Marketing System and Structure for Agroforestry Products in Sindh, Pakistan

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Abstract:

Pakistan is a forest poor country with very low cover of less than five percent, thus agroforestry can help in achieving the national target of forest cover and in meeting the rising demand for wood and wood products. In order to determine that whether the agroforestry is economically viable in the country, we have conducted to determine agroforestry marketing structure and margins in Sindh, Pakistan. Data were collected from 100 randomly selected respondents (30 farmers, 30 Local assemblers, 30 Saw-mill owners and 10 Retailers) from three randomly selected districts of Sindh Province of Pakistan, i.e., Badin, Hyderabad, Matyari, and Sanghar, following a semi-structured questionnaire. According to our results, main agroforestry products are; timber, mining-timber, fire-wood, pods, flowers, gum, forage etc, where the major products are timber, mining-timber and firewood. Results show that agroforestry not only generates additional income to farmers but also reclaims the soil conditions and is the main source of environmental benefits. We have also disclosed that lower returns to the producers and high marketing margins to middlemen

resulting in inefficient agroforestry production and marketing system in the study area.

Key words: Agroforestry; Marketing system; Marketing channels; Wood products; Pakistan

1. Introduction

The share of forest in gross domestic products (GDP) of Pakistan is only 0.6 percent, where the forest area is 4.04 million hectares out of total land area of 79.61 million hectares. The forest cover thus constitutes only 5.07 percent of its total land area, and is relatively low as compared to other Asian countries (see figure 1). Due to rapid growth in population, demand for wood and other forest products is increasing. In Pakistan, the state forests contribute only 14 percent of timber and 10 percent of firewood whereas 46 percent of timber and 90 percent of firewood requirements are being met by agroforestry (GOP, 2012).
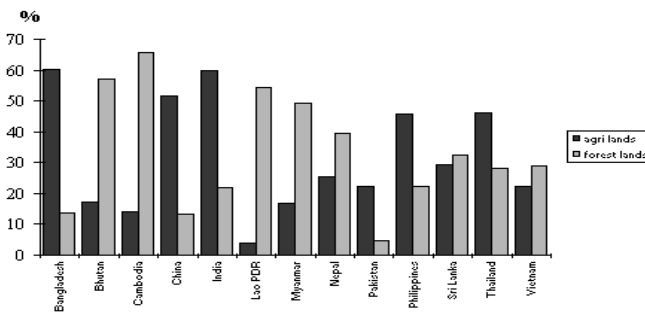

**Figure 1: Extent of forest and agricultural lands (*FAO STAT, 2008)*

Acacia nilotica and *Eucalyptus camaldulensis* are most common forest tree species grown under agroforestry in Sindh, while other tree species including, *Azadirachta indica, Delbergia sissoo, Prosopis cinéraire, Prosopis julifora, Conocarpus lancifolius,* and *Sesbania grandiflora, etc,* (Lohano, 2007). *Acacia nilotica* provides various wood and non-wood products,

like pods, leaves, flowers, gum, timber, mining-props, and firewood. Its timber is commonly used for manufacture of low cost furniture, doors, windows, carts and other household articles. Its fire-wood is used by rural households and firms. *Eucalyptus camaldulensis* is mostly used as a low cost timber, chipboard manufacture, paper and pulp making (Mamun *et al.,* 2014).

The marketing structure and its efficiency determine how consumer rupee is distributed among producers and different middlemen (Traub and Jayne, 2008; Qamar, 1998). The high marketing margins to middlemen may result in inefficient production due to the lower returns to the producers and/or higher consumer expenditure on the products. Marketing structure and channels of agroforestry products are totally different from other agricultural products due to bulkiness and high weight of wood and other forest products. The previous studies in Pakistan have focused on marketing of vegetable, poultry, and fruits (Khair *et al.,* 2002; Bashir *et al.*, 2001), but very little attempt had been made to study agroforestry marketing channels and margins earned by intermediaries and stakeholders involved (Magsi and Lohano, 2012; Magsi 2011; Lohano, 2007). Therefore, this study conducted for detailed investigation on marketing of agroforestry products. The main goal of the study was to explore market structure, marketing system and margins of agroforestry products in the province, and finally to identify marketing issues and suggest policy measures for agroforestry products.

2. Materials and Methods

In the view of objectives the following methods of study were adopted. Primary as well as secondary data were used in this study; primary data were collected by conducting field survey from 100 randomly selected respondents (30 farmers, 30 Local

assemblers, 30 Saw-mill owners and 10 Retailers) from three randomly selected districts of Sindh Province of Pakistan, i.e., Badin, Hyderabad, Matyari, and Sanghar. The respondents were personally interviewed with the help of detailed and comprehensive questionnaire, in order to extract the true picture of marketing system of wood and wood products as well as to watch the different paths of marketing structure. Moreover, secondary data were collected from various sources of government publications as well as from other available literature.

Marketing Margin:
Marketing margin is the difference between sale prices of two or more than two agencies for equivalent quantity of a specific commodity. The following formula was used to calculate the marketing margins,

$$Mm = Ps - Pb$$

where, *Mm* stands for marketing margin, *Ps* indicates sale price *Pb* represents buying price.

Net Margin:
The net margin of a specific agency is the net earnings, which it earns after paying all marketing costs. Net earnings of various market agencies involved in the marketing of agroforestry products were computed with the following formula.

$$Nm = Mm - Cm$$

where, *Nm* stands for net margin and *Cm* represents marketing costs incurred by the same agency.

3. Results and discussion

This section presents the survey findings on various components, including market structure, marketing channels, cost and margins of agroforestry products from study area.

3.1 Marketing structure of agroforestry products

Market structure refers to the organizational characteristics of a market for the particular purposes, to those characteristics which determine the relationship of sellers and buyers in market to each other (Traub and Jayne, 2008; Qamar, 1998). Market structure lays on organization of a market, nature of competition and price behavior within market (Ali, 2008). Similarly, "market conduct" studies price policy of firms, aims to pursue and methods applied to charging price quantity to be produced and sale promotion cost incurred. Scherer and Ross (1990) added research and development commitment, investment in production facilities and legal tactics "market performance" mostly depends on behavior of sellers and buyers taking into account the parameters like price, output, production, selling cost etc.

There were numerous agroforestry products depending on the tree species, non-wood forest products were pods, forage, flowers, leaves, glue, gum, and many other indigenous products, generally marketing system of non-wood forest products was found fully non-commercialized in the study area, it also seemed that these products were locally sold on cheap rate or gifted to others, even producer didn't know value because of imperfect marketing system. In contrast, Holding *et al.* (2006) reported that woody materials from farms are mainly sold in three forms only: as firewood, wood-logs, or as standing trees.

Wood and wood products are basic necessities of life weather people belong to rural or urban areas. Major portion of forest wood products was fire-wood, which is wastage or small pieces of wood, sold to bakers, restaurants and households while remaining products were timber, that serves as raw material for various wood based firms, like saw-mills, chip-board and hardboard factories, from which furniture is made, used in household articles as well as for office appliances, and other wood product was mining prop, that is trunk of tree almost used as supporting pillars in coal mines, mainly *Acacia*

nilotica and *Eucalyptus camaldulensis* props were traded to coal mines at Lakhra in Sindh and Quetta in Balochistan. There were decentralized marketing channels prevailed in the study area for agroforestry products, which refers as producers/farmers not to bring their products in market, like other agricultural products, products were sold directly to local assemblers, saw-mill owners and other intermediaries on farm gate.

3.2 Marketing channels of agroforestry products
Channels may be defined as flow of goods from producer, assembler or manufacturer to consumer. When a commodity passes directly from the producers to the consumers, the route is known as direct channel, but when several agencies operate between producers and consumers, the route is referred as indirect channel of marketing. Marketing channels of agroforestry wood products are illustrated in Figure 2:
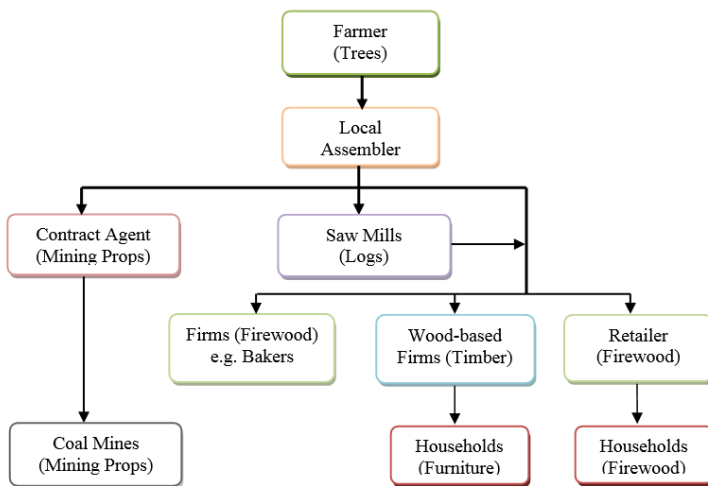

Figure 2: Marketing channels of agroforestry products in Sindh

Above figure indicates the, channels of wood products are totally different from other agricultural products because

different products transacted by different middlemen and stakeholders are described below:

- A large number of agroforestry producers geographically dispersed in various locations of the study area, mostly growing *Acacia nilotica,* and *Eucalyptus camaldulensis* tree species in their private lands. In Sindh *Acacia nilotica* trees were grown by either blocks or shelterbelts and scattered, blocks of *Acacia nilotica* were designed for purpose of mining props and felled down at the age of 5-6 years and sold per acre basis, while shelterbelts and scattered tree felling cycle was 10-15 years, *Eucalyptus camaldulensis* trees cut at age of 8-10 years and whole trees also sold to local assemblers. Producers have no control on price of their products but they depend upon intermediaries. Local assembler purchases whole trees from producers, after processing he deals with different type of wood products. Mining props supplied to contract agents of coal mines, timber supplied to the Saw-mill owners as well as to factories, and they supply fire-wood to retailers. The customs wood belonging to small private forest farms and individual villagers who might have brought fallen or cut trees from their own sources, thus act as agent to these timber owners.

- In order to determine the response of the saw-mill owners, the saw-mill owner bought timber logs from local assembler and engaged in some types of operations, and sell different types of wood products, which were observed; Planks, Beams and fire-wood. Mostly planks were going for manufacturing of furniture to wood based industries (Shahid, 2000). Beams largely went to timber market traders for onward sale as bulk timber further shapeable and saw-able by the subsequent buyer and finally fire-wood or small piece of the timber went to the retailers near cities.

- The figure also indicates that, retailers purchase fire-wood from Local Assembler and Saw-mill according to the demand of consumer. They maintain direct contact with consumers (Restaurants, Bakers and Households) and make transactions according to the qualitative and quantitative aspects of products. Large number of retailer working in all over the Sindh, majority of them were found at roadsides near cities. Retailers purchase that much quantity of fire-wood, which they could sell in a week, because they didn't possess facility to keep for more than one week. Wood consumers are of different types, generally, timber used for doors, windows and other household articles, where as firewood used for fire/energy purpose, firewood consumers were restaurants, bakers and households.

Table 1: Percentage of wood products from agroforest trees

Wood Types	*Acacia nilotica*		*Eucalyptus camaldulensis*
	Block	Scattered & Shelterbelts	
Mining Props	50	16	12
Timber (logs)	10	38	43
Fire-wood	40	46	45

Results of the table 1 indicates that percentage of whole tree of *Acacia nilotica* Block consisted of 50 percent mining-timbre, 10 percent timber logs and 40 percent firewood, from scattered & shelterbelt trees of *Acacia nilotica* 16 percent of mining props, 38 percent timber and 46 percent fire-wood were obtained. *Eucalyptus camaldulensis* whole tree contained 12 percent mining props 43 percent timber, and 45 percent fire-wood. Keerio (1997) reported that wood material produced from *Hurry* (block of *Acacia nilotica*), contained 67 percent mining timber and the remainder 33 percent is fire-wood.

3.3 Marketing margin analysis

Marketing margins are the differences between prices at two market levels. In order to measure marketing margins, data on

wood and wood-product prices were obtained at different stages in the marketing chain. Marketing costs consists of the total costs incurred on marketing activity such as, loading unloading, transportation, market taxes, storage and assembling. The most important factors which influence marketing costs are distance between production and consumption market. The net margin of a specific agency is net earnings, which it gains after paying all marketing costs. The net profit margins of collection Local Assembler/Saw-mill/Retailer were calculated as sale price of wood in the market minus purchase price and marketing costs.

Table 2: Margins of *Acacia nilotica* Products Rs*

Middlemen	Products purchased	Products sold	Price paid	Marketing Cost	Price received	Net Margin
Local Assembler	Logs from block plantation	Mining props, timber & firewood	50	17	83	15
	Logs from shelterbelt and scattered trees	Mining props, timber & firewood	63	17	88	07
Contract agent	Mining Pit props	Mining Pit props	83	15	103	5
Saw mill	Timber logs	Timber & firewood	103	16	130	11
Retailer	Firewood	Firewood	77	6	92	9

*RS= Pakistani Rupee

Results from above table revealed that, average price of Rs 50 paid by Local assembler of each 40 kg of wood legs of *Acacia nilotica* block owner and Rs 17 were spent on marketing, includes cutting, loading, unloading and transportation, where he received Rs 83 per 40 kg, thus his net margin was Rs 15 per 40 kg, price of whole trees grown as scattered and shelterbelts were Rs 63 per 40 kg, where marketing costs per 40 kg were Rs 17, and price received was Rs 88, thus he took Rs 7 as net margin. Contract agent of mining props purchased props for Rs

83 per 40 kg and sold to coal mine for Rs 103, where his expenditure at transportation only, was Rs 15 per 40 kg, thus his net margin was Rs 5 per 40 kg. Saw mill purchased timber logs on Rs 103 per 40 kg, after processing he sold on average price of Rs 130 per 40 kg, his marketing cost, includes transportation only, Rs 16 per 40 kg, net margin taken by saw mill was Rs 11 per 40 kg. further, retailer deals with fire-wood only, purchased fire-wood from local assembler or from Sawmill at Rs 77 per 40 kg and sold to restaurants and households at Rs 92 per 40 kg, where his marketing cost was Rs 6 per 40 kg, thus his net margin was Rs 9 per 40 kg.

The prices were calculated as weighted average based on percentage of quantity of wood sold per 40 kg, and only explicit costs of each intermediary calculated as marketing costs, whereas, labor working, monthly rent as well as investment costs are not calculated.

Table 3: Marketing Margins of *Eucalyptus* Products Rs

Middlemen	Products purchased	Products sold	Price paid	Marketing Cost	Price received	Net Margin
Local assembler	Logs from shelterbelt and scattered trees	Mining props, timber & firewood	61	17	85	7
Contract agent	Mining Pit props	Mining Pit props	83	15	103	5
Saw mill	Timber logs	Timber & firewood	95	16	121	10
Retailer	Firewood	Firewood	77	6	92	9

The information on the margins of *Eucalyptus camaldulensis* Products presented in Table: 3 that average price Rs 61 per 40 kg paid by local assembler to the *Eucalyptus camaldulensis* producer, where marketing costs were Rs 17 per 40 kg, he received Rs 85 as an average, and thus net margin earned Rs 7 per 40 kg. Contract agent purchased mining props at Rs 83 per 40 kg and sold to coal mine for Rs 103 per 40 kg, where his

transportation expenses were Rs 15 per 40 kg, therefore net margin was Rs 5 per 40 kg. Saw mill purchased timber logs from local assembler for Rs 103 per 40 kg, after processing saw mill sold at average price of Rs 121 per 40 kg, marketing cost of Saw mill was Rs 16 per 40 kg, and where net margin of earned Rs 10 per 40 kg. In case of wood retailer, that deals with fire-wood only, purchased fire-wood from local assembler and saw-mill at Rs 77 per 40 kg and sold to bakers, restaurants and households at Rs 92 per 40 kg, where his marketing cost was Rs 6 per 40 kg, thus his net margin was Rs 9 per 40 kg.

Note that the prices were calculated as weighted average based on percentage of quantity of wood product sold per 40 kg, and only explicit costs of each intermediary were calculated, but labor working, monthly rent as well as investment costs were not calculated.

3.4 Agroforestry marketing issues in the study area

In the analysis of wood prices it was difficult to compare the prices in different seasons and wood products. There were some complications in formulating the standard price of wood products and the problem was day-to-day variation among prices of agroforestry product per 40 kg (mound) basis. Workers engaged in the production, processing and marketing of agroforestry products were belongs to weaker sections of the society, they used simple skills acquired either from their elders or doing job without experiences. Wood market was governed by a complex set of internal as well as external factors, included unskilled manpower (Smith, 2000), unavailability of financing credit and low economic conditions of consumers, etc. Similarly, as investigated by Mamun *et al.,* (2014) that local population were little aware about agroforest technologies and its potentiality in Bangladesh.

5. Conclusion and suggestions

Agroforestry is referred as plantation of forest trees on private agricultural land. In Sindh large number of agroforestry producers, mostly producing *Acacia nilotica,* and *Eucalyptus camaldulensis* tree species in their private lands. Marketing system for agroforestry wood and non-wood products was not identical, and fully non commercialized marketing structure found for non-wood forest products, these products were either sold on the farm get or presented freely because of unawareness. The marketing channels of wood logs were found different from product to product; the products were mining props, timber and fire-wood. Farmers sold the whole trees or the blocks to local assembler, it was observed that in locations, there were few local assemblers, thus market exploitation situations were prevailed, and they offered fewer prices of wood logs. This situation may lead lower profits to farmers and may discourage for tree plantation. Saw mills were engaged in distinct types of operations: they purchased timber logs, after processing were sold to wood-based industries, retailers and to consumers also, where retailer sold firewood to consumer. It is concluded that, local assembler earns higher margins as compared to other intermediaries because he serves as wholesaler in wood market.

On the basis of conclusion drawn from primary data analysis and qualitative inferences, the following suggestions were developed and presented as follows:

- In Sindh as well as in Pakistan all factors are available to develop wood based industries through increasing agroforestry production. Yet wood business is not carried out on scientific lines and supply of wood and wood products does not meet ever increasing demand for these products. Increasing growth rate in population have resulted in lower per capita consumption of wood products

which refers as timber, mining timber, fire-wood, and other non-wood products. Government should take efforts that tree plantation techniques should be introduced at school level, training for tree plantation and plants should be available to tree growers, comprehensive information on the agroforestry products, market orientation training should be provided to market operators by researchers, government should provide financing facilities to promote wood-based industries, approved timber markets should be established, profit should be ensured, and means of transportation of timber should be made adequate.

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