Chapter 15

The Successful Development of a Cash Crop from Local Biodiversity by Farmers in Sikkim, India

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Introduction

The hill farmers of Sikkim are composed of different ethnic groups - *Lepcha, Bhutia, Limbu* and *Nepalis*. They grow varieties of rice, rice beans, peas, beans, turmeric, and cardamon (Table 15.1). The major cropping systems are maize-pulse and ginger, maize-potato, paddy, and large cardamom under tree cover. The main cash crops are large cardamom, mandarin oranges, ginger, and potatoes. The first three are indigenous, whereas potato is an introduced crop.

Table 15.1: **Existing Land Races and New Varieties of Crops in Sikkim**

Crop	Altitude (m)	No. of land races grown	No of New Varieties	Commencing year of crop improvement
Maize	<2400	4	43	1978
Rice	<1800	19	60	1976
Wheat	<2200	0	34	1975
Black gram (urd)	<1000	3	75	1987
French beans	500-1600	5	93	1988
Field peas	<2200	4	230	?
Rice beans	<1800	6	4	?
Barley	800-2800	-	5	1982
Finger millet	500-1600	4	5	1982
Buckwheat	300-2500	1	None	-
Potatoes	300-2500	0	13	1979
Large cardamom	600-2000	5	None	-
Ginger	<1500	4	2	1976
Turmeric	<1500	5	4	1984

This diversity in crops and varieties is associated with specific ethnicity. The large cardamom (*Amomum subulatum*) is a good example. It is native to Sikkim where its five wild relatives, *A. linguiforme, A. kingii, A. aromaticum, A. corynostachym,* and *A. dealbatum,* are still found. The many species of cardamom now grown in Sikkim are all derived and propagated from these wild types. Farmers can recognise different varieties and their special characteristics. The common varieties maintained by farmers are *Ramsey, Golsey, Sawney, Madhusy,* and *Ramla*. The *Lepcha* tribe in the Sikkim mountains was the original custodian of this crop. This tribe identified the large cardamom in forests and domesticated it. Cardamom farming practices developed through innovative experimentation by *Lepcha* farmers. Knowledge about cultivation was gradually passed to the *Bhutia* and *Nepali* people living in Sikkim. Now cultivation of large cardamom has spread to the adjoining hills of Darjeeling, Bhutan, and eastern Nepal. Improving this technology was initiated through a farmer-to-farmer network. This crop has been doing well in terms of both varietal development and crop management without research or extension support from formal institutions.

Cardamom farming is a perennial, low-volume, high-value, non-perishable, cash crop (Sharma and Sharma 1997) and it demands less nutrients and other inputs in comparison to other crops (Sharma *et al.* 1994). By cultivating large cardamom, farmers have harnessed the mountain niche to its greatest advantage. Farmers in Sikkim have provided an example of how indigenous agrobiodiversity can be harnessed for cash cropping and have identified beneficial species, varieties, and farming practices for this crop. The crop domestication process was performed by the farming community, thus ensuring that farmers conserve and manage a large number of cardamom varieties on each farm.

There seems little danger of genetic erosion of the large cardamom as more and more farmers plant cardamom under *Alnus* forest in marginal lands. Since large cardamom is propagated by splitting the rhizomes, there is less concern for varietal loss.

The cases of turmeric and ginger are similar. Nevertheless, genetic erosion of ginger land races is becoming a possibility. The seed requirement for ginger is substantial, and much space is needed for storage. To avoid the problem of space and loss due to soft rot during storage, farmers do not keep seed rhizomes but buy them from the weekly market at planting time. Ginger cultivation requires high fertility and mulching with forest litter. In recent years, forest degradation has forced farmers to discontinue ginger farming, thus the gradual disappearance of ginger land races is a matter of concern.

Threats to Traditional Seed Systems

Sikkim is rich in local germplasms of arable crops (Table 15.1). Crops such as large cardamom and buckwheat are still grown using land races only, whereas hybrids are now used for ginger, turmeric, finger millet and barley. The land area under ginger increased by 191 per cent, and the area under potatoes by 311 per cent, between 1981 and 1992. The trend of switching over from traditional agriculture to cash crop agriculture has become obvious in the last decade. The cultivation of cash crops is leading to a decline in local crops and varieties. At present minor crops are maintained by farming households on a small scale to meet the needs of their traditional religious and food cultures. There is no longer sufficient land available for the cultivation of all crops, and farmers' preference is for expansion of cash crops. The threat to traditional crops will increase as the amount of cropland available per household is reduced.

In marginal and low-input farming systems, women have been the traditional managers of germplasm. The agricultural biodiversity that has been maintained by women, through traditional systems, has diminished with the promotion of hybrid seeds, monocropping, and changes in traditional agricultural practices.

References

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