breaking of the new splints in the polishing drum, and increased hardness of the wood which makes peeling and splint block mounting difficult. Altogether, this spring season wood produces a much higher than normal amount of cull splints. When this subject was discussed with Orient, they said that they have had some of the same problem, but have basically determined that the bad material is coming from Baijor. I assisted the OMCO mill in running some test samples of wood from Baijor, Mardan, and Sadhoki for comparative analysis.

The Sadhoki wood is from OMCO's own 8-year old plantations of Deltoides which are now being harvested for the first time. About 1200 trees will be cut, and the harvest is about 25% complete. The mill was concerned that the Deltoides poplar was too heavy and was too yellow in color, as compared to the poplar from Mardan. I was

able to show them that the extra weight and yellow color were both due to the **freshness** of the material, and that it was of the desired density and color after drying.

We also found that:

a. the greatest cause of defect in the Mardan poplar was from **black knots**, which are the result of small branches dying away without being pruned from the tree.

b. the greatest cause of defect in the Baijor poplar was **elliptical growth** which caused the pith to be off-center and caused too much cross-grain in the splints, resulting in the high amount of fracture in the polishing drum. Secondary defects included too many black knots and reddish-brown **discoloration** of the wood as result of wounds in the bark of the young trees.

c. the greatest cause of defect in the Sadhoki poplar was the **discoloration** of the wood. Darkened heartwood of 2-3 inches in diameter is probably related to root damage from tilling the soil too deep while growing annual crops. There was also a fairly high incidence of streaks of reddish-brown (similar to the Baijor samples) which are related to **wounding the bark** of the trees, either during agricultural operations or from pruning too close.

The results of these tests showed that the majority of the logs from Sadhoki graded "No.1", the Mardan logs were mixed "No.1 and No.2", and the majority of the logs from Baijor were "No.3".

Recommendation: The causes of poplar degrade are of major concern to farmers and contractors which would prefer to sell all of their wood at the higher grade and price. This is a perfect example of the need for continued extension and outreach efforts to communicate between the users and the producers. TAT and the Forest Departments need to continue to relay this message to farmers.

3. **Faruki Pulp Mills -** Construction of civil works is continuing at the plant, and there is noticeable progress since my last visit in April '93. About 30-35% of the mill equipment is on site, and some re-tooling and assembly of components is still in progress, but at a relatively slow rate. The Finnish Partners in the venture have sent 7 of their engineers to Pakistan (arrived on 22 October) for more supervision on the next stage of the assembly. Also, a crew of the company's people are now in Sweden putting together the next shipment of mill machinery.

The nursery at the plant site is not looking as good as before. Many of the polybags have multiple seedlings, trees have been planted on the nursery site for **shade**, in spite of earlier warnings that shade would cause spindly and undesirable seedlings.

Also, the system of watering the beds is not adequate; you can easily see that the plants in the outer edges of the beds are getting all of the water, while those in the center are puny because of inadequate watering. In spite of these problems, the nursery has put out 400,000 seedlings so far in 1993, and has another 250,000 of suitable plants ready to be planted now. Also, during Spring 1993 tree planting, the Faruki nursery sold 200,000 eucalyptus seedlings to the Punjab Forest Department at a below-cost price of 40 paisa each.

Faruki is now selling the plants to farmers at the concessional rate of 25 paisa each to keep in line with the programs of the FPDP and of the Punjab Forest Department nurseries. Earlier, trees had been sold for 50-65 paisa each. Demand for seedlings is running high, and farmers can buy plants at the nursery, almost anytime they show up. The company also has nursery production contracts with 40 farmers, and the average farmer nursery is 50,000 plants. They are producing better quality plants than the nursery at the mill site.

> Recommendation: The Social Forestry Staff from Punjab should work closely with the Faruki nursery manager to correct these production and quality problems. At a time when project funds for nursery are limited, here is a golden opportunity to continue to supply seedlings to farmers through the technical assistance of the foresters.

Faruki Mills would like to introduce the growing of conifers (chir pine, etc) to farmers so they can have a ready access to long fibre pulp wood. The forest department's current policy of keeping conifer production out of the farmlands will frustrate this effort, plus the fact that a suitable species of pine for the plains of Punjab might be hard to find. At least, however, it appears that chir could be produced on the Potohar Plateau area. Perhaps Faruki could muster support for this idea within the industry, then leverage PFI to provide the technical information on species, site requirements, nursery techniques, etc. I believe that PFI would respond if the industries presented a good case and backed up their request with some financial support for the research.

One alternative is to find some coniferous species which is exotic, and therefore not traditionally under forest department policy constraints. In this regard, two American cypresses, Cupressus arizonica and C. lusitanica were introduced into Pakistan years ago, and have been shown to be climatically adapted over a wide area of the country. There is only scanty information available at this time as to their pulping qualities, but a search of literature at PFI indicated that test results in Sudan, Kenya, and Angola produced good quality Kraft pulp from the C. lusitanica, whereas tests of C. arizonica in Argentina and the Congo were not good.

> Recommendation: TAT and PFI should work together to acquire additional and more definitive information about the pulping qualities and silvical requirements of these

two species of cypress (as well as other conifers which might be suited to production on farms) and make necessary arrangements, as appropriate, to import selected new seed lots for introduction into the tree farming system through the Faruki Mills nursery program.

Faruki Mills has its own Forestry Division for conduct of an outreach and extension program to farmers. Although this division has been receiving some technical support from FPDP, the company feels that there is a need for some of its staff to get more specific formal training. The company is willing to finance such training for selected employees, but needs help in locating the appropriate training facilities/programs.

Issue: Can private companies, like Faruki Mills, send their people to get technical forestry training at PFI or one of the forest guard schools?; or, perhaps overseas?

Recommendation: The willingness of a private company to seek out improved training programs for its personnel should be considered as a significant point of change in the future of private sector forestry development. FPDP should help to develop some training recommendations for Faruki and assist in their implementation.

Based upon the current level of construction activity, the Faruki mill can be expected to be in operation in about 15 months. Even though the final approval for the loans for construction was received in April 1993, the majority of the summer was passed at an extremely slow pace because the money was "passing through the system" and was not accessible until the past few weeks. There are several banks involved in the financial scheme, and there has been an incredible amount of red tape and delay.

Some local eucalyptus was shipped to the paper laboratory in Finland recently and the test results were encouraging. There appears to be no reluctance on the part of the company to use the eucalyptus as the primary feedstock.

There are still some unresolved problems of collection, transport, and storage of raw material to feed this plant. The key problem is how to get an average of 50 truckloads per day into the plant site and onto the storage yard in an efficient manner so that the pulping process can proceed without shutdown. At least initially, we are recommending that Faruki negotiate contracts with two or three major Taykadars to buy, collect and transport the wood. There is going to be a need for two or three satellite storage yards to accumulate the material prior to shipment, since so many small producers will likely be involved in selling.

Faruki continues to be optimistic, and is constantly on the move trying to get this mill going. His estimate now is that it will be ready in 12 to 15 months.

4. Furniture Manufacturers - Decent Furnishers at Gujrat have discontinued their plans for a covered air-drying yard and have started construction of a new furniture assembly plant on the site. Plans now call for using the old plant building for the lumber drying area. They have also been using their 4 new German dry kilns regularly, and express having no technical problems with their operation.

They have basically solved the problems of operating their block-board machine, and are presently making 25-30 sheets per day, using poplar (12mm thick) for the core stock. This is then covered with a veneer "sandwich", 4mm thick on each side, for a 20mm board to be used for furniture backs, etc. The blockboard has the advantage of good strength with only about 40% of the weight of particle board for this purpose. The additional advantage of blockboard is that it can make good use of very poor or "waste" pieces of poplar, semal, etc.

Decent is now paying an average price of about Rs 600 per cft for shisham logs at the mill, and are also actively buying kiker for stuffed furniture frames. In this regard, they have also recently bought 3 or 4 loads of mesquite logs for the same use, and are satisfied with this wood. The harvesting moratorium will have serious impact on the availability of good shisham logs from the Punjab plantations. They are not satisfied with the roadside shisham which is coming as a result of widening the Grand Trunk road, because the trees have been badly scarred and mutilated by the forestry department's policy of demarcation with blazes on the main trunks of the trees. This causes internal defect in the wood and significantly reduces the quality and value.

Decent would like to set up a particle board plant of its own to produce 150-200 sheets per day of 700 density board. Steady price increases from their suppliers have pressed them to make this consideration. They also told me that the mill of Nawaz Sharif's father -- Iftar Particleboard on the Lahore -Faisalabad road -- has started producing in the past few months, but is experiencing some technical difficulties. There is also another new particleboard plant, Pakistan Laminates, at Sheikhupura. I saw some of the board from this second plant, and it is made from mango, in sheets 4' X 11' (an unusual size, but one which fits the needs of part of Decent's furniture production program). These two new plants are undoubtedly a part of the reason for the decreased supply of mango coming to Jhelum, and further explain some of Pak Chipboard's recent acceleration in the purchase of eucalyptus.

> Recommendation: The practice of the Forest Departments of "blazing" trees for demarcation along roadsides and canals causes serious de-valuation of the wood for purposes of furniture and other high value uses. GOP should bring this to their attention and, with the help of PFI, develop some alternative means of marking which will not be detrimental to tree values.

5. Sporting Goods - The world-wide market demand for mulberry hockey sticks of the first quality, as produced by the major companies in Sialkot, continues to increase.

The hockey stick export business is caught in a tight squeeze due to the low supply of good quality mulberry, just at a time when the continued devaluation of the rupee in foreign exchange should be giving these Pakistani companies their best competitive edge on the market. Another problem related to this drop in raw material supply is the competitive advantage it gives to producers in India who are also making mulberry sticks, and to Taiwan and Holland which are making and selling aluminum and fibre-glass hockey sticks. There is a lot of national pride and world reputation at stake with regard to this hockey stick business, and every drop in raw material supply threatens the future position of these industries.

The big issue with these companies (Gray's of Cambridge, Ali Trading Co., and Classico) is the potentially damaging effect of the tree harvesting ban which has been imposed by government since late summer. Specifically, they have traditionally bought over 80% of their mulberry logs from the Punjab Forest Department plantations, and will not have adequate raw material to sustain production of hockey sticks over the coming two years if the ban remains in effect. They have been getting some farm-grown mulberry from farms in NWFP, but this supply is inadequate to carry them very long.

Instead of getting involved in self-help, they have spent much of their time over the past several years in an adversarial effort to try to force the forest department to concede to their demands for more mulberry guarantees, non-competitive buying, and independent control of public forest lands for their own benefit. This has not been a productive approach and has, in fact, delayed them from taking positive action to help themselves.

Because the cutting ban has jolted their thinking, these mills are now interested in supporting the production of farm-grown mulberry in the Punjab plains under the social forestry producer-user linkage model. These industries now seem ready to take some positive steps toward sponsoring this work through the provision of nursery stock, farmer motivation, and technical support. **There has been an obvious need for this type of industrial support for at least 5 years.** The successes of getting farmers to grow poplar and eucalyptus need to be repeated in the case of mulberry.

Even though the cutting ban, with respect to the irrigated plantations, will likely be lifted during the coming months, the fact that it was imposed has made an impact on these industries which have been reluctant to take an active role in sponsoring farm forestry. Fortunately, this change in attitude comes at a time when the new FPDP/NGO grants for hiring of extension foresters have just been sanctioned.

Both Gray's of Cambridge and Ali Trading Company stated that they would provide logistical support for the placement of an extension forester from the Pakistan Tree Farm Society in Sialkot. This would include the provision of an office space, either at the Chamber of Commerce office (Ghazanfar Shabbir is the new President of the Chamber) or at one of their company offices.

We discussed this fairly thoroughly, and this NGO-sponsored linkage has a great chance to succeed in this case because of the level of support being shown by the industries. They also indicated that, if the first effort is productive, they would favorably consider continuing to support the extension forestry program with their own funds, and that **any industry** which wants to get wood from farmers should help finance the extension forestry program.

> Recommendation: FPDP should provide continuing technical support to the NGO Extension Forestry programs being initiated by the Pakistan Tree Farm Society and the Belour Advisory and Social Development Organization, so that this effort has an opportunity to become self-sustaining through financial support from the wood-using industries. Specifically, these NGOs will need help from TAT in selecting and training the extension foresters and introducing them to the industries; help from PFI in resolving technical needs for improved plant materials and improved wood utilization methods; and help from project Social Forestry DFOs and RFOs in contacting farmers and establishing nurseries.

6. Farmers' Marketing Workshops - The purpose of these workshops was to apprise the farmers of the current situation for eucalyptus as an industrial raw material for chipboard and paper pulp; and to get them to share their local marketing and utilization experiences with other farmers and the foresters present at the meetings.

Farmers are generally optimistic about the level of market development, especially for local consumption, but are concerned about how they are going to sell large volumes of eucalyptus in the coming years. The NWFP project area is remote from the industrial buying centers at Jhelum and Gujrat, making transport cost and road taxes too high to allow for the farmers to make enough profit at this time. Where local sale prices bring in the range of Rs 25-28 per maund on a stumpage basis, the conversion return to the farmer from Kohat who sold wood at Jhelum (2 loads) was only Rs 22. The problem is still one of scale efficiency versus transport costs.

Farmers report that they are now using eucalyptus regularly in their home villages for construction poles, shuttering, and fuelwood. Almost all of the 105 farmers attending these meetings have begun using their own eucalyptus wood during the past 12-18 months. Some have also used it for charpoi and other home-made furniture with satisfactory results.

D.I. Khan farmers are especially pleased to have eucalyptus for shuttering since the more commonly used poplar is scarce and high-priced by comparison. Because there has been some general complaint that eucalyptus poles split when they are nailed up for shuttering, we asked if this was a problem. The farmers told us that this was not a big problem because **they dip the nails in oil first, and the wood does not split as badly.**

The farmers at Kohat are particularly keen to get a chipboard

plant built in their area so they can sell industrial wood. They don't have a clear idea of the manner in which private investors decide where to build a plant, and seem to believe that government should set a chipboard or pulp plant in Bannu or Kohat. Presently, they have the following options in their province:

1. Bannu Sugar Mills might be approached to invest in an "add-on" chipboard plant so they can use bagasse and wood;

2. The chipboard plant at Jamrud Road Estates in Peshawar might be pressed to convert part of its production to wood;

3. Farmers could organize a marketing association for a combined effort to market their wood in Jhelum, taking advantage of higher volume to reduce freight charges.

These farmers have gradually overcome almost all of their earlier uncertainties about how, when, and where to use eucalyptus. Most of them have been using it for fuelwood, have found it to be good, and have been selling some for fuel. Local brick kilns have shown a new willingness to buy eucalyptus for fuel, at rates about 15% below the price of kiker and phulai, but which still yield the farmer about Rs 24-25 per maund on a stumpage basis.

Individual pole-size trees of the 5 inch diameter class are bringing about Rs 60-65 (about Rs 27/maund). This price appears to be about the same all across the project areas of Punjab and NWFP, with little variation. Special sizes, as for ridge and rafter pieces in the 8-9 inch diameter class bring from Rs 150-250 each (about Rs 32/maund).

In spite of the fact that the eucalyptus market remains in a fledgling state and has an undetermined future, the biggest concern of these farmers was **demand for more seedlings** and the related demand for more subsidized kissan nursery production. The FPDP has certainly done a great job of motivating and teaching farmers how to plant tree successfully.

7. **Solar Dry Kiln -** Mohammad Yasin, Director of Forest Products at PFI, reviewed the results of three successful tests of solar drying of eucalyptus boards, as reported in the Institute's 1992-93 Annual Progress Report. These test results look very encouraging in that the lumber was thoroughly dried to stable moisture content of 11-12% within 30-40 days, and with only slight defect.

The solar kiln, as presently designed, offers a good and reliable low-cost alternative for the drying of lumber with minimum defect. Still, in spite of our efforts to extend this knowledge to the industrial users, none of the private furniture makers have taken it up. Now that more definitive and positive results are available, this extension effort can be made with more confidence.

Recommendation: PFI should prepare a simple fold-out brochure describing the solar kiln and its low-cost, simple operation, along with an offer to send plans for construction upon request, then circulate it to furniture industries through local forest department officers.

PFI wants to modify the kiln design to significantly increase the load capacity, and/or to reduce the size to accommodate short boards. In the first instance, the efficiency of the solar kiln is dependent upon the ratio of square feet of solar collector as to the board feet of wood to be dried (1:10); or 1.2 square feet per 1 cubic foot of lumber. This has been established by lengthy research tests in the U.S. at various latitudes and under various drying conditions. In the second case, the existing kiln design is quite adequate to handle both long and short boards in the same or separate loads, merely by modifying stacking procedures.

For the sake of on-site research, there should be no problem in experimenting with less expensive construction materials or with kilns of different volume, so long as the standard kiln is kept as a control unit for such experiments. There is an old flat-roofed solar kiln at PFI which can be modified to test the effects of increasing the volume of the charge. All it needs is a new glass or polyethylene panel collector on the roof, set at the appropriate angle, and some fans for air circulation.

8. Demonstration Growth Plots - In the fall of 1989 we identified one of the major problems of on-farm planting to be that farmers were planting eucalyptus at extremely high density, up to 5,000 or more per acre, then failing to do necessary thinnings on time to keep the trees growing at a vigorous rate. We held some thinning demonstration workshops and discovered that the social forestry officers, themselves, were not well versed on thinning of plantations and the ramifications of overstocking as it relates to the productive growth of the stands.

To demonstrate the results of proper thinning, we selected two stands over overstocked block plantations, and attempted to get the cooperation of the DFO and the farmers in setting up some controlled thinning plots. One stand was on the property of Haji Malik Feroze at Burhan (planted in 1985), and the other was on the property of Master Mohammad Aktar at Hazro (planted 1987).

In each case, a representative portion of the stand was selected, divided into 3 plots of approximately 1 kanal each, and randomly assigned a thinning prescription of either: (a) control, (b) remove all trees below average DBH, and (c) remove one-third of the total trees by taking every third row. Measurements were taken for the first time in September of 1989.

Although the DFO was actively helping to set up these tests, we were unable to convince the farmers to follow our recommendations according to prescription. The result was that some thinning was done on **every plot**, thus taking away our chance for making a valid comparison against an untreated control. But, for the demonstration value, these measurement have been re-done each year, and we have been able to observe and show a lot about the growth dynamics of these two stands. The fact that the Burhan

stand is on a dry barani site and the Hazro stand is on a flat waterlogged site, added to the comparative value of the demonstration.

DEMONSTRATION STAND GROWTH DATA

STAND: **Hazro**				STAND: **Burhan**			
Year	Trees/ac	DBH	BA/ac	Year	Trees/ac	DBH	BA/ac
1989	3370	2.32	97	1989	1800	2.85	80
1990	3280	2.65	124	1990	1770	2.94	85
1991	1360	3.95	115	1991	1625	3.02	83
1992	1335	4.42	140	1992	1590	3.12	86
1993	1283	4.74	153	1993	1230	2.87	55

During these five years of measurement/observation, even the conservative cutting policies of these farmers have netted positive results. But, unfortunately, these stands are still badly overstocked in terms of their site potential for producing large trees quickly; the 1993 stocking levels are only now approaching the 1200 trees per acre recommended for **initial planting density** on a 6' X 6' spacing, after 6.5 and 8 years, respectively!

Meanwhile, the total production figures show:

YIELD FROM FARMERS' BLOCK PLANTATIONS

STAND	1993 CFT/AC	PREV HVST	TOTAL CFT/AC	CFT/AC/YR
HAZRO	4,830	970	5,800	890
BURHAN	1,900	2,190	4,090	510

Both farmers have been selling their thinnings during this period. The **Burhan** stand has produced **Rs 42,000** per acre with a residual value of **Rs 34,000** after 8 years; the **Hazro** stand has produced **Rs 18,000** per acre with a residual value of **Rs 106,000** per acre after 6.5 years. Both farmers made their first sales in December 1990 when 200 trees were taken from each stand for the pulping tests at the Adamjee Mill.

A sale is currently in progress at Burhan for 300 trees (stumpage) of the 5"-6"DBH class at Rs 65/tree. In addition, the farmer is cleaning up the tops and slash and selling that for fuelwood locally at Rs 25/maund. He is pleased with this sale. The buyer is a resident Afghani from Haripur.

Another sale was completed in July 1993 from the Ahsan Khan agroforestry plantation on the Lawrencepur-Tarbela road. These trees, planted on the field bunds in 1987 (4,000 total) produced their first harvest of 400 trees (7"average DBH) in February 1992, at a price of Rs 85/tree, or about Rs 22/maund. This second harvest was for 800 trees (6" average DBH) at Rs 75/tree, or about Rs 25/maund.

The farmer is in the process of thinning the coppice sprouts. The coppice from the first cut is averaging about 3" DBH per sprout, with 5 and 6 sprouts per stump. He is also thinning these

down to 2 or 3 per stump, and is taking away ballies and firewood. He is a happy man; he figures that he will harvest between 500-1,000 trees per year now, **every year.**

9. The Punjab project staff has begun collecting and validating some information on the marketing experiences of project farmers. In at least one case, a mass meeting for farmers to meet with a wood contractor in Attock produced very positive results for bringing the sellers and the buyer together, and an agreement was reached to market up to 10,000 tons of eucalyptus at the rate of Rs 29/maund. The farmers will cut and load trees of the designated size, and the contractor will provide transport and the payment of taxes en route. A trained crew can cut and load 4"-5" trees for about Rs 2 per maund, leaving a net stumpage value of **Rs 27.** When the trees are smaller or the crew is less experienced, the cost per maund will rise and the net stumpage value will decrease.

Through my contact with industries, it was verified that the bulk of this material is consigned to Pakistan Chipboard (Pvt), Ltd., at Jhelum, while there is also some indication (**not verified**) that the contractor is also selling some of this wood as industrial fuel for brick and tobacco kilns.

> Recommendation: The Punjab staff should try to continue this successful activity in the other districts. In addition to serving the immediate needs of farmers to gain market access for their trees, this is also an extremely valuable activity for the foresters to improve their outreach skills and to gain more first-hand knowledge of the marketplace which may, in turn, be shared back to the farmers.

Another issue, raised by DFO Malik Nazir, ABAD II Project, relates to the problem of finding some way for landless tenant farmers to share in the benefits from tree plantings on farm lands. One of the solutions to this dilemma is to find a share-cropping arrangement for these tenants in which they can profit from the raising of trees just as they would from any farm crop.

Such arrangements have already been satisfactorily worked out on at least 4 or 5 farms which I have previously visited in Attock District. Since I don't remember the farmers names, nor all of these crop-sharing details, I encouraged him to got to Attock and visit with the range officers, particularly Javed Khan, to get more information. Some or all of these arrangements were moderated by DFO Ghulam Mustafa in 1991-92, and perhaps he should also be contacted to learn more about the specifics of each case and the role he played in getting the deals made.

In general terms, such arrangements with tenants require that the landlord realize and admit that trees are a valuable and useful farm crop, and that their planting, care, protection and harvesting require inputs of time and labor from the tenants which should be compensated by some share in the returns. Further, the principal involved here is that giving up the production of a traditional crop, even grass, represents a cost to both landlord and tenant

which must be met or exceeded by the production of the alternative crop -- trees in this case. Equitable solution would seem to require two things: (1) that the share in the tree crop should be equivalent to the respective shares of the parties in the costs of production, and (2) that the equitable share of the tenant should be his proportionate share of the value of the crop on the date his tenancy is severed, in cases where the tenant's rights end before the trees are harvested.

APPENDIX I - TERMS OF REFERENCE

Reinforce farmer-industrialist linkages to improve the efficiency of marketing farm grown eucalyptus and poplar trees produced under the project. This will be accomplished by meeting members of the provincial forest departments and wood-using industries, organizing farmer field days, conducting 1-day woodlot management and marketing field training workshops for farmers and foresters, and conducting 1-day farmer and forester tours of wood-using industries. Accomplishments and follow-on activities will be reported to USAID, GOP and WI orally and in a written report.

APPENDIX II- DAILY RECORD

Date		Activity
8 Oct 93	--	Arrived at Islamabad. Friday (Holiday).
9 Oct 93	--	At the office, reading up on current project activities, correspondence, and reviewing project progress during my 5 months absence.
10 Oct 93	--	Worked at the office with GOP counterparts. Met with IGF and Hatch to discuss my agenda and uncover any special needs of the IGF. It was agreed that I should continue my basic field agenda as before. Met with Syed Mahmood Hashmi, President of Pakistan Tree Farm Society, and discussed the PTFS proposal to hire three new PFI graduates as Extension Foresters to work on management and marketing programs and to improve the farmer-market linkages. Met with all 3 D/IGFs (Rana, Nasrullah, and Wani).
11 Oct 93	--	Extension Forestry Coordinators meeting, Mingora, Swat, with Wani. This meeting was hosted, in rotation, by Malakand Social Forestry Project. The focus was on the development of Management Plans for project areas (plantations, etc.) for Village Development Committees which have been aided by projects. .

12 Oct 93 -- The second day of the Extension meeting involved a field trip to some of the villages where the project works are ready to be turned over to the local people. Later, we set the agenda for the next meeting, which is scheduled to be hosted by FPDP at Islamabad in February '94 (before Ramazan). The subject will be the need for Continuing Education for Foresters assigned to Social Forestry duties. Specifically, it is felt by the entire group, that the PFI curriculum is not adequately preparing it's graduates for Social Forestry work, and that PFI should be requested to develop a series of in-service short courses (or similar) for people on field assignment.

ISSUE: The need for a Continuing Education program for active foresters in the social forestry programs of various projects in all Provinces.

13 Oct 93 -- Met with MSFP technical team to finalize the proceedings of the Extension Forestry Conference which was held at PFI on 6-8 April '93. This was the final edit, and the proceedings have now been sent to FAO in Bangkok for publication. FPDP is getting full credit as a co-sponsor of this activity. Distribution is expected in January 1994.

Travel to Peshawar by air. Met with Hamayun Khalil, DFO Peshawar (w/ Wani). He indicated that his farmers need marketing assistance, and he would like to conduct marketing workshops in all four Southern Districts. We tentatively set the time from 23-26 Oct for these meetings, details to be worked out later.

Hamayun accompanied Wani and me to the Jamrud Road industrial area where we met with officials of three match companies (Noor, Mohsin, and Khyber).

14 Oct 93 -- Met with representatives of the Daudson's Armoury, Peshawar.

Travel to Islamabad.

15 Oct 93 -- Friday (Holiday).

16 Oct 93 -- Went with Wani to meet with some of the Punjab staff at Soan Camp in Pindi. We had a very productive meeting with P.D. Amin Khan and his staff, and with CCF Qazi. They brought me up to date on recent eucalyptus market activity in Attock and Jhelum Districts. There have been 5 or 6 successful private marketing arrangements by farmers, even to the extent that one farmer sent 5 truckloads of wood to Karachi for construction poles. In at least one other case, the farmer made a large sale to be used as tobacco curing fuel in Mardan.

17 Oct 93 -- With Hatch to USAID to see Khawaja Hameedullah, and discus the main points of my work assignment.

Travel to Jhelum. Met with Tariq Naseer Ahmed, Director of Pakistan Chipboard, and Naeem Bashir, Executive Director of KDC Board in Jhelum.

Travel to Gujrat. Met with Mohammad Fayyaz, Director, Decent Furnishers.

18 Oct 93 -- Visited the Faruki Pulp Mills plant site on the Gujrat-Sargodha road with Najeeb Hussain, Director of the Forestry Division of the company.

Travel to Sialkot. Met with Khawar Khawaja, Executive Director of Gray's of Cambridge.

19 Oct 93 -- Met with Ghazanfar Shabbir, Ali Trading Co. Shabbir has just recently been elected as the President of the Sialkot Chamber of Commerce.

Travel to Lahore. Met with Khawaja Akbar, Director, Orient Match. They were having some quality control problems in the mill so we conducted an on-the-spot test of different grades of logs.

Orient has been exporting some matches and splints because of a better margin for profit. Finished matches are going to Iran (two truckloads left the plant while I was there) and match splints have been shipped to Iraq. Whereas Iran apparently has a good poplar resource, there is not enough plant capacity internally to meet their needs. In the case of Iraq, it appears that they have plant capacity but no raw material.

20 Oct 93 -- Faruki Mills; Saleem Faruki and Najeeb Hussain.

CCF Rana Masood, at his office. We spent a very productive time talking about the long-term effects of the FPDP, and what the follow-up project from World Bank might manage to accomplish.

Dr. Mohammad Afzal Chaudhry, Deputy Secretary of Forests, Punjab. We had a brief meeting concerning the impacts of the tree cutting ban imposed by the acting Prime Minister. He informed me that the Secretary of Forests has entered a timely and well-directed objection to the ban as it relates to irrigated and riverain forests which are under intensive timber production schedules. At the same time, there is a degree of general agreement to the ban with regard to the forested mountain watersheds.

21 Oct 93 -- Met with Khizar Hayat Minhas, DFO, Gujrat. This man is new to the project since my departure in May, and I stopped to get acquainted with him. He was preparing to

respond to the request of a farmer to get help in the proper procedure for pruning poplar trees in a block plantation. We went together to visit the farmer, who turned out to be one of the project's long-time cooperators. He had planted a 12'X12' block plantation of poplar in spring 93, which I had visited at the time of planting. The trees are planted in an agroforestry system with vegetables, and have made remarkable first-season growth (many are already 2 to 3 inches in DBH). Because of rapid growth, the side branches were extending out so far that they were getting caught and torn by the tractor wheels, so the farmer had started pruning. We showed him the proper way to make the cut, and cautioned him against pruning up more than half the height of the trees. This plantation contains at least 5 different clones from the DFO's nursery, and the differences in bark and leaf characteristics are already easily noticeable.

23-26 Oct 93 -- Tree Farmers' Marketing Workshops, NWFP. With D/IGF Wani and the NWFP Social Forestry Staff, we held 4 marketing workshops (D.I.Khan, Bannu, Karak, and Kohat) with a total attendance of 118 farmers, plus staff.

27 Oct 93 -- Saleem Faruki, President of Faruki Pulp Mills.

28 Oct 93 -- Reviewed the training file (provided by Wani) for an Extension Organization and development short-course which he attended at the University of Wisconsin in 1992. This course could be adapted for presentation to senior forest officers in Pakistan. Wani is interested in developing and presenting a one-week short course on extension organization. There is no ready made "package" which can be used for this purpose, but some of the materials available can be adapted. This course, if presented, could be scheduled for the 2nd or 3rd week of April, 1994, during my next technical support visit to the project.

29 Oct 93 -- Friday Holiday

30 Oct 93 -- Soan Camp, Office of the Project Director, Punjab. Met with DFO Ali Asghar Qureshi and his range officers.

Met with Rashid Randhawa, DG/Environment, CDA.

31 Oct 93 -- With Chuck Hatch to the Malik Feroze plantation at Burhan.

1 Nov 93 -- Worked in office on compilation of growth data for the Burhan demonstration plots.

2 Nov 93 -- Went with Qasim to measure the growth on the demon-

stration thinning/harvesting plots at Hazro. We also did an evaluation of the poplar nurseries being grown under an NGO grant by the Pakistan Tree Farm Society. These nurseries are now at full growth and meet the criteria for final payment of the grant.

Attended a Winrock dinner in Islamabad for Earl Kellogg, Senior Vice President, who was in town the past 2 days reviewing the FPDP.

3 Nov 93-- Ateeq-ur-Rehman Sheikh, Islamabad Board Mills, Rawalpindi.

4 Nov 93 -- Annual meeting of the Pakistan Tree Farm Society, Holiday Inn, Islamabad. About 40 farmers, foresters, and industrialists were in attendance.
The General Manager's report included a thorough briefing about the activities of the past year, especially with regard to accomplishments under 2 active project grants from FPDP, one for production of poplar nurseries and one for conduct of a nationwide farm forestry awareness campaign. A new grant of Rs 600,000 for the hiring of three graduate foresters to serve as extension foresters for the NGO in the particular arena of farmer-market linkages was discussed in detail by the assembly. Discussion was lively with occasional differences of opinion, but was fruitful in terms of the unanimous support of the group. This extension program is considered to be a necessary part of PTFS because it seems highly unlikely that the forest departments will be effective in providing this type of information and educational service.

5 Nov 93-- Friday (holiday)

6 Nov 93-- Worked with D/IGF Wani on drafting of an agenda for a workshop on "Extension Organization for Social Forestry".

7 Nov 93-- With Abeedullah Jan, Inspector General of Forests, site visit to Pakistan Chipboard (Pvt) Ltd., Jhelum.

8 Nov 93-- Office, compiling statistical data. Evening meeting with officers of the Pakistan Tree Farm Society.

9 Nov 93-- Office, working on report draft.

10 Nov 93-- Exit Seminar for GOP, USAID, and TAT. Preparation of final report.

11 Nov 93-- Completed final report and cleared all accounts.

12 Nov 93-- Depart Islamabad 9:00 a.m.

APPENDIX III - PERSONS CONTACTED

1> Dr. Charles R. Hatch, COP/TAT, FPDP
2> Arnold Radi, USAID
3> John Swanson, USAID
4> Judy Schumacher, USAID
5> Tahir W. Malik, TAT/FPDP
6> A.S. Bokhari, FPDP/NGO
7> M.I. Sheikh, TAT/FPDP
8> Abeedullah Jan, IGF
9> Dr. Bashir Ahmed Wani, D/IGF
10> Nasrullah Khan Aziz, D/IGF
11> Rana Rafique Ahmed, D/IGF
12> Syed Mahmood Hashmi, Pres., Pak Tree Farm Society
13> Titus Bekkering, CTA, Malakand Soc. Forestry Proj.
14> Frans Werter, Extension Spec., " " " "
15> Khawaja Hameedullah, FPD Project Officer, USAID
16> Dr. K.M. Siddiqui, DG/PFI
17> Ishtiaq Ahmed Qazi, CCF, Rawalpindi
18> Amin Khan, (CF), PD, Punjab
19> Iqbal Swati, (CF), PD, NWFP
20> Syed Mohsin Raza, Vice Pres., Pakistan Tree Farm Soc.
21> Tariq Naseer Ahmed, Pakistan Chipboard
22> Naeem Bashir, KDC Boards
23> Mohammad Fayyaz, Decent Furnishers
24> Najeeb Hussain, Faruki Pulp Mills
25> Khawar Khawaja, Gray's of Cambridge
26> Ghazanfar Shabbir, Ali Trading Co.
27> Khawaja Akbar, Orient Match Co.
28> Rana Masood, CCF, Lahore
29> Dr. Mohammad Afzal, Dep Sec Forests, Lahore
30> Mohsin Aziz, Mohsin Match Co.
31> Fuad Ishaq, Noor Match Co.
32> Nooruddin Daud, Daudson's Armoury
33> Rashid Randhawa, DG/Environment, CDA
34> Quayyum Sheikh, World Bank
35> Ali Asghar Qureshi, DFO Rawalpindi
36> Nazir Ahmad Malik, DFO Barani II
37> Khizar Hayat Minhas, DFO Gujrat
38> Abdul Nasser, DFO (Terr.), Attock
39> Dr. Saeed Ahmed Chaudhri, Pakistan Horticultural Society
40> Dr. Sultan Maqsood Khan, FEFP Staff, Punjab
41> Dr. Zahid Javaid, FEFP Staff, Punjab
42> Dr. Javed Ahmed, AKRSP, Gilgit
43> Mr. Orakzai, Pak. Environmental Protection Foundation
44> Ateeq-ur-Rehman Sheikh, Islamabad Board Mills
45> Ali Ahmed, Comforta Furniture
46> and approximately 150 farmers of Punjab and NWFP