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Agriculture Diversity: Forestry in Costa Rica

by

JERRY KEMPERMAN

Although enlightenment may have come to forestry students of the 1980's, my undergraduate days in the late 1960's at the University of Michigan contained little education in tropical forestry. I thought of forestry in Latin America in terms of vast rain forests or "jungles". Disillusionment was rapid during two years as a Peace Corps volunteer in the early 1970's working with a United Nations agricultural diversification project in Costa Rica. While smaller than Iowa, Costa Rica has nineteen vegetation zones based on Holdridge's life zone classification. Within the 90 miles from Pacific to Atlantic Oceans, forest communities change from the very dry savanna conditions, up the mountains to subalpine cloud forests and back down to the Atlantic lowland rain forests with over 20 feet of annual precipitation. With this diversity, general statements about tropical forestry have little significance.

My limited experience in tropical forestry certainly does not qualify me to give a detailed discussion of the subject. The objective of this article is to generally describe some of the difficulties experienced by a United Nations project attempting to diversify agricultural production with tree crops in Costa Rica.

The first step was the establishment of a nursery to sell tree seedlings or grafted stock. This required training a tree seedlings nurseries existed in the local labor force as no others such nurseries existed in the United States. Diverse, then telephone poles and finally cut at sawlog size with a rotation age of 10 to 20 years. Within coffee plantations, walnut trees were to be interplanted to provide shade and sunlight alternately as needed by the coffee plants. Rotation of veneer size walnut within the coffee fields was to be 15 to 25 years. Plantations of Macadamia nut trees from Hawaii were also to be established for an additional export crop.

Biologically, this was a relatively simple project. Tree species were screened and tested. Caribbean pine, eucalyptus species, and other hardwoods were well suited for local conditions. Eucalyptus plantations were ready for thinning at age 2½ to 3 years with dominant tree heights of 50 feet. Height growth of some trees average 0.6 inches per day over the first three years! Diameter growth was 4 to 8 inches during this period. The Macadamia nut trees also grew well and began to produce nuts within a couple years of planting grafted stock.

Some biological problems were encountered. The Caribbean pine had a tendency to "gooseneck". Each year the lateral bud development failed on about 10% of the trees resulting in 8 to 14 feet of terminal growth without lateral branches. While a forester's dream tree for producing clear lumber, such trees often could not support themselves as branches later developed above the gooseneck. Another problem was weed control. While trees grew fast, weed initially grew faster. The only form of weed control that appeared to be biologically and economically feasible was the machete. Weeds and vines had to be cut by machete 2 to 4 times during the first year of establishment. An exasperating problem with the Macadamia trees was a leaf eating bee. Control had to be found for this persistent defoliator while not interfering with other bees and insects needed for pollination. Fortunately these bees did not sting, but they certainly did bite.

The major problems encountered with this diversification project, however, were not biological. The difficulty was in the development of entire marketing systems needed for the successful introduction of these new crops. There was reluctance to plant these tree crops without a guaranteed market, but a market could not develop until the tree crops existed. The first step was the establishment of a nursery to sell tree seedlings grafted stock. This required training a local labor force as no other such nurseries existed in the country. A cost treatment plant then had to be built. Plantation thinnings would be useless as fence posts in the tropical climate until treated. These thinnings at age 2½ could pay off the initial investment plus a profit to the landowner. I spent over a half-year just developing treatment schedules of the various species and diameter classes. Once treated, a market had to be developed with ranchers to buy the posts. By the time I left Costa Rica, the various parts of this entire marketing system were beginning to fit together. Once this project became self-sustaining, the United Nations participation was to stop.

A similar situation occurred with Macadamia nuts. A very good market with high prices existed in the United States for the Hawaiian Macadamia nut, but no system

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existed to collect, process and transport the nut from the Costa Rican trees to the United States market. This project had to develop a local processing system so the nuts could be purchased from the landowners. Again a guaranteed local market was needed before landowners were willing to plant commercial acreages of Macadamia trees.

The interplanting of walnut trees in coffee plantations was just beginning while I was in Costa Rica. We felt that gaining acceptance of this practice would be easier than with establishing forest tree plantations or Macadamia orchards. Coffee plants need shade part of the year and full sun the remainder. Being deciduous even as a tropical species, walnut provided shade when needed. Walnut was often interplanted in coffee plantations in Nicaragua where it was native. While inferior to the North American walnut, the Nicaraguan black walnut veneer logs were exported to Germany. Through trials, it was known to grow well in Costa Rica. The initial problem was to obtain sufficient quantities of seed to begin sizeable field plantings. An “expedition” drove to the Nicaraguan Mountains where we spent several weeks collecting truckloads of walnuts. While most people were friendly, all the men were armed with a shotgun, pistol or at least machete in those years prior to the most recent Nicaraguan revolution. Although tense, the collection trip was without major problems and was repeated the next year. Within a few years, trees from these nuts were expected to provide the seed to sustain the walnut planting program.

Was this agricultural diversification project a success? Over the years, personnel has changed, and I have lost contact. I would consider it successful only if the various tree crops were absorbed by the local economy. Unfortunately, such projects often fail when the outside agency pulls out. This program did stand a better chance of success than many because it tried to adapt to the local conditions and help develop the entire system from seedlings through marketing the products.

It is often too easy for us North Americans to condemn the underdeveloped countries for the apparently slow rate at which they adapt our advanced technologies. We tend to forget that we too have government programs that are not always successful such as those to reduce soil erosion. Iowa farmers still send two bushels of soil down the rivers for each bushel of corn grown. While we lament the fact that large areas of tropical forests are being cleared, Iowa lost over 40% of its forest land in a recent 20 year period. As a forester in Iowa, I sometimes feel as though I am still a Peace Corps volunteer.

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