

Introduction

It is now universally agreed that a catastrophic loss of diversity in our crop plants has been taking place during the last few decades, and this process of genetic erosion is likely to continue at an even greater speed in future, due to the introduction of improved varieties; changes in agricultural land use; clearing of forests; construction of dams, canals, and roads; and expansion of cities and industrial areas. Plant breeders need this genetic diversity as a basis for the creation of high yielding, better adapted, and disease resistant varieties to help solve the problems of hunger and malnutrition.

Innovative crop varieties and the introduction of high yielding varieties are rapidly transforming traditional and peasant farm lands into fields with uniform crops. These new varieties provide a significantly higher yield or quality and have other beneficial characteristics bred into them. Unfortunately, they replace traditional cultivars and may be responsible for the elimination of around 10,000 years of evolution. Once a local traditional cultivar is totally displaced, its unique characteristics are gone forever. Future generations are, thus, deprived of genetic variation which is the basic material for any breeding programme, and, in particular, they are deprived of genetic combinations to combat the potential ravages of pests and diseases.

From more than 10,000 years ago, when primitive hunters and gatherers first developed agriculture by cultivating wild plants for food, human society and the earth's abundant plant resources have experienced a joint evolution, producing innumerable patterns of variation, especially in locally adapted plant populations used for food, textile, and fuel. Cultivated plants have the capacity to evolve rapidly. Rapid evolutionary bursts are possible only through some variation on the theme of differentiation - hybridization cycles, in which the variability already accumulated can be exploited (Harlan 1966 and 1970). Such cycles are, more or less, automatically built into the traditional agricultural system. Farmers are basically sedentary. They settle down in an area and occupy it for a long period of time. This results in an array of varieties adapted to that particular area. But, occasionally, farmers move, taking their seed stock and plant materials with them. In the new location there is an opportunity for the transported varieties to cross with the local ones. Populations separated geographically and differentiated ecologically are thus brought together where they cross and the germplasm is exchanged and the potential variability released. Seed agriculture originated in the mountainous regions of warm temperate to tropical zones with areas having very well-marked wet and dry seasons.