Chapter VIII
SUMMARY AND CONCLUSION

The study of traditional agro-ecosystems and use of biodiversity is considered in present traditional agriculture from Bhor and Mahad region. Bhor and Mahad region are greatly in need in order to develop more sustainable agro-ecosystems and biodiversity conservation. These two regions are adjacent to each other and climatic conditions are more or less similar. The rain fall is 1255.5 and 5856 mm in Bhor and Mahad, respectively. The mean daily maximum temperature is 28-38°C while minimum temperature in winter season is 8°C. During mid of February to end of May there is a continuous rise in temperature from 21.4°C-41.9°C. Vegetation of the region includes tropical semi-evergreen, moist deciduous, dry mixed deciduous and scrub types. Mahad forest areas are with lower and mostly sloping hills, denser and probably smaller area under rice, thinly wooded and have a few forests. Most of the hill slopes are covered with coarse grass except in some patches. There are all types of communities like Maratha, Kunbi, Mahadeokoli, Dhanger, Harijan, Katkari, etc. Agriculture is the main occupation of most of the communities. Present survey was conducted in Bhor and Mahad tahsil of Pune and Raigad districts of Maharashtra state. A sample of 109 informants from Bhor and 74 informants from Mahad was selected. Total 41 and 35 villages from Bhor and Mahad, respectively were visited for data collection. Average population in villages surveyed is 95.9 and 94.4 percent, respectively. Most of the farmers community belongs to Maratha (82) 45%, Baudah (52) 28% and Mahadeokoli (19) 10%. All of them are playing major role in agriculture practices. Social community structure in Bhor and Mahad comprises Maratha, Kunbi and Mahadeokoli in Bhor and Katakari, Harijan, Dhangar, Bhandari and Nahvi (Barber) in Mahad region. Very few people depends on Panchag and flowering of Cassia fistula, birds noise during April and May for prediction of rainfall.

Farming practices are started in the month of April or May, Akashay Tritiya is one of the auspicious day. Only 4 informants from Mahad follow this tradition. 12 informants from Bhor region sowing rice seeds in Rohini Nakshatra and only 4 informants from Mahad depend on this Nakshatra. 46 farmers from Bhor and 13 from Mahad are not linked to month or particular day. These farmers cultivate rice and other crops on flat land, shifting cultivation, intercropping, mixed cropping and terrace farming system.
Rab is a method of burning land with three layers of plant resources. A sample of 20 farmers was selected for interview. Seven farmers opinion that it controls weeds, 8 suggest it eradicate diseases spores and available disease resistant seedlings. 8 says that vigorous growth of seedlings, 4 says that rab operation is helpful for easy uprooting of seedlings, 2 says that sturdy seedlings are obtained. Rab is also effective to sterilize soil, burn the grass seeds and develop high seed germination percentage. More than 10-20 different plant twigs, FYM, grasses and leaf litter of forest is used for rab method.

Agricultural implements are playing a major role in traditional tillage practices. Each implement functions differently and its wood strength capacity is considered while preparing implements. Science behind the selection of wood is an experience from generation to generation. These agricultural implements are plough, harrow, hoe, petari, maind, yoke, bullock cart, etc. Plant species used most commonly for making implements are Terminalia alata Heyne ex Roth, Terminalia chebula Retz., Terminalia paniculata Roth., Tectona grandis L. Acacia nilotica (L.) Wild ex Del., Bridelia squamosa Gehr, Emblica officinalis Gaertn. and Canthium diccomum (Geartn.)Teijsm., Artocarpus heterophyllus Lam., Syzygium cumini (L.) Skeels, etc. Total 59 tree resources are used for making agricultural implements and most of them are regularly used while others are used after deterioration of implements. The trees which give good return from non-timber forest produce (NTFP) are used in less quantity for implements. It is observed that once these agro-forestry trees are cut down, no replacement of new trees is done in the territory.

The composition of wood strength is important as like Bridelia squamosa (Lam.) Gehrm - Colour grey to olive brown; moderately hard to hard; seasons well; durable, stands well under water. Tectona grandis L. A strong wood of average hardness and of outstanding merit in retention of shape and durability; dry wood is having bending strength of 1036 kg/cm²; density of dry wood is 624 kg/m³; its hardness 470 kg; impact strength of teak wood is 63 cm. Mangifera indica L. Fairly strong; not very durable in exposed positions; bending strength of dry wood is 1058 kg/cm². Density of wood is 624 kg/cm²; wood hardness is 645 kg; maximum crushing strength of dry wood is 524 kg/cm²; wood stiffness is 133/1000/kg/m³; weight of wood 608 kg/m³; wood toughness is 345 cm-kg. Syzygium cumini (L.) Skeel. Moderately hard, rough, strong, durable; lasts well under water; bending strength of dry wood is 1343 kg/cm²; density of dry wood is 641 kg/m³; hardness of dry wood is 671 kg/cm²; hearing strength of dry wood is 709 kg/m²; shearing strength of dry wood is 167
kg/m². Thus local farmers consider proper wood for implements without scientific knowledge.

Conservation of land races in Bhor and Mahad region is a good practice of in-situ conservation of crop germplasm. A special emphasis needs to be developed on a wider system because these farmers are village-level landrace custodians (a farmer curator system) whose purpose would be to continue to grow a limited sample of endangered landraces native to the region.

Farmers have traditional knowledge of seed treatment, manuring, harvesting, threshing, cleaning of threshing yard with brooms, winnowing and other miscellaneous instruments require for agriculture operations. Some folk beliefs, witch crafts are associated with traditional agricultural practices. These people are using storage structures for grain storage as like Hatari and Kanagi made from plant resources. Farmers use dry plant leaves to control food grain pests. Plants like Azadirachta indica A. Juss, Tectona grandis L., Melia dubia Cav., Emblica officinalis Gaertn., Eucalyptus globulus Labillls, Tridax procumbens L. and Vitex negundo L. are used. Laboratory testing of 10 plants leaf have been observed for efficacy of different plant leaf powders and tested on the basis of their toxicity to adult beetles and effects on egg laying, hatching of eggs, percentage of loss in grain weight and progeny adult emergence. Leaf powders are tested on pulse beetle Callosobruchus maculatus. Adult mortality in Gnidia glauca powder at 5% level, followed by Eucalyptus globulus and Catunaregam spinosa leaf powder at 3% and 5% levels show positive results. Vitex negundo powder at 3% level did not show any toxicity against bruchids. Madhuca longifolia 3% and 5% and Pogostemon benghalensis at 3% showed minimum adult mortality of 3.33%. Azadirachta indica at all three levels shows remarkable adult mortality.

All the information given by local farmers regarding traditional agricultural practices with special reference to food grain management is a wealth of ancient Indian culture. Agricultural biodiversity includes species 122, genera 104, families 45 and one pteridophyte. It further classified into trees 59, shrubs 29, culms 3, fern one and climbers 2. Maximum used families are Fabaceae 17, Poaceae 14, Mimosaceae 6, Combretaceae 5, Verbenaceae 5, Rubiaceae 4, Euphorbiace 4, Lamiaceae 4.

Scientific evaluation with the help of wood quality, strength, hardness, smoothness, etc. are the parameters required for different type of agricultural implements. Traditional knowledge of food grain pest control is also supported by laboratory testing and proved that
Azadirachta indica, Gnidia glauca, Eucalyptus globulus and Catunaregam spinosa are showing positive result of adult mortality against pulse beetle. Biodiversity conservation is indeed to succeed among small farmers, the process must be linked to rural development efforts that give equal importance to local resource conservation and food self-sufficiency and/or market participation.