Improving Domestic Markets for the Wood Products of Reforestation Programs: A Case Study of Eucalyptus in Northwestern Senegal

by

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(ABSTRACT)

There is a drastic need for reforestation in the Sahel region of Africa. International donors and local governments invest large sums of money for the purpose of planting trees. Unfortunately, the majority of reforestation efforts last only as long as the projects. Presently there is a push in the donor community to have more sustainable projects, increasing local participation and creating a situation in which reforestation efforts will continue beyond the scope of any one project.

This thesis examines the potential opportunity for the use of eucalyptus in the domestic sawn wood markets of Senegal. It is hoped that with increased economic incentives the local population will become more inclined to plant trees. It is therefore important to identify the market opportunities for the products of reforestation. In this research it has been noted that more emphasis should be placed on determining the barriers to market entry for the goods to be produced from the reforestation and providing assistance to lower those barriers.

In Senegal it is generally accepted that planting for fuel wood and housepoles does not provide enough of an economic incentive for increased local involvement in reforestation. This thesis finds that the domestic sawn wood market for eucalyptus in Senegal holds potential but will not provide tangible benefits until there are further improvements in the market infrastructure and communication to the farmer.

To increase the participation in this market the people of Senegal need to see for themselves that reforestation can be financially beneficial. Reforestation projects must have a longer-term vision and provide assistance throughout the productive cycle of the tree.

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Chapter 1

INTRODUCTION

Many reforestation efforts have been undertaken in the Sahel region of West Africa. Most of these projects have either failed or have ended as soon as the funds from the international donors are exhausted. Few of these projects have had the desired effect of long-term, independent local involvement in the process of reforestation. What has been missing in these projects is that they have failed to stimulate long-term public interest. The hypothesis of this thesis is that it is the lack of economic incentives that terminates much of the local involvement in the reforestation. After the international project ends, the local population cannot afford to reforest. How can the local government and international donors create a positive economic environment for the reforestation process?

Problem Statement

Many reasons have been given for the lack of success of internationally-funded reforestation projects in the Sahel region of West Africa. These include: the projects being too large and not addressing the issues confronting the local people; lacking sufficient local involvement in the planning stage and therefore destroying useful local flora and replacing it with exotic trees such as eucalyptus; another suggested reason is that projects are too focused on the individual growers and do not address the needs of the society (USAID, 1986; Diallo, 1992). Whatever the reason, the fact remains that most of the reforestation projects end when the international funding is exhausted.

The result of this lack of continuity is that the donor money is not as well spent as it could be. More importantly, the people who take the chance and become involved in the projects can be left without assistance to complete the growing and selling of their product in a market that is either too far away, too small, or simply does not understand or need the product.

Justification

The justification for this research lies in the belief that if the proper economic incentives are available there will be increased local involvement in reforestation. Bourke (1989) states that domestic markets hold great potential for local investment in forest industries. This research will consider only the domestic sawn wood markets for the wood of *Eucalyptus Camaldulensis* in Senegal. *E. Camaldulensis* has been the most frequently planted tree in many reforestation projects including the Senegal Reforestation Project (SRP). The sawn wood market was chosen for study for three reasons. First, it is believed that the house pole and charcoal markets in Senegal,

although active, do not provide the necessary economic incentive for large-scale local involvement (USAID, 1986). Therefore this thesis will examine the sawn wood markets that will potentially provide higher economic returns. Second, marketing through the domestic wood markets of Senegal will require considerably less infrastructure than entering international wood or pulp markets. Third, because over 90 percent of the sawn wood market consists of wood imported from the Cote D'Ivoire there would appear to be potential for domestic growers to compete with these imports due to lower transportation distances and costs.

This concern with the sustainability of reforestation projects is currently being addressed by the SRP. The Private Sector Initiative of this project is attempting to involve the Senegalese people in the reforestation effort by providing economic incentives. This is an important aspect of the project because without local initiative and involvement, the projects are not sustainable. This is clearly demonstrated by the fact that there have been about 23 international forestry projects in Senegal, spending over 50 million dollars (USAID, SRP Project Paper, 1986) with limited success from the sustainability perspective.

Objectives

The objectives of this research are (1) to evaluate the Senegalese wood product market and to identify the potential economic incentives and disincentives for reforestation; (2) to develop methods that other developing nations can use to examine their market channels for domestic wood products. Issues raised in this thesis will provide insight into the complexity of establishing sustainable reforestation projects.

Summary of Methods

In order to accomplish the objectives of this thesis it is necessary to understand the present market channels and to gauge the knowledge of the growers about the product and markets. It is also necessary to interview the wood merchants and to understand the difficulties involved in selling the product. It is for those reasons that the following three groups of people will be surveyed:

1. the farmers/villagers growing the eucalyptus;
2. the wood merchants in the towns; and
3. the wood users in the urban areas.

Each nation will face a different set of problems and constraints when attempting to develop their domestic markets. This study will identify areas of market research which countries can use to improve their reforestation efforts. A market channel model developed at Virginia Polytechnic Institute and State University will be examined as a method for a more quantitative analysis of the markets. It is expected that with models such as the one to be presented, research on markets can be conducted with the technology and knowledge that already exists in many developing nations.

Maps of the Study Site

To provide an introduction to the study area, three maps are provided on the following pages. Figure 1 shows the location of Senegal on the African continent. Figure 2 shows Senegal and its neighboring nations in more detail. Figure 3 shows the study site within Senegal. The study site was located in the northwest of Senegal. Surveys were conducted in the following towns and surrounding villages: Dakar, Thies, M'Bour, Fatick, Kaolack, Diorbel, Touba, Louga, San Louis, and Dagana.

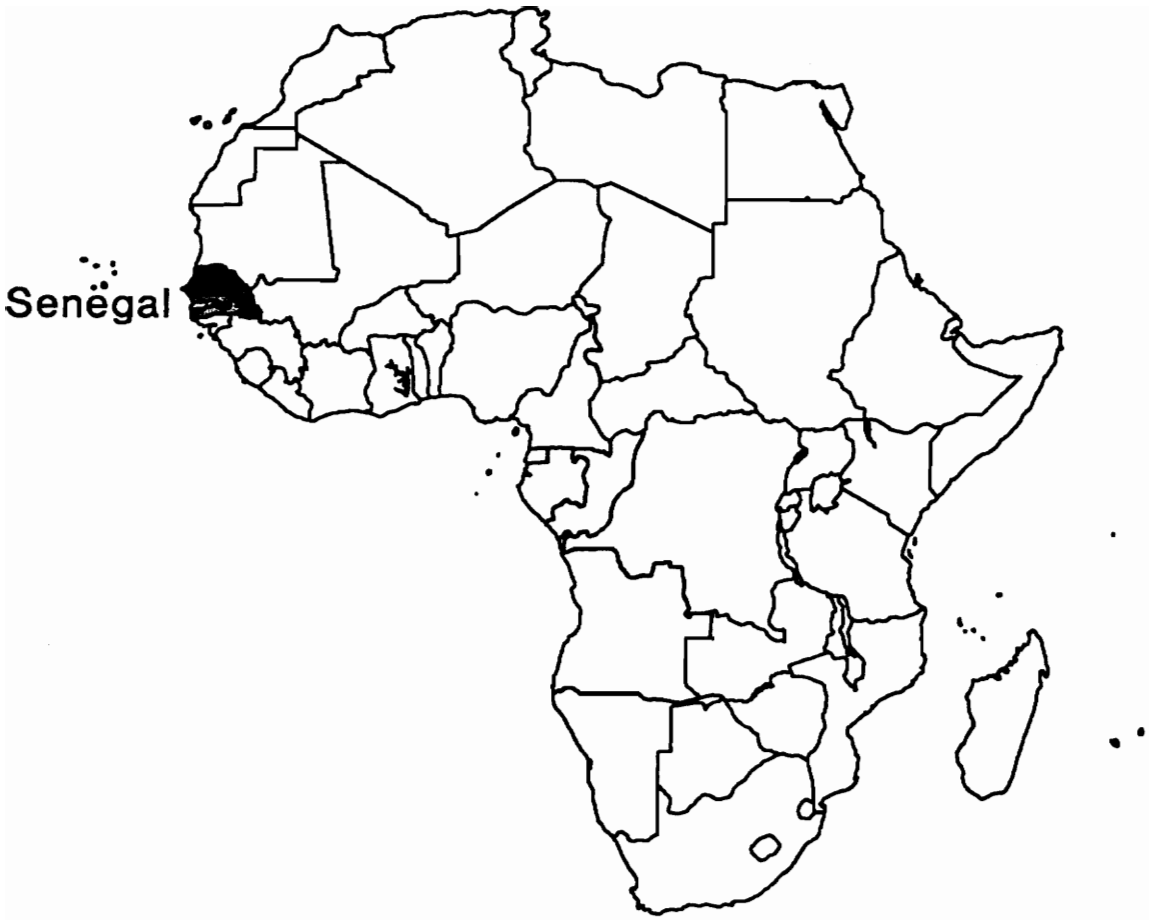

Figure 1. Senegal in the African Continent

Figure 2. Senegal and Neighboring Nations

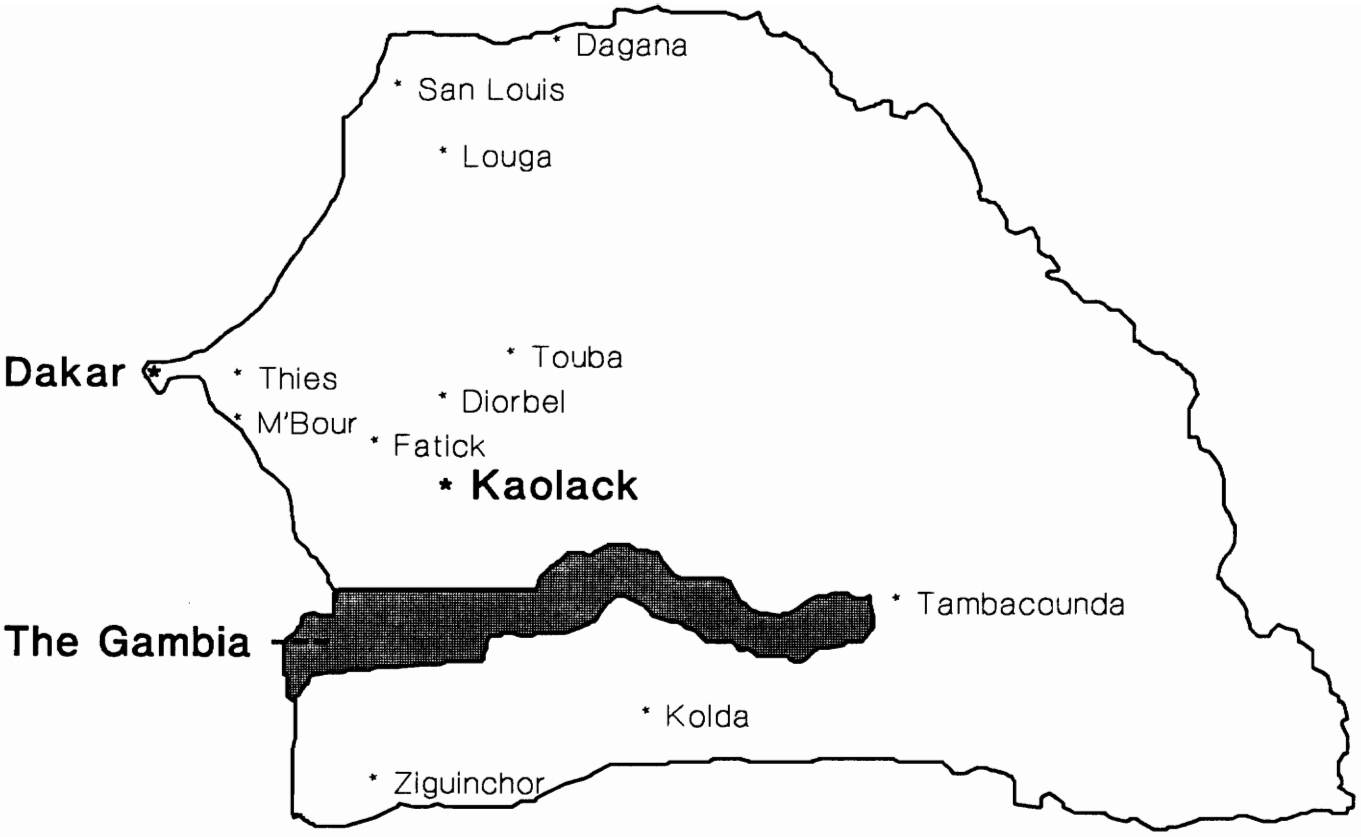

Figure 3. Senegalese Urban Centers

Thesis Contents

Chapter 2 contains a brief introduction to the nature of markets with reference to the barriers present in the Senegalese market structure. Also included in this chapter is a discussion of the potential markets for the products of eucalyptus plantations in Senegal. Chapter 3 describes the methods of research used in this study. Chapter 4 consists of a discussion of the three sections of the Senegalese market that were surveyed: (1) the wood merchants; (2) the wood users; and (3) the wood growers. Also a market channel model will be examined as a method for conducting a more quantitative analysis of the markets. Chapter 5 summarizes the research and presents the conclusions of the study and recommendations for both future reforestation programs and further research.

Chapter 2

MARKETS

To effectively encourage the rural Senegalese to make use of the market system for their economic benefit how market function must be understood. This chapter will examine the function of markets and relate this to the market research requirements in the developing nations. In concurrence with the theme of this thesis, particular reference will be made to eucalyptus in the Senegalese wood markets.

Market Functions

In any trade environment markets develop. These markets may develop in forms as diverse as a meeting between two groups of nomadic pastoralists in the African desert or the sale of commodities between traders in Chicago. Markets form because people require them to fulfill a function.

What then are the functions of a market? Markets provide a forum in which people can exchange for goods and services that they cannot produce themselves, or that they cannot produce as efficiently as others. Markets essentially serve the same purpose for all people but it is because of the distinctions between urban and rural markets, free and protected markets, domestic and international markets and so forth that individual market parameters become important when analyzing the functioning of a particular market. The knowledge and ability to work effectively within a market hinges on the understanding of the market structure and the availability of accurate information.

Saxena (1991) describes the function of a market as either allocative or exploitative, the former allowing the equitable distribution of products to those in need and the latter, under which he places the wood markets of India, allows a few controlling interests to manipulate the market to their advantage. The Senegalese wood product market is primarily exploitative since it is essentially under the oligopolistic control of a few sawmills and has a unidirectional flow of products.

Market Technology

The transference of markets and market systems from one country to another is much the same as transferring industrial or agricultural technology, a basic or indigenous process already in place is removed and an allegedly more "efficient"

system is installed. The direction of this transfer is customarily from developed to less developed nations (LDC). Due to cultural, physical, financial and other misunderstood differences, many of the innovations that perform favorably in the industrial world do not function in the developing nations.

To aid in the development of a country's market system the functioning of the current market must be understood. Only after extensive study of the domestic markets and with knowledge of the desires of the local population can suggestions be made about how the local assets can best be used to compete in the national arena. Indigenous or domestic market structures have only lately become considered as important areas of potential development, Evans (1986). Bourke (1991) states that domestic wood markets do not receive the attention they deserve from governments and the forest products industries of developing countries. It may be that the most viable option, at least in the early stages of market development, is to have limited involvement in the international markets.

Market Information

The efficient functioning of a market is in part related to the following two problems: (1) the amount of information necessary to understand the processes of a particular market; and (2) the amount of information available on the processes of that market. Simple markets require less information for an adequate grasp of their nature, while complicated markets require a large amount of information to achieve a minimal understanding of their character. Information is vital to the entrepreneur in the market, without the appropriate information, opportunities will be missed and he or she may be overrun by more efficient competitors. For example Meyer et al. (1992), in a profile of the U.S. wood furniture industry distribution channels, state that with limited information firms selling wood to furniture

manufacturers and firms selling furniture will find it difficult to gauge the demands for their respective products.

Information on African markets is at best difficult to obtain. A general lack of cohesive data collection systems leaves the researcher having to depend on subjective personal accounts and on often inaccurate government documents. If the objective of the Senegalese, or any other developing country's government is to develop its national resources, then accurate collection and effective use of information should be accorded a high priority. Information on the domestic market process will enable the government of Senegal and the Senegalese entrepreneur to better understand the needs of the Senegalese consumer and in the future will facilitate their analysis of the international markets to judge their competitive ability.

Forest Product Markets

In general, forest product markets can be broken down into two categories: (1) Non-wood products, for example fruit; and (2) Wood products, or products derived from the woody segment of the tree. Historically the Senegalese have viewed both of these categories as gathered products. It is because of this cultural nuance that the growing of trees for the specific purpose of developing a market for the wood product of those trees will be difficult. The non-wood forest product markets of Senegal remain primarily gathered product markets such as nuts, fruit and fodder.

The Senegalese national forest policy, theoretically designed to reduce the cutting of wood from the remaining natural stands, has forced changes in the wood product market. Instead of cutting wood from the native forests for sawn wood products, the Senegalese import wood from the Cote d'Ivoire (Moreno, 1990). The species of wood that predominate in the market have not changed, because the natural forests of the Cote d'Ivoire are similar to those of the Casamance in Senegal.

Wood products such as charcoal and fuel wood continue to be predominately gathered products, but there are cases where the products of reforestation projects have been used for fuelwood and charcoal.

The obstacles to be overcome in changing market structure are substantial. Apart from the economic factors involved there are the political and cultural changes, such as improving the forest policy legislation and accepting a changing role for women respectively, that must take place in order for the markets to function effectively. In Senegal these changes must take place under arduous environmental constraints and in a situation where information is not readily available.

If the reforestation effort in Senegal is to be successful then there must be a large scale involvement of the local population (USAID Project Paper, 1986). This involvement would entail changes in the nature of the markets to accommodate the long maturation of the product, the cultural acceptance and use of those markets, and the availability of information to allow this to occur.

Market Research

One definition of market research is given as: ".. the systematic and objective approach to the development and provision of information for the marketing management decision-making process."(Kinnear and Taylor, 1983; p 16).

This definition is aimed primarily at the decision-makers in large corporations but contains the basic ideas relevant to successful market research. The basic idea is that a comprehensive, unbiased description of the market will lead to more effective marketing decisions. In the Senegalese context, the question is whether E. camaldulensis can substitute for the wood presently being used for products other than fuelwood. To analyze the potential markets for these products two aspects must be considered: (1) production possibilities or supply; and (2) consumer behavior or

demand.

Supply

Can the eucalyptus being planted in Senegal provide a guaranteed, consistent and adequate supply of sawn wood to meet the demands of the domestic market at competitive prices? Can the product be grown, processed and transported to market and remain price competitive with the wood imported from the Ivory Coast? How many trees will need to be planted to enable the local sawmills to compete successfully in the market?

To answer these questions it is necessary to understand: (1) the number and cost of trees being planted and the growth characteristics of *E. camaldulensis* under Senegalese environmental conditions; (2) the cost of treatment, transportation and processing of the wood; (3) sawmill capacity and throughput needed for profitable production; and (4) the level of acceptance of the product in the market.

If the market does not change and eucalyptus is not accepted as a sawn wood then there may be serious consequences of market saturation. Saxena(1991) reports on the market collapse for eucalyptus poles in villages in India. Overplanting led to an excess supply of poles and the prices fell leaving many farmers with unprofitable plantations, the result of which was that the trees were not allowed to coppice and the stumps were removed, often at great expense. This demonstrates a need to understand the potential effect on the markets that a large supply of eucalyptus would create. The number of eucalyptus and survival rates planted by the Senegal Reforestation Project (SRP) are discussed in chapter 5. Although there have been many projects that have promoted the planting of eucalyptus little is known about the growth characteristics of eucalyptus planted under the Senegalese environment. The acceptance of eucalyptus products is addressed in the following section on demand and also in chapter 5.

The import level for sawn wood, in both whole log and sawn wood forms, is an average of 26,438 cubic meters for the years 1982 through 1988. The theoretical capacity of local sawmills as estimated in Moreno, 1990 is presented in table 1 as 11,350 cubic meters per year. Since imports of sawn wood comprise 90 percent of the Senegalese demand, the demand for sawn wood is estimated at 29,375.6 cubic meters per year while the capacity of the local mills is considerably less than that figure. This indicates that in a perfect market situation, the local mills could be working at full capacity and meet barely 40 percent of the demand.

How many trees will be needed to allow these sawmills to produce at full capacity? If one eucalyptus tree, as shown in table 6, appendix B, can produce 0.110 cubic meters then approximately 267,051 trees per year will be needed. It is important to remember that these trees will need to be somewhere in the region of 15 to 20 years old to produce this size.

Table 1. ESTIMATED CAPACITY OF LOCAL SAWMILLS	
Sawmill	Capacity (m^3)
SCIENCIE	4,500
GIE DERICOURT	1,500
COUSSY	2,000
KOLDA	400
BOUTOLATTE	700
SIFAC-TOBOR	1,500
BIGNOMA	750
TOTAL	11,350

Source: *Etude de Marche pour le Bois d'Oeuvre*, Moreno A., pg 70, 1990

Demand

Important factors to consider in an analysis of the nature of timber demand in Senegal are the building trends in Senegal, tastes and preferences in wood uses and prices. Also important are the effects of population change and changing income levels.

During the two research visits to Senegal it was observed that in the construction of residential buildings in the urban areas the preferred material was brick. Wood was used as forms to retain the concrete while it set. Quantitative representation of this observation is not available at present but might be verified by examining the sales data for bricks.

Tastes and preferences for wood are governed as much by what is available in the market as they are by the preferences of the Senegalese people. The limited selection of wood available in the market may not allow the consumer to accurately express his or her desire for alternate products. Therefore altering tastes and preferences in the Senegalese wood market may be as simple as introducing new products into the market.

Many of the consumers in the wood markets indicated that the primary motivator in their choice of wood was price. With limited budgets, consumers are forced to use the cheaper products even though they might prefer to use the higher quality, more expensive products. Thus, the question to be answered concerning the effect on demand due to changes in income is: if incomes rise will the Senegalese consumer remain faithful to traditional forms of building and wood use? What the direction of income change will be and what effect it will have on the demand for wood are two important questions for future research.

With population increasing at a rate of 3 percent per annum it can be expected that the demand for wood and wood products will increase. If there is little change in the real income level and no change in tastes and preferences, then it