

ADOPTION AND YIELDS OF IMPROVED BEAN VARIETIES IN HONDURAS. P. Martel, and R. Bernsten. Michigan State University, Department of Agricultural Economics.

INTRODUCTION AND JUSTIFICATION

Beans (*Phaseolus vulgaris*) are the most important legume crop in Honduras, and constitute an important source of protein for rural and urban consumers. Moreover, beans are viewed as more than simply a source of nutrition. Debates in the popular press emphasize the importance of beans in the Honduran culture and diet. Production, productivity levels, food availability, and competitive performance in the Central American context are at the center of these debates (various newspaper articles, 1993-1995). Aggregate data show that technological progress in the bean subsector has been slow over the past two decades, with population growth out-pacing bean production growth during the period of 1970-1990, thus supporting the concern voiced in the popular press.

During the 1980s and 1990s, international and local support for agricultural research programs in developing countries has decreased. For instance, although beans are still one of the most important crops in Honduras, governmental support for bean research has decreased considerably since 1991. As a result several research positions have been eliminated at the Ministry of Natural Resources (MRN), and funds for extension services have been reduced. These events put increased pressure on collaborative research programs such as the Bean/Cowpea CRSP and PROFRIJOL to conduct and finance research targeted for agro-ecological areas which have the potential for rapid productivity gains.

The major emphasis of these collaborative research programs has been to develop high-yielding bean varieties with multiple disease resistance, and higher productivity levels. The most important technological contribution of these programs has been to cooperate with the MRN in the release of three small-seeded bean varieties. Catrachita, released in 1987, is a highly productive variety but susceptible to viral diseases. Dorado and Don Silvio, released in 1990 and 1993 respectively, both have high yield potential and are tolerant to Bean Golden Mosaic Virus (BGMV), the most virulent bean disease in the low valleys.

Despite these recent technological successes, there exists little understanding of consumer acceptability of these new varieties and the impact of political and institutional factors on the overall productivity of the bean subsector. This is partly because it has been implicitly assumed that only production constraints need to be relaxed to improve the productivity of beans in Honduras. Moreover, the socioeconomic component of the national and the collaborative bean research programs is very limited. The National Research Program does not employ any trained socio-economists, and PROFRIJOL has only one economist for the Central American region. Therefore, bean scientists have very little empirical knowledge about the socio-economic characteristics of bean farmers, and their impact upon productivity.

It is important that a biological research program carry out studies directed at better understanding farmers' socioeconomic characteristics because these factors affect farmer adoption of technology and its performance in farmers' fields. Moreover, given that farmers production decisions are influenced by environmental conditions, it is important to study the performance of traditional and newly released varieties under different agro-ecological conditions. With a better understanding of both farmers' socioeconomic circumstances and the performance of new technology under different environments, researchers and policy makers will be better able to set research priorities and target policy prescriptions to relax constraints to increasing bean productivity.

In addition, the bean market has been one of the most dynamic socio-economic components affecting the bean subsector during the last five years. Price control deregulations and the implementation of the Central American free trade agreement have been the most important market policy changes since 1990. These policies are expected to generate more technological investment in the most competitive commodities produced in the Honduran agricultural sector. However, no studies have analyzed the potential effect of market interactions upon the productivity of the bean subsector. Because market forces create incentives and disincentives for producers and consumers, research is needed to better understand how market interactions affect the productivity of the bean subsector.

METHODS AND RESULTS

The results presented in this paper are based on analysis of primary data collected from 215 bean farmers in the Northeastern and Mideastern Regions of Honduras, and 57 traders in the most important urban centers of the country. As a multidisciplinary study, both plant scientists and agricultural economists were consulted in designing the questionnaires and selecting the farmers' and traders' sample. Using the 1993 Honduran National Agricultural Census as a sampling frame, farmers were stratified into small (≤ 2 has), medium (2-10 has), and large farmers (> 10 has). In addition, 51% of the farmers were selected from the flat-lands and 49% from the hill-sides.

Farmers were asked to name and identify some characteristics about the improved varieties they had planted during the 1993-1994 agricultural year. The data show that 23% and 20% of the farmers planted Catrachita and Dorado, respectively. Nonetheless, the adoption rates vary significantly across administrative region, topographical region, and farm size. A larger proportion (27%) of Mideastern farmers planted Catrachita and/or Dorado, while only 16% and 7% of Northeastern farmers planted Catrachita and Dorado respectively. These results reflect the low emphasis given to the Northeastern Region by extensionists and the research community. In the Northeastern Region farmers have less access to modern technologies than in the Mideastern Region. On the other hand, a larger proportion of Catrachita adopters are located in the hill-sides (76%) than in the flat-lands (24%). This reflects Catrachita's low tolerance to the BGMV which is more prevalent in the lower-land valleys. Finally, while only 19% of the small and medium size farmers planted Catrachita, 32% of the large farmers planted Catrachita.

Although adoption rates of improved varieties are relatively high, the yield performance of these varieties is still low compared to expectations by agricultural extension agents. The Agricultural Extension Division of the Ministry of Natural Resources expects Catrachita to yield 1.4 mt/ha, and Dorado 1.7 mt/ha. However, according to farmers records, on average Dorado only yielded 0.4 mt/ha in the rainy season and 0.7 mt/ha in the dry season, and Catrachita 0.6 mt/ha in both seasons.

At the market-level the per unit yields of Catrachita and Dorado are lower than those of some preferred traditional varieties. While traders paid farmers US\$ 0.63/kg for Seda, a traditional variety, Catrachita and Dorado only commanded a price of US\$ 0.56/kg and US\$ 0.53/kg, respectively. Taking farmers' yields and market prices of improved and traditional varieties, the data show that in the rainy season one hectare of Seda commanded a gross revenue of US\$ 270, whereas a hectare of Catrachita and Dorado commanded a revenue of US\$ 350 and US\$ 230, respectively. On the other hand, in the dry season one hectare of Seda, Catrachita, and Dorado yielded a revenue of US\$ 330, US\$ 340, and US\$ 380, respectively. Furthermore, although higher yielding, Catrachita and Dorado are not always more profitable for farmers than are some traditional bean varieties.

CONCLUSIONS:

While adoption rates of improved varieties are relatively high among Mideastern farmers, it is clear that Northeastern farmers have had less access to improved varieties. Moreover, farmers' decision to adopt improved varieties are also linked to environmental conditions. Therefore, plant breeders must continue to evaluate improved varieties under different environmental conditions. Finally, although agronomic characteristics are important in determining adoption and acceptability of improved varieties, plant breeders and extensionists must understand that market preferences have an important impact upon farmers' decision to plant new improved materials. Therefore, breeding programs must give high priority to improving consumer acceptability of new bean cultivars.