

7.2 Strategies and Actions for Domesticated or Agricultural Biodiversity

7.2.1 Domesticated Biodiversity: Strategies and Actions for Enhancing Understanding and Information

(Note: This chapter should be read in conjunction with the *Domesticated Biodiversity Thematic BSAP*, and the *Research and Development Work in Agrodiversity Sub-thematic Review*, prepared under the NBSAP).

Overall Strategies:

1. **Consolidate, update, and enhance information regarding domesticated biodiversity**, including both traditional and modern knowledge, the dynamics of agricultural, pastoral, and fisheries systems, the mapping of agro-biodiverse sites and landscapes, the links between cultural and domesticated diversity, the value of domesticated biodiversity for food and livelihood security, and the possible impacts of climate change;
2. **Monitor the status of domesticated biodiversity at local levels**, through participatory methods;
3. **Maintain publicly accessible databases**, at local to national levels, on domesticated biodiversity.

7.2.1.1 Strategy: Consolidate, Increase and Update Knowledge on Domesticated Biodiversity

Overall Justification: Current *formalised* information on domesticated biodiversity is inadequate, and often concentrated in a specialised circle. In addition, the rich, *non-formalised* understanding and information available with the farming communities is often ignored and undermined. There is a need to balance the formal and non-formal systems, by enhancing the understanding of agricultural biodiversity and related cultural/economic issues among all sections of society, and especially among the scientific and policy sectors. In addition, the serious degree of ignorance about the dynamics of agro-biodiversity loss, and its impacts on livelihoods, nutrition, and food security, needs to be tackled.

Simultaneously, the enormous wealth of information, knowledge and understanding of agro-biodiversity that rests in rural communities needs to be supported through systematic promotional and affirmative actions. Most of the time this knowledge gets derided and undermined to such an extent that rural people feel very defensive about this knowledge. As a consequence, much of it over a period of time faces the danger of complete extinction. Particular emphasis is needed to make the younger rural generation feel confident and proud of this knowledge that lies with their communities. In areas where knowledge and skills may have been lost, the capacity to rebuild these or acquire new knowledge to deal with changed circumstances is also needed.

In the scientific community, a new understanding needs to be built that a much larger effort is necessary in terms of conserving entire landscapes and ecosystems. Communities also need to access relevant information to bolster their confidence, such as the national and global values of local agro-biodiversity and related knowledge, and the needs and ways of protecting them.

Similarly, the need of the communities to access information and understanding on larger trends like trade, IPR, agricultural policies, global warming etc. should be met.

Actions

1. Undertake Comprehensive Surveys of Domesticated Biodiversity

Undertake an inventory of all forms of domesticated plants and animals, agro-ecosystems, and related biodiversity in India. This should include:

- i. Agricultural and pastoral ecosystems;
- ii. Traditional cultivars of crops;
- iii. Wild relatives of crop plants;
- iv. Domesticated animal breeds;
- v. Wild relatives of domesticated animal breeds;



- vi. Micro-organisms linked to the above.

This survey should also cover the key characteristics of each species/variety/breed. The survey should be built on initiatives already being taken by both governmental and non-governmental (especially community) institutions, including the ongoing assessment of crop diversity being undertaken by the National Bureau of Plant Genetic Resources. It should also attempt an integration of traditional or community taxonomic and categorisation systems of crops and livestock with modern or formal systems.

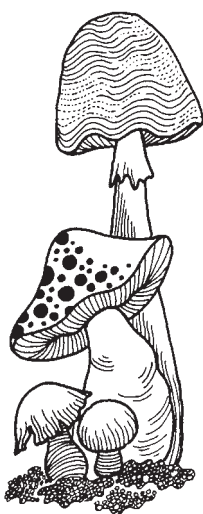
Justification: India's vast domesticated diversity has not been fully inventorised, documented, and assessed for its various characteristics. Significant efforts have been made by ICAR institutes, NBPGR, NBAGR, other institutes, NGOs and community groups, but lack of a coordinated national process and paucity of resources have constrained even these efforts. Given the rapid loss that domesticated biodiversity is facing, such an exercise is extremely critical and urgent. R&D also needs to build much more on the many important characteristics contained within India's crop and livestock diversity, including grain productivity, taste, smell, colour, drought and disease resistance, ability to grow in adverse conditions, efficiency in input use, fodder output, etc.

Suggested Responsibility: Ministry of Agriculture through ICAR and the National Bureaus of Plant, Animal, and Fish Genetic Resources, agricultural universities, Animal Husbandry Departments, and NGOs, with community institutions at the centre of the exercise. Department of Biotechnology and National Bioresources Development Board could also be associated.

Time Frame: 5 years

Steps:

- i. Collate all existing inventories and major studies on domesticated biodiversity, including those with the National Bureaus of Plant, Animal, and Fish Genetic Resources, relevant agricultural universities, agriculture/animal husbandry/fisheries departments, NGOs, and community institutions and movements such as the Beej Bachao Andolan or the community/people's biodiversity register initiatives in various parts of the country;
- ii. Create a system of integrating folk/traditional taxonomies with modern/formal ones, such that they synergise rather than contradict each other;
- iii. Ensure that such collated information is properly sourced and credited, that it is not open to misuse and theft by any party, and that all uses of the information and data are done in accordance with principles and practices of protecting the resource/knowledge and benefit-sharing rights of the communities and persons from whom they are accessed (as laid out in *Strategy 7.1.5.4*);
- iv. Identify major gaps in coverage of the above information, including the geographic and thematic gaps identified in *Chapter 6.2.1.3* (including areas such as the hilly regions of north-eastern India, the shifting cultivation areas of north-eastern, central, and western India, the diversity grown/used in 'marginal' areas including wetlands, deserts, and mountains, the diversity used by nomadic communities, the dynamics of multiple cropping, crop-livestock-fisheries-forestry combinations, macromycetes and other micro-organisms that are part of agricultural practices, etc.; see also *Domesticated Biodiversity Thematic BSAP*, and the *Research and Development Work in Agrodiversity Sub-thematic Review*);
- v. Undertake, through or with full involvement of local communities, further surveys and documentation of domesticated biodiversity to fill the gaps identified in *Chapter 6.2.1.3*, and those listed in (iv) above; this should include participatory germplasm characterisation and evaluation (see *Research and Development Work in Agrodiversity Sub-thematic Review*);
- vi. Update the collation done earlier, on a regular basis, and integrate into local, state, and national level databases (see *Strategy 7.2.1.3*).



Ongoing Relevant GOI Schemes/Programmes:

- Department of Biotechnology: (i) Conservation of Endangered Species, (ii) Germplasm characterisation, and (iii) Medicinal and Aromatic Plants programmes.

- National Bureau of Plant Genetic Resources: (i) Exploration and Germplasm Collection, and (ii) National Herbarium on Cultivated Plants, under Division of Plant Exploration and Collection; (iii) National Centre for DNA Fingerprinting, (iv) National Genebank, and (v) Indian National Plant Genetic Resource System programmes.
- The initiative 'Digital Inventorisation' project of the National Bioresources Development Board under Department of Biotechnology and NBPGR.

2. Document and Disseminate Indigenous Knowledge, Practices, and Technologies Relevant to Domesticated Biodiversity

Undertake a comprehensive survey of indigenous and traditional community knowledge, practices, and technologies relevant to domesticated biodiversity. This should be a dynamic, ongoing documentation, carried out by communities themselves and linked to their ongoing livelihood strategies, facilitated by formal institutions. In particular, successful initiatives at conserving and promoting domesticated biodiversity, and linking this to livelihoods and food/nutritional security, should be thoroughly documented and highlighted.

Justification: The enormous wealth of information, knowledge and understanding of agro-biodiversity that rests in rural communities needs to be supported through systematic promotional and affirmative actions if we want this knowledge pool to stay alive. Most of the time this knowledge is derided and undermined to such an extent that it makes rural people feel very defensive about this knowledge. As a consequence, much of it lies subaltern, and over a period of time faces the danger of complete extinction. Particular emphasis is needed to make the younger rural generation feel confident and proud of this knowledge that lies with their communities. In areas where knowledge and skills may have been lost, the capacity to rebuild these or acquire new knowledge to deal with changed circumstances is also needed.

Suggested Responsibility: Community institutions including forums and associations of farmers, pastoralists, fisherfolk and forest-dwellers, as also the Biodiversity Management Committees to be established under the Biological Diversity Act, facilitated by ICAR's institutions, the National Bureaus of Plant, Animal, and Fish Genetic Resources, state agricultural universities, Department of Biotechnology, Ministry of Tribal Affairs, Krishi Vigyan Kendras and Agricultural Technology Information Centres in various parts of India, NGOs, etc.

Time Frame: 5 years

Steps:

Modified from Action 1 above. This exercise should be part of the Community/People's Biodiversity Register initiative (see Section 7.2.6.2, Action 4). Case studies that focus on indigenous knowledge and technologies must be carried out in all agro-ecozones.

Ongoing Relevant GOI Schemes/Programmes:

- The programme on 'Awareness Generation among Tribal and Rural Youth, General Public and School Children' of the National Bioresources Development Board, Department of Biotechnology.
- i. Training Programme and information Services project of the NBPGR.
- i. NEAC ii. Mass Awareness Campaign under Non-formal Environment Education and Awareness programme of MOEF.
- Information and Mass Media of Ministry programme of the Tribal Affairs. Modification would have to be made in the programme to include the above steps.
- Projects under Training, Capacity Building and Awareness Generation Projects of the Department of Biotechnology.

3. Expand Knowledge on the Dynamics of Crop and Animal Genetic Diversity Systems

Undertake studies, in representative agro-ecological zones, of the dynamics of domesticated biodiversity. In particular, the following should be focused upon:



1. Multiple production systems maintained by communities, or initiated by other institutions, that combine crops, livestock and poultry, forestry, fisheries, and other land/water or resource uses;
2. Multiple and inter-cropping practices;
3. Dynamics of soil, water, and atmosphere in relation to domesticated biodiversity, including adaptability of specific species/varieties/breeds to specific conditions.

Justification: Much is uncertain and unknown about the structure and multiple function of crop and animal genetic diversity. Knowledge is still rudimentary about the functions of biodiversity, as linked to synergies and interactions within agro-ecosystems, and ecological processes within soils and with the atmosphere and water. Over the past few decades and continuing into the 21st century, formal agricultural research and development (R&D) in India has predominantly focused on a narrow definition of productivity and on intensive-input agriculture. It has tended to ignore or only weakly deal with agro-biodiversity and sustainable farming and animal husbandry issues. The complexities of agricultural systems, including systems of mixed cropping and integrated crop-livestock-forest-fisheries production, generally do not find a place in the research agendas of the agricultural establishment. Many traditional varieties are yet to be fully screened for their usefulness in specific conditions. The dominant approach also often does not recognise the wider issues of people's livelihoods and community control over their resources. In recent years, even the stated 'public purpose' orientation of agricultural R&D is beginning to get eroded, with increasing focus on hybridisation and genetic engineering to the exclusion of other options, and an increasing trend towards privatisation or private-sector funded R&D. Many agricultural universities are having to depend more and more on corporate (often foreign) funding, and are therefore likely to move further away from a public service focus (*also see Research and Development Work in Agrodiversity Sub-thematic Review*).

Suggested Responsibility: Ministry of Agriculture, through relevant ICAR institutions, in collaboration with universities, NGOs, state agricultural departments, community institutions and individual farmers/pastoralists.

Time Frame: 5 years for a representative sample of sites; ongoing for the other areas.

Steps:

Supportive studies on dynamics of crop genetic resources of the country are to be initiated. The pattern of distribution of land races in agro-ecosystems needs to be understood, with sufficient budgets to be allocated towards such studies that evolve information and knowledge towards genetic diversity and its conservation. Advanced techniques such as GIS and computer-based formats should be adopted in generation and management of such information and knowledge.

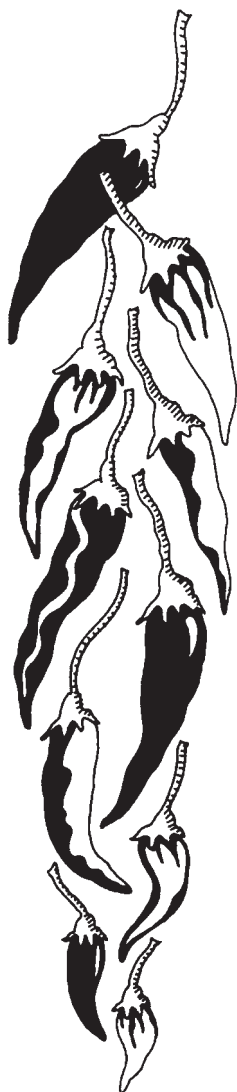
The above steps could be linked to the ongoing research programme of NBPGR.

4. Identify, Map and Study Hotspots of Domesticated Biodiversity and Critical Cultivated Landscapes

Identify and undertake mapping and research in the regions that are considered to be critical for domesticated biodiversity, and integrate them into the Biodiversity Atlas of India (proposed in *Section 7.1.1*). This should include:

- i. Regions with *adivasi* or other populations that are sustaining a large diversity of domesticated plants and animals, including those listed in *Section 7.2.2.1, Action 1*;
- ii. Areas that are critical for crops that have originated in India, either for the continued cultivation of these crops, and/or for the conservation of their wild relatives (*see Chapter 4.1.4*);
- iii. Larger biodiversity-rich landscapes that are 'cultivated' by local communities (*see Section 7.2.2.1*);
- iv. 'Marginal' areas and ecosystems that have uniquely adapted domesticated biodiversity, such as wetlands, high mountains, deserts, and coasts.

Justification: While there is considerable attention to biodiversity hotspots for wild animal and plant diversity, there is no corresponding focus on regions or landscapes that have high or unique domesticated biodiversity. Some of these may well overlap with wild biodiversity hotspots (in particular many *adivasi* areas), but this is not necessarily the case. Such areas may have the last large-scale repositories of indigenous domesticated biodiver-



sity left, as also vital knowledge and cultures related to this diversity, from which the rest of society could learn a great deal. Research on such areas is therefore vital.

Suggested Responsibility: As in Actions 1 and 2 above, with mapping support from the National Bureau of Soil Survey and Land Use, Indian Institute of Remote Sensing, and National Remote Sensing Agency in association with the Ministry of Agriculture.

Time Frame: 5-10 years.

Steps:

- i. Put together available information on the centres of origin and diversity of crops and livestock in India, and plot these regions on the agro-ecological zones map of India; use also the data emerging in Action 1 for this exercise;
- ii. Undertake detailed assessments of the current status of domesticated biodiversity in these areas, the continuing threats as also available opportunities for conservation, and the traditions and capacity of local communities to sustain the diversity.

Ongoing Relevant GOI Schemes/Programmes:

All India Soil and Land Use Survey Schemes (AISLUS) scheme under Natural Resource Management component of the Ministry of Agriculture.

- Landscape and Biodiversity Characterisation project under Bioprospecting and Molecular Taxonomy, Department of Biotechnology.
- National Natural Resource Management System project of the Ministry of Environment and Forests.
- Natural Resources Data Management System (NRDMS), Department of Science and Technology.

5. Assess the Value Provided by Indigenous Domesticated Biodiversity to the Agricultural, Health, and Livelihood Security of the Country

Calculate, in quantitative and qualitative terms, the full value of the contribution that indigenous domesticated biodiversity has provided and continues to provide to various sectors of India's economy and society; in particular, the contribution to the agricultural sector, health sector, and to livelihood security. Integrate this value into planning and budgeting of the agricultural (and agriculture-related) sector.

Justification: Though indigenous domesticated biodiversity has been the backbone of agriculture and pastoralism in India, and though its contributions to even modern-day agriculture and animal husbandry are substantial, there is no overall estimate or study available of what this contribution amounts to. In the absence of such an estimate, or range of estimates, domesticated biodiversity continues to be under-valued in decision-making circles. There is therefore a need to make such an assessment, and to mainstream it into decision-making.

Suggested Responsibility: National Bureaus of Plant and Animal Genetic Resources, with farmer experts and networks, relevant NGOs, National Institute of Nutrition, National Food Technology Research Institute, etc., with facilitation by the Ministry of Agriculture, Ministry of Health, and MoEF.

Time Frame: 3 years

Steps:

- i. Prepare a methodology, sufficiently flexible to allow for local adaptation, to assess the contribution of agrobiodiversity to various aspects of health, nutrition, agriculture, and livelihoods; this methodology should contain both folk/community parameters/indicators of valuation, and those developed by formal sector scientists;
- ii. Orient a wide range of actors, including KVK personnel, agricultural extension workers, farmer groups etc. to this methodology of assessment;
- iii. Carry out participatory assessment at a representative set of sites and communities, and project from these to obtain state and national level values;



- iv. Build the values into local, state, and national plans and budgets, through natural resource accounting/budgeting methods.

6. Assess the Possible Impacts of Climate Change on Domesticated Biodiversity, and the Role of Such Diversity as a Coping Strategy

(See also Strategy 7.1.1.1, Action 8)

Study, through the most appropriate methodologies, the possible impact of climate change on domesticated biodiversity (and consequently on farmers and pastoralists and fisherfolk), and on wild relatives of crops and livestock; also study the possible role of such diversity as a coping strategy against the unforeseen events likely to be caused by climate change and global warming. The possible spread of alien or other invasive species also needs to be carefully assessed.

Justification: The understanding of how human-induced climate changes are going to affect domesticated biodiversity is rather poor. Some studies have been done (see Box 5.9), but these are far from adequate. It is also not clear how these studies have integrated, or built upon, indigenous and traditional knowledge that may be of use in assessing the impacts, and in evolving coping strategies.

Suggested Responsibility: MoA and MoEF, in collaboration with remote sensing institutions, Indian Institute of Science, TERI, and other relevant national level institutions and NGOs that are involved in climate change issues.

Time Frame: 5 years, and ongoing thereafter.

Steps:

- i. Collate available studies on the possible impact of climate change on agriculture, and on potential coping strategies;
- ii. Study traditional coping strategies of farmers, in the face of sudden or gradual changes in the environment; in particular, assess the role of agro-biodiversity in these coping strategies;
- iii. Undertake modelling on the basis of the above, to attempt prediction of impacts and recommendations of coping strategies in different agro-ecological conditions.

7.2.1.2 Strategy: Monitor the Status of Domesticated Biodiversity Across India

1. Monitor the Status of Domesticated Biodiversity at the Village Level

Undertake participatory monitoring, at regular intervals, of the status of domesticated biodiversity at the level of each village, including the threats it faces; integrate this in the maintenance of Revenue Record Books and into the emerging practice of Community/People's Biodiversity Registers.

Justification: At present there is absolutely no monitoring of the status of domesticated biodiversity in India, as a result of which considerable loss takes place without anyone noticing, or without it being highlighted. Continuous monitoring could be used for taking urgent action when a serious decline in diversity is noticed.

Suggested Responsibility: Local community institutions and revenue or agricultural departments, with facilitation and capacity-building by institutions like the National Bureaus of Plant, Animal, and Fish Genetic Resources, state agricultural universities, Krishi Vigyan Kendras, and relevant NGOs and user groups.

Time Frame: Set mechanism into place in one year; ongoing thereafter.

Steps:

- i. The revenue books kept by village development officers, in which a seasonal record of crops and livestock grown in each village is kept, should also include entries on the varieties being grown over a period of time. This would be one of the tools for continuous and effective monitoring of the status of diversity in each village;



- ii. This exercise could also be done for, or within, the Community/People's Biodiversity Register process (see *Section 7.2.6.2, Action 4*);
- iii. For the above purposes, orient and train agricultural extension workers, relevant NGO members, and community members;
- iv. The exercise could also be used to generate an early warning system for the loss of agro-biodiversity.

7.2.1.3 Strategy: Create and Maintain Databases of Domesticated Biodiversity

Adapt actions from *Section 7.1.1.2*. In addition, MoEF along with MoA to designate ENVIS centres for agro-biodiversity, to be housed in NBPGR, NBAGR, and NBFGR (with their respective mandates for crops, livestock, and fish), but as independent entities with management committees that include community organisations like Beej Bachao Andolan and relevant NGOs.



7.2.1.4 Strategy: Enhance Understanding of the Links Between Cultural Diversity and Domesticated Biodiversity

Adapt actions from *Section 7.1.1.3*

7.2.2 Domesticated Biodiversity: Strategies and Actions for *In Situ* Conservation

Overall strategies:

1. **Conserve landscapes, waterscapes, and sites that have significant levels of domesticated biodiversity**, through their declaration as agro-protected areas and the provision of appropriate incentives and measures including participatory crop/livestock development; these would include large regions such as the central drylands, as also single farms or farm clusters with exceptional diversity (hotspecks);
2. **Encourage the use and conservation of non-cultivated foods**, as an important element of the interface between domesticated and wild biodiversity, and a critical part of the food security of poor people;
3. **Encourage the creation of a national network of domesticated biodiversity initiatives**, possibly to evolve into a National Federation of Organic and Biodiverse Agriculturists;
4. **Take special measures for the conservation and revival of threatened taxa** of indigenous crops, livestock (including poultry), and pets;
5. **Revive, where eroded, domesticated biodiversity**, including in Green Revolution areas, through a mix of appropriate incentives and disincentives;
6. **Encourage existing home/kitchen gardens, and create a network of new ones**, as a special measure to conserve domesticated biodiversity and enhance the livelihood security especially of women;
7. **Tackle non-utilisation threats to domesticated biodiversity**, including alien invasive species, diseases/epidemics, and genetic pollution;

7.2.2.1 Strategy: Conserve Biologically Diverse Cultivated and Husbanded Landscapes and Sites

Justification: *In situ* conservation efforts in biodiversity need a landscape approach (see also *Section 7.0.1*). Efforts to reward a farmer or two, or find one or two institutions to work on agro-biodiversity, or offer a few incentives to a few farmers will not suffice. Serious conservation needs more initiatives like conserving entire cultivated or husbanded landscapes which have high or critical domesticated biodiversity.

Box 7.2.2.1 Cultivating Landscapes: The International Focus

Initiatives to conserve cultivated landscapes, or landscapes with cultivation as a major land use, are under way in many parts of the world. The new perception of Multi-Functional Character of Agriculture and Land Use (MFCAL), which is actively promoted by the FAO, encourages this. It argues that agriculture is not only an issue of crop production but also conservation of an entire landscape. A similar focus is contained in the biosphere reserve concept as promoted by UNESCO, and now the Ecosystem Approach promoted under the Convention on Biological Diversity. People's initiatives have already established such landscapes, e.g. the Potato Parks of the Andean communities (discussed at the *National Workshop on Biodiversity and Protected Areas*, Cuyo Grande, 26 March, 2002); or the farm landscapes in the United Kingdom.

Sources: Pimbert 1999; www.andesperu.org; A. Argumedo, personal communication 2002



Actions

1. Declare and Conserve Domesticated Landscapes and Agro-Biodiversity Hotspots (Agro-Protected Areas)

Take measures to conserve and sustainably use landscapes that contain significant domesticated biodiversity components and agro-ecosystems, including semi-natural ecosystems managed by human communities, wetlands used for fisheries, and other such land/water uses. These should include the following (this list is only indicative; see also *Domesticated Biodiversity Thematic BSAP*):

- i. the contiguous areas in the Deccan plateau, which stretch across the Telangana belt in AP, North Karnataka and the Marathwada region of Maharashtra (millets and pulses, cattle);
- ii. the central Indian *adivasi* landscape which stretches from the northern Telangana districts of AP to Chandrapur in Maharashtra, the northwestern forest belts of Orissa and a large part of central MP and southern Chhattisgarh (rice and millets, poultry);
- iii. the shifting and terraced cultivation hilly regions of the north-eastern Indian states (several crops and animals including fruits, mithun, yak etc.);
- iv. the mixed cultivation valleys of Assam, Manipur, and Arunachal Pradesh;
- v. the fields and plantations of the Western Ghats (spice, paddy, hill cattle);
- vi. the terraced and valley fields of the Western Himalayan foothills and mid-hills, including in Uttaranchal and Himachal Pradesh (beans, paddy, millets, maize, hill-adapted livestock);
- vii. the pasturelands of Ladakh and Lahaul-Spiti, Kachchh, western Rajasthan, the Western and Eastern Ghats, the Eastern Himalaya, and the Western Himalaya (indigenous livestock breeds including camel, cattle, goat, sheep).

Conservation measures should include legal steps, economic and social incentives (like conservation bonuses, see *Strategy 7.2.9.2, Action 1*), and steps to empower farming and pastoral communities to manage the landscape.

Justification: The biodiverse regions in Indian agriculture offer natural clues for a comprehensive landscape approach. Many of the above regions, for instance, are 'humanized' natural landscapes, where existing biodiversity can be strengthened and enhanced even while reviving the lost diversity, and where cultural associations with nature and agriculture can be a critical base for conservation and sustainable use. Providing these regions with a special status will also help in the objective of conserving wild biodiversity, as such areas could be vital corridors or refugia for threatened species, or where threatened species like the wolf and the bustard have adapted and become dependent on traditional pastoral and agricultural practices. Finally, many of these are also important for protecting the historical heritage of India and perhaps even promoting ecotourism, e.g. the Bahmani trails in the Deccan and the Gondvana trails in the central belt can be coterminous with agro-biodiversity belts.

Suggested Responsibility: Ministries of Agriculture, Environment and Forests, Department of Biotechnology, Department of Science and Technology, along with relevant state government departments and NGOs working on agriculture, and through District Planning Committees, local community institutions etc.

Time Frame: 2 years for declaration of the areas, 5 years to set management plans into motion.

Steps:

[Overall: 'Policies and programmes to prevent the transfer of prime agricultural land (important for biodiversity and sustainability of agriculture) to non-agricultural purposes' (MoEF's National Policy and Macro-level Strategy on Biodiversity)]

- i. Declare the regions listed above (and other similar ones) as Ecologically Sensitive Areas under the Environment Protection Act, or as Biodiversity Heritage Sites under the Biological Diversity Act;
- ii. Prepare a Regional Landscape Plan for each of these regions, with farming and pastoral community associations and forums (and especially women and other underprivileged sections within them) as the central planning agents;
- iii. Prohibit large-scale development projects (mining, dams, industries, ports, urban growth, infrastructure, etc.) that are destructive of agro-ecosystems and domesticated biodiversity, in these regions;

- iv. Provide special social and economic incentives for conservation and sustainable use of domesticated ecosystems and species in these regions, such that the residents and users are not deprived of legitimate developmental benefits (see Section 7.1.2.3, Action 2 and 7.2.9.2 for incentives); in this pay special attention to the needs and rights of women and other underprivileged sections;
- v. Develop, on an experimental basis, a few regions for genuine ecotourism, managed by the local farming and pastoral communities after appropriate capacity-building (see also Section 7.2.4.4, Action 2);
- vi. Study the use of such regions as corridors and refugia, or other forms of supportive landscapes, for wild plants and animals, and integrate further incentives to enhance such features;
- vii. Create special management arrangements for these regions, akin to the authorities or other institutional structures being proposed under Section 7.0.3; these should build on existing or new associations of farmers and pastoralists, and keep in mind the special rights and needs of women, small-scale farmers and pastoralists, and nomadic pastoralists.

2. Conserve Outstanding Sustainable Farms as 'Agro-Biodiversity Hotspots'

Encourage and facilitate the continuation of individual farms or farm clusters, or pastoral sites, that show very high or significant levels of biodiversity and sustainability; recognise such sites as 'agro-biodiversity hotspots'. These could be fields belonging to individuals, communities, institutions like the armed forces and religious bodies, academic institutions, and government agencies such as agricultural R&D units. Care needs to be taken to concentrate on small and marginal farmers, who have been the custodians of biodiversity, and who would be encouraged by social recognition, and other incentives like conservation bonuses. It is particularly important that such a programme is not cornered by large-scale commercial farms owned either by big farmers or commercial/corporate houses.

Justification: Across India, there are a very large number of innovative farms and pastures, carrying on from tradition or initiated recently, which could be excellent models for biodiverse, sustainable farming and pastoralism. Such innovative sites and their practices need recognition and support to continue, and to inspire other similar initiatives.

Suggested Responsibility: PRIs, farmer/pastoral associations, relevant NGOs along with local agricultural and district level authorities, with help and guidance from NBPGR, NBAGR, NIF, and networks like the South Asian Network for Food, Ecology, and Culture (SANFEC).

Time Frame: Ongoing, with an annual target of identifying and supporting at least 50 such farms every year.

Steps:

- i. Circulate a letter amongst knowledgeable individuals and groups, and to all state agricultural establishments, requesting information on farms/pastures with innovative or important agro-biodiversity initiatives; these could belong to farmers/pastoralists, communities as a whole, government agencies such as agricultural universities, and institutional areas such as those with the armed forces, religious institutions, etc. However, the predominant focus should be on small and marginal farmers, including women farmers.
- ii. Use also existing documentation and databases, including those mentioned in the *Domesticated Biodiversity Thematic BSAP*, sourcebooks by the Other India Press and others, etc.;
- iii. NBPGR or MoA to set up an independent team consisting of farmer/pastoral groups, relevant NGOs, and officials, to screen the incoming information, and recommend support measures for the deserving initiatives; such measures could include financial, social or other appropriate incentives, as also declaration as Biodiversity Heritage Sites under the Biological Diversity Act if the concerned farmer/community willingly agrees to such a designation;
- iv. PRIs, farmer and pastoral associations, and NGOs, to identify farmers maintaining agro-biodiversity hotspots, and support such initiatives or recommend them to the government for support;
- v. Carry out case study documentation of these and other 'agro-biodiversity hotspots', for widespread circulation;
- vi. Facilitate exchange visits amongst the farmers and pastoralists who are involved with these initiatives, and orientation/learning visits from others to these sites.



3. Promote Use and Conservation of Uncultivated Foods

Promote the use and conservation of uncultivated foods, in particular wild and semi-wild plants that are important sources of nutrition and supplemental food, across the landscape/waterscape.

Justification: In view of the fact that uncultivated foods are a part of biodiverse agricultural landscape, their conservation is also an argument for agro-biodiversity. As discussed in *Box 7.2.2.2* below, this effort can help communities regain control over their food resources. It is well known that uncultivated foods have always helped communities to cope with stress periods, and that even otherwise such foods are critical for the survival of underprivileged sections including women amongst them. But less discussed is the fact that they have also supported a farming system dominated by food crops. As one study in Bangladesh suggests, there is an inverse relationship between the cultivated and the uncultivated systems. The study points out that when the cultivated sources decrease, uncultivated sources increase, thereby offering food cushions to people.

Suggested Responsibility: Community groups and PRIs, state Agriculture and Forest Departments.

Box 7.2.2.2 Uncultivated Plants for Food Security and Livelihoods

Terms like food security have become politically loaded today. Globally the word has been heavily distorted to mean making food available to people through trade, obliterating all discussions on issues like the location where it is grown, its quality and safety, how many food miles it travels, and whether it is culturally and socially acceptable to the local communities.

The term food miles refers to the distance travelled by food from the site of production to the site of consumption. The shorter the distance, the better it is and vice versa. The most worrying food mile in India is the distance rice produced in Punjab travels to its consumption points in Kerala - nearly 4000 km. This not only diminishes the food production abilities of a region which has to depend upon another region for its food supply, but also requires drastic changes in food habits. Mizoram complains that it is capable of producing the rice it needs, but the local agriculture does not get any support, whereas it receives rice under PDS from distant Punjab at an enormous cost of transportation and storage (Proceedings of the Workshop on PDS and Food Security, National Institute of Rural Development, Hyderabad, August 2000).

In a subversive manipulation of the term, food security has often been used as an instrument to destroy local agriculture and livelihoods. Global food security, a concept that is used in opposition to household food security, has brought about serious aberrations in South Asia. A poignant example of this was witnessed in 2001 in India: even while state godowns were struggling with their inability to store 60 million tonnes of excess grains produced in the country, much of which was allowed to rot, people in some parts of the country were trying to stave off hunger by eating dried mango kernels. They simply did not have the purchasing power, nor had they ever been facilitated to regain their food self-sufficiency through locally available resources. Many of them met their death in this process (Satheesh 2001).

It is to confront this insensitive food politics and to restore people's access and control over their own food security that one needs to look at the role of uncultivated foods and the essential farming landscape within which such foods survive.

The presence of uncultivated foods in the farming landscape also restores the nutritional security, which is left out deliberately in the political debates on food security. In South Asia, general estimates suggest that about 30% to 60% of the nutrition of several communities comes from uncultivated sources (Development Perspectives 2001).

Therefore, the way to understand agro-biodiversity is to look at:

- i. The survival of people's agriculture on its own inherent strengths
- ii. Assured food security within the local and community resources
- iii. Food and nutritional security as elements of the same farming system

4. Create a National Network of Domesticated Biodiversity Conservation Initiatives

Encourage the creation of a National Network of Domesticated Biodiversity Conservation Initiatives, consisting of community level groups and networks, agricultural universities and institutions doing innovative work in this

area, relevant botanical and gene bank centres, and other relevant institutions. This Network should function independently, though with support from the government.

Justification: While there are thousands of initiatives at domesticated biodiversity conservation in various sectors, there is little active exchange of experiences and expertise amongst them. Some local or regional networks do exist, especially at farmer and NGO level, but these cover a small percentage of the initiatives. A national network, building on local, state, and regional networks, would therefore fill a critical gap.

Suggested Responsibility: Farmer and pastoral networks and organisations that are working on organic farming and domesticated biodiversity, with support from the MoA, the Planning Commission, relevant ICAR institutes, state Agriculture and Animal Husbandry departments, and relevant NGOs.

Steps:

- i. The proposed Committee on Agro-biodiversity, in the National Biodiversity Authority under the Biological Diversity Act 2002, to facilitate participants of the NBSAP process and others working on this subject (including the 'Using Agricultural Diversity network' of SANFEC) to initiate such networking; overall responsibility for coordination could be given to a national-level institution or NGO with a strong community base;
- ii. Establish state-level networks, feeding into the national network;
- iii. The network could receive some seed money from the proposed National Biodiversity Fund or other such source, but needs to eventually generate its own resources to remain independent;
- iv. The network could evolve into a National Federation of Organic and Biodiverse Agriculturists, and should be given membership in all national- and state-level agricultural policy bodies;
- v. The network/federation should work towards promoting the concept of biodiversity in agriculture among farmers, educational institutions, agricultural universities, and government departments.



7.2.2.2 Strategy: Conserve and Reintroduce Threatened Domesticated Biodiversity

Actions

1. Conserve and Reintroduce Threatened Indigenous Taxa of Crops

Take legal, administrative and incentive-based measures to conserve threatened species and varieties of crops and associated micro-organisms. Add to this the status surveys to be taken up under *Strategy 7.2.1.1, Action 1*. Build on the ongoing initiatives to conserve domesticated taxa, undertaken by government agencies, NGOs, and communities, some of which are mentioned in Chapter 6.2.2.2.

Justification: Several species and varieties of crop diversity are threatened to various degrees, with some of them close to extinction. While complete status surveys of these do not yet exist, there is enough information to warrant emergency action for a number of them. In some of these cases, there are already ongoing initiatives, which need to be strengthened, and in other cases the initiatives may need to be newly undertaken.

Suggested Responsibility: Local community institutions and networks like the Beej Bachao Andolan, *Jaiv Panchayats*, and the AP Coalition in Defence of Diversity, with support from MoA, state agriculture department, National Bureau of Plant Genetic Resources, and NGOs working in this field.

Time Frame: Put into motion the conservation efforts within two years, and ensure all threatened taxa are covered within 10 years.

Steps:

- i. Spread information on the threatened taxa, identified under *Strategy 7.2.1.1*, or in other documents amongst the general population and specialised sectors including farmers, agricultural officials, relevant institutions, NGOs etc.;



- ii. List all such taxa as protected under a relevant legislation, such as the Biological Diversity Act;
- iii. Phase out direct threats to the survival of each of these taxa, including for instance, the spread of hybrids and monocultures, the disruption of growing and migration conditions, the destruction or diversion of their agro-ecosystems, and others as enumerated in Chapter 5;
- iv. Ensure that the tenurial, resource availability-related and cultural conditions under which farming communities have evolved and maintained these taxa are revived, strengthened, and guaranteed (*see also Section 7.2.5 below*);
- v. Provide special incentives, both social and economic, for farmers who are maintaining such taxa, especially if they are incurring opportunity costs in doing so (*see also Section 7.2.9.2*);
- vi. In cases where the localised populations of any of the taxa have gone down drastically, reintroduce them from other suitable locations, or from *ex situ* collections (*see actions regarding repatriation in Section 7.2.3*); this would also require a search for what is in these collections.

Ongoing Relevant GOI Schemes/Programmes:

- Exploration and Germplasm Collection, (b) National Genebank, (c) the Indian National Plant Genetic Resource System, of the Division of Plant Exploration and Collection, under National Bureau of Plant Genetic Resources.
- Biodiversity Conservation sub-programme under Conservation of Natural Resources programme of the Ministry of Environment and Forests.

2. Conserve Threatened Livestock (Including Poultry) Breeds

Take legal, administrative, and incentive measures to conserve threatened species and breeds of livestock, including poultry. Add to this the status surveys to be taken up under *Strategy 7.2.1.1, Action 1*. Build on the ongoing initiatives to conserve domesticated taxa, undertaken by government agencies, NGOs and communities, some of which are mentioned in *Section 6.2.2*.

Immediate attention is needed for cattle breeds like Ponganur, Vechur, Ongole, and Amritmahal, indigenous camel breeds, poultry breeds like Aseel, Kadaknath, Chittagang, Maly, etc. (*see Domesticated Biodiversity Thematic BSAP; see also Box 7.2.2.3*).

Suggested Responsibility: Community institutions, livestock and pastoralist interest groups such as the Lokhit Pashu-Palak Sansthan (LPSS) and ANTHRA, livestock breeding centres, with support from MoA, state animal husbandry departments, the ICAR institutes set up for the purpose (e.g. for the yak, camel and mithun), and the NBAGR.

Time Frame, and Steps: As in Action 1 above. Additionally, also update the breed surveys across the country, to complete a comprehensive breed inventory based on both local traditional knowledge and formal sector scientific assessments (*see also Box 7.2.2.3*).

Box 7.2.2.3 Conserving Threatened Livestock Breeds

(Recommendations from some BSAPs)

- The **Chhattisgarh State BSAP** advocates conservation of domestic livestock for the economic well-being of the poor, through incentives and subsidies for upkeep and alternate usage of local breeds, people's participation in Breed Societies, Associations, Breed Survival Trusts and NGOs, and setting up state-level Livestock Conservation Boards/Conservation Units. Specific breeds such as the Aseel poultry have been mentioned for Bastar, taking up recommendations made in the **Central Forest Ecoregional BSAP**.
- The **Goa State BSAP** indicates the need for the 'Animal Husbandry Department to have a cell that initiates programme for conservation of local breeds, and use of such gene pools as a base for improvement of breeds.'

- The **Madhya Pradesh State BSAP** proposes the 'need to establish pilot sites for on-farm conservation of indigenous livestock breeds like Malwi/ Nimari and Kenkatha', and the need for regeneration of endangered breeds.
- The **Punjab State BSAP** suggests the establishment of Breeding Centres for rare and threatened species.
- The **Rajasthan State BSAP** mentions the need to develop a 'programme of incentives encouraging cultivation of local species and varieties of crops, livestock, fish, fruits and vegetables, especially those that are being forgotten or abandoned.'
- The **Kachchh Sub-state Site BSAP** states the need for 'documentation of success stories of farmers who are practicing traditional systems of cropping, organic farming, breeding of indigenous livestock breeds. Create awards and rewards systems for farmers for more diverse farms, cultivation of indigenous varieties of crops, adoption of organic farming, innovative crop protection techniques, livestock breeding, etc.'
- The **Uttara Kannada Sub-state Site BSAP** has a strategy for the conservation of indigenous livestock breeds, including the Malenadu Gidda and the Gowli buffaloes.

3. Conserve Threatened Domesticated Pet Breeds

Take incentive-based and other measures to encourage the propagation and revival of threatened indigenous breeds of pets, in particular dogs. Take as a starting point the list of dog breeds mentioned by Somani (1963) (see Table 4.20, and Section 5.1.2.2), and others that may be listed as part of the status survey of domesticated biodiversity under Section 7.2.1.1, Action 1 above (see also *Domesticated Biodiversity Thematic BSAP*). Particular attention is needed for breeds that are nearing extinction, such as the Tibetan mastiff (see *Sikkim State BSAP*), the Kombai, the Banjara, and the Santal hound (see Sections 5.1.2.2, and 6.2.3.2).

Justification: With the widespread introduction of exotic breeds of dogs, indigenous breeds have been wiped out or severely threatened all over India. There is no comprehensive national initiative towards reversing this trend. Since dogs are essentially in the domain of households, special efforts are needed to encourage their propagation by citizens.

Suggested Responsibility: The Kennel Club of India, and kennel clubs in various states, along with individual breeding centres, interested individuals and community groups (including adivasi and nomadic communities that maintain indigenous dog breeds).

Time Frame: Cover all such breeds within 5 years.

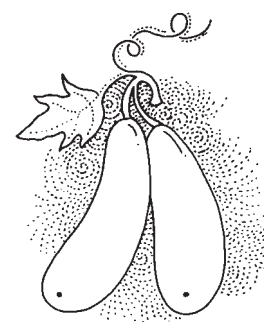
Steps:

Similar to those for Action 1 above, with modifications for the unique position of pets; add actions relating to households/families. Also:

- Document, highlight, and support the sporadic individual efforts to promote indigenous breeds, e.g. through the Kennel Club of India, the North Eastern Kennel Club established mainly to conserve the Himalayan breeds, the Dog Breeding Unit at Chennai, etc. (see Ch.6.2.3.2);
- Facilitate and encourage kennel clubs and other centres to take up breeds not yet dealt with, including those mentioned above, the Rampur and Mudhol hounds, the Himalayan breeds, and others; .
- Encourage and provide incentives to communities, including nomads, who are continuing to keep indigenous breeds such as the breeds mentioned above .

Ongoing Relevant GOI Schemes/Programmes:

National Institute of Animal Welfare under Animal Welfare Division, MoEF.



7.2.2.3 Strategy: Promote *In Situ* Conservation through Participatory Crop and Livestock Development

Actions

1. Promote Participatory Crop and Livestock Development

Undertake measures to promote *in situ* conservation of domesticated biodiversity, through participatory crop and livestock breeding and development, centred around farmers (especially small and marginal, and women farmers), and building on traditional or community knowledge. In so doing, build on the ongoing initiatives by community institutions, NGOs, and the National Bureaus of Plant and Animal Genetic Resources (see also *Research and Development Work in Agrodiversity Sub-thematic Review*). Subject all plans for 'agricultural diversification' to such participatory processes, emphasising that this should lead to greater on-farm diversity (see Box 7.2.2.4)

Justification: Crop and livestock improvement and development in the formal sector has not focused much on *in situ* conservation. This alienation and disjunction needs to be removed. Participatory crop and livestock breeding and improvement, based in the field, should become the predominant agricultural development strategy. This will help provide synergy between the strengths of the formal and indigenous/traditional sectors, a continuous reality check with ground conditions, a link with cultural and social issues, enhanced ability amongst local communities to manage innovations and new introductions, and continued incentives to conserve indigenous diversity *in situ*.

Suggested Responsibility: ICAR through its various institutes and regional stations, including the National Bureaus, and agricultural universities along with Krishi Vigyan Kendras; all acting through farmer and pastoral associations and communities. Ministry of Rural Development, Department of Biotechnology, and Department of Science and Technology could also be associated.

Time Frame: Re-orientation of the programmes of agricultural and animal husbandry institutions within 3 years, and ongoing implementation thereafter.

Steps:

- i. Prepare national and state-wise plans for participatory crop and livestock development, ensuring that these maintain and enhance indigenous diversity rather than displacing it; base these plans on the inventory and surveys of indigenous crop/livestock diversity and its characteristics that already exist or would emerge from the actions in Section 7.2.1;
- ii. Build on, and spread the lessons of, the experiences of relevant KVKs and agricultural universities/institutions that have undertaken participatory R&D, and of NGOs like Navadanya, Deccan Development Society, Academy of Development Sciences, Green Foundation, Rupantar, Lokhit Pashu-Palak Sansthan, ANTHRA, etc.;
- iii. Develop training and orientation programmes and manuals for farmers, extension agents and NGOs, on participatory crop and livestock breeding and development techniques; develop special programme elements for underprivileged sections (especially women) amongst them;
- iv. Provide incentives for promotion of *in situ* conservation through participatory crop development, and facilitate need-based restoration of genetic resources that have been lost or have declined.

Box 7.2.2.4 Agricultural Diversification = Increasing Crop Diversity?

Several states are moving into 'agricultural diversification' strategies, realising that a single-objective or single-produce strategy does not lead to sustainable livelihoods. However, do the programmes under such 'diversification' necessarily mean greater domesticated biodiversity? Here is what the **Punjab State BSAP** has to say about this:

'Another disturbing trend is the issue of 'crop diversification', which does not address the issue of crop diversity, but rather seeks to promote hybrid high yielding varieties of crops under controlled conditions for the western markets. Though this is expected to

help in elimination of non-point pollution from the agricultural sector (as fertilizers and pesticides would be provided in optimal quantities), this could lead to industrialization/corporatization of agriculture and could potentially convert land cultivators to farm labourers if proper caution is not exercised. This issue needs to be carefully studied and discussed before major projects are taken up....The present policy for diversification promotes only cash crops and other hybrid varieties. This needs to be changed, for which appropriate guidelines need to be developed at the national level.'

This caution needs to be heeded by all states that are going in for diversification strategies.

Ongoing Relevant GOI Schemes/Programmes:

- (i) Integrated Programme for Development of Horticulture in Tribal/Hilly Areas and (ii) Human Resource Development under Horticulture programme of the Ministry of Agriculture.
- (i) Wasteland Development (ii) Technology Development under Extension and Training component of the Ministry of Rural Development.
- (i) Science & Technology for Weaker Section, (ii) Science and Technology for Women and (ii) Special Component Plan schemes under Societal Programmes, of the Department of Science and Technology.
- (i) Biotechnology based programmes for Scheduled Caste and Scheduled Tribes (ii) Biotechnology Based Programme for Women and Rural Development under Biotechnology Based Programmes for Society, Department of Biotechnology.
- Biotechnology Complex for Women project under Training, Capacity Building and Awareness Generation Projects of the National Bioresources Development Board.

7.2.2.4 Strategy: Revive Domesticated Biodiversity and Regenerate Diverse Agro-Ecosystems Where They have Eroded

Actions

1. Repatriate Indigenous Crop Varieties and Livestock Breeds to Places Where They were Once Found

Bring back crop varieties and livestock breeds to places and communities that once grew/used them, but no longer do so, or do so only at a greatly reduced level. This should be done after ascertaining that the conditions are suitable for such reintroduction, or can be made suitable with appropriate interventions, including social and economic incentives.

Justification: Many farming and pastoral communities in India have lost their indigenous and traditional diversity of crops/livestock, and have in many cases not received any suitable alternative. In many areas, the alternatives introduced through state-sponsored or corporate-sponsored programmes have proved economically, ecologically, or socially inappropriate. A great many such communities are looking for alternatives, and would perhaps be ready for a switch-back to their traditional crops and livestock, or a combination of traditional and new crops and livestock. Such a desire and demand was voiced in several public hearings during the NBSAP process, along with the lament that they had lost varieties and breeds that had earlier stood the test of time.

Suggested Responsibility: National gene banks and breeding centres including National Bureau of Plant Genetic Resources and National Bureau of Animal Genetic Resources, along with relevant agricultural and animal husbandry departments, through farmer/pastoralists associations and communities, NGOs working with them.

Time Frame: Ongoing

Steps:

- i. Identify sites and communities across India, where loss of indigenous domesticated diversity has taken place, and where conditions are ripe or can be made suitable for its revival;



- ii. List, for each site, the crop varieties and/or livestock breeds that can be reintroduced, the conditions that would make this reintroduction successful, and the *in situ* or *ex situ* sites from there these varieties/breeds can be brought;
- iii. For the above, take into account the extra and special measures that may be needed, including appropriate market linkages and subsidies or other economic support structure, for areas where the Green or White Revolutions have wiped out most indigenous diversity, including Punjab and Haryana (*see Punjab State and Haryana State BSAPs; see also Box 7.2.2.5*);
- iv. Integrate the necessary interventions into the state/district agricultural and animal husbandry plans, including social and economic incentives, bank loans, fodder/grazing/manure and water availability, and other necessary inputs;
- v. Integrate a pro-active strategy of repatriation of genetic resources into the plans of the National Bureaus of Plant and Animal Genetic Resources, including by building this element into the ongoing national programme on crop diversity of the NBPGR;
- vi. Reintroduce the identified crop varieties and livestock breeds;
- vii. Undertake community-based monitoring to evaluate the success of the reintroductions.

Box 7.2.2.5 Bringing Back Agro-biodiversity to Green Revolution Areas

(Recommendations of some state BSAPs)

The **Punjab State BSAP** states that, since the negative impacts of green revolution are becoming evident, efforts need to be made for the revival of the traditional, time-tested farming systems that have promoted sustainable agriculture. This BSAP recommends:

- The promotion of traditional farming systems, integrated pest management, bio-fertilizers and bio-pesticides, etc., by (i) Promotion of ecological farming through use of organic manure and integrated pest management systems, (ii) Promotion of environmentally safe bio-pesticides and bio-fertilizers, (iii) Facilitating marketing of organically produced food/traditional crop varieties by establishing direct links between such farmers and consumers (e.g. providing marketing infrastructure, quality checks and certification, subsidies, transport, etc.), and, (iv) Documentation of success stories of farmers who are following traditional agriculture successfully and disseminating this information to others.
- The establishment of a social security system for farmers growing traditional crops/following traditional farming practices, and extending the scope of the Public Distribution System (PDS), specifically by (i) taking up the issue of crop insurance with insurance companies to extend it to several crops especially those requiring less water, pesticides and other farm inputs, (ii) extending the scope of the PDS by promoting distribution of millets, pulses and crops other than just wheat and rice, and, (iii) promoting commercial enterprises (including post harvest technology) which support traditional crops (e.g. maize, oat and barley based products).

The **Haryana State BSAP** recommends the promotion of organic farming and also the 'formulation of a policy framework to ensure ecologically sound crop management practices so that maximum diversification in agriculture is ensured without impairing food security and consistence income to the farming community.' It also recommends the promotion of agricultural diversification with (i) crop genetic diversity, crop species diversity over space, crop species diversity over time, agro-ecosystems biodiversity through crop livestock interactions, (ii) Market research and data processing for promotion of diversification in agriculture, and, (iii) Natural biodiversity within agro-ecosystems as a paradigm of agro-biodiversity protection.

The **Gujarat State BSAP** states that the dangerous trend of intensive farming practices that use pesticides and fertilizers needs to be countered and recommends that (i) natural/organic farming should be propagated by creating a market for naturally/organically grown products and identifying and commending all the farmers practicing natural farming in the State, (ii) subsidies on chemical fertilizers should be discouraged, (iii) farmer and pastoralists who are propagating native varieties/breeds of seeds and livestock respectively should be encouraged through market and civil supply system's support, (iv) distribution and use of hybrid seed varieties should be reduced and stopped in a phased manner, and, (v) the number and depth of bore wells (both existing and new) should be controlled through special provisions such as increase in electricity cost and removal of subsidy for diesel used in pumping water.

7.2.2.5 Strategy: Promote Home and Kitchen Gardens

Actions

1. Document and Encourage Existing Home Garden Initiatives or Networks

Study, document and provide support for the continuation of existing home and kitchen gardens (called home gardens for short) across the country, both in rural and urban areas.

Justification: Home gardens have so far been seriously neglected in agricultural research and development, though they are a widespread practice with significant positive impacts on biodiversity and people's livelihoods, and in particular as a source of nutrition and control for women and children, and for those with little or no land. Scientific interest in this phenomenon is recent. There is therefore, an urgent need to document, analyse, and help spread further, those home garden networks that still exist.

Suggested Responsibility: Ministry of Agriculture (including its Horticulture Department/Wing), along with the Ministries of Health, Rural Development and Environment and Forests, through Krishi Vigyan Kendras and extension workers, with the central role being played by farming and pastoral communities and institutions.

Time Frame: Ongoing

Steps:

(see also *Home Gardens and Biodiversity Sub-thematic Review*).

- i. Collate existing studies and material on home gardens from various parts of India, using the NBSAP Sub-thematic Review on this subject as one base;
- ii. Develop region-specific guidelines for central and state agricultural and animal husbandry departments to support home gardens;
- iii. Commit funds to provide incentives for continuing and strengthening the home gardens that still exist; if need be, revise the guidelines and terms of relevant schemes and programmes;
- iv. Assess ways and means of enhancing the diversity in the existing home gardens, with the fully informed involvement of, or preferably by, the garden owners and keepers; identify those highly diverse home gardens that exist in different parts of India, through the coordinated effort of agricultural researchers and NGOs;
- v. Identify the key elements that warrant conservation in this set of home gardens, including the availability of some species or varieties, certain practices or knowledge, or certain social or cultural features that influence the nature of home gardens;
- vi. Constitute an 'award' system of rewarding highly diverse home gardens;
- vii. Declare a few highly diverse home gardens as 'natural and agricultural heritage' sites, with some financial or other support as appropriate;
- viii. Bring the attention of product makers, including genetic resource users, to the diversity that exists in home gardens, and facilitate the emergence of arrangements to share the benefits of such product development, ensuring the protection of the rights of the home garden owners;
- ix. Encourage local and regional networks for marketing 'natural' products from home gardens;
- x. Evaluate the crop-based agricultural development policies and property right regimes on their potential impact on the sustenance of home gardens, and change these policies as appropriate;
- xi. Encourage institutes having collection of traditional seed varieties to share with farmers and households who are interested in enhancing the diversity of their home gardens;
- xii. Facilitate exchange visits amongst communities and families who are maintaining home gardens to and from various parts of India; tailor the above activities keeping in mind the special links between home gardens and women and children, including the critical health, nutritional, and cultural benefits that such gardens provide (see also *Health and Biodiversity Thematic BSAP* on kitchen health gardens).

2. Facilitate New Home Gardens Across India

Provide support to the establishment of new home gardens, including on lands redistributed to the landless or



marginal farmers, and especially women (see Section 7.2.5.2, Action 1). This support should include planting material, and finances for the necessary investments, provision of leases and ownership over land plots, and marketing links for species that have an economic livelihood potential.

Justification: Given the enormous biodiversity, livelihoods, and health potential of home gardens, and their rapid loss in many parts of India, it is critical to encourage the setting up of new gardens as widely as possible.

Suggested Responsibility: As in Action 1

Time Frame: Ongoing

Steps:

Modified from Action 1; including exposure visits of new home garden owners/lessees to sites where home gardens continue to be a successful land use.

7.2.2.6 Strategy: Tackle 'Non-Utilisation' Threats to Indigenous Domesticated Biodiversity

Actions

1. Tackle Invasive Alien Species that Affect Cropland, Pastureland, and Wetlands in Use for Agriculture or Pastoralism

(Justification, Suggested responsibility, Time frame and Steps to be modified from Strategy 7.1.2.6 Action 2)

2. Tackle Serious Diseases, Especially When They Affect Already Threatened Species/Varieties/Breeds

Take measures to prevent and counter diseases and epidemics to crop and livestock species and varieties/breeds, in particular threatened taxa.

Justification: Though evidence on this aspect is scanty, there are indications that outbreaks of disease may be threatening the local viability and future of crop and livestock species or varieties. Work on these diseases needs to be consolidated and strengthened, and oriented towards traditional species and varieties/breeds.

Suggested Responsibility: MoA to coordinate, with the collaboration of state agriculture departments, and quarantine/plant protection/veterinary institutions and agencies.

Time Frame: Initial anti-disease measures within 5 years, and prevention/treatment ongoing thereafter.

Steps:

- i. MoA to set up a working group of experts from within and outside the government, including community members with specialised ethno-veterinary and plant *ayurveda* or disease knowledge; this expert group to identify ongoing work in this field, assess gaps, and recommend measures to prevent or tackle serious disease outbreaks;
- ii. Farmer and pastoral groups/communities to be assisted in tackling these threats, including through building on their own knowledge and practices, availability of outside medical care when needed, etc.
- iii. Institute an ongoing system of monitoring by such communities themselves, with outside scientific help if needed, to enable modifications in the disease prevention and mitigation measures.

7.2.3 Domesticated Biodiversity: Strategies and Actions for *Ex Situ* Conservation

Overall strategies:

1. **Strengthen and expand the network of gene banks and breeding centres**, with emphasis on community-level grain banks and animal breeding sites, complemented by regional-, state-, and national-level gene banks and breeding centres;



2. **Initiate the *ex situ* conservation of domesticated biodiversity in zoological and botanical gardens**, and other such centres where the focus has so far been on wild taxa.

7.2.3.1 Strategy: Create a Network of Gene Banks and Breeding Centres

Actions

1. Create or Strengthen Community Gene Banks

Facilitate, support, and strengthen a network of gene or seed banks at the level of individual communities and clusters of communities. In so doing, learn from the experience of existing community gene bank initiatives in different agro-ecological zones. Use existing and proposed programmes of the central and state governments, with appropriate modifications, to achieve maximum coverage.

Justification: Many farming communities complain that even if they want to revert to their traditional forms of agriculture, they cannot access genetic material, because it has been locally lost. Most small and marginal farming communities have depended upon women to select, save and safeguard the diversity in their farming systems. The gradual destruction of these farming systems due to various factors has taken away the control over their own genetic resources from the small and the marginal sections, particularly the women amongst them. Growing dependence on the market for plant material has made the women powerless in their communities and eroded their knowledge and skill base. Establishment of community gene banks managed and controlled by communities themselves, rather than by government agencies or NGOs, can offer solution to multiple problems such as these.

Suggested Responsibility: Local community institutions and farmer associations, with facilitation and support from Ministry of Rural Development, NBPGR, Ministry of Agriculture, Ministry of Tribal Affairs, DWCRA, DRDAs, ITDAs, NABARD, and relevant NGOs.

Time Frame: A representative sample in each agro-ecological zone within 3 years; the remaining over the next 15 years.

Steps:

- i. Document and assess ongoing community and NGO initiatives at creating such gene banks, including those of the Deccan Development Society in Medak District of AP, *Beej Bachao Andolan* in the Tehri Garhwal region of Uttaranchal, Green Foundation in Bangalore, Centre for Indian Knowledge Systems and MSSR Foundation in Tamil Nadu, Rupantar in Chhattisgarh, etc. (see Section 6.2.2.2);
- ii. Use this experience to integrate the establishment of such Community Gene Banks into each of the government's and NGO's empowerment and poverty alleviation programmes, e.g. women's self-help groups (SHGs) under DWCRA and watershed initiatives in many states, DRDAs under IRDP programme, and the programmes of Scheduled Caste Finance Corporations for *dalit* women. All these programmes must recognise that Community Gene Banks can be truly empowering to the marginalised, especially the women amongst them;
- iii. Make use of the proposed Grain Bank Scheme of TRIFED and Government of India (<http://tribal.nic.in/grain-bank1.html>), with modifications in the design of the scheme to ensure the maximum use of local grains rather than only wheat and rice, terms of exchange that could include repayment by grains in place of money, management in the hands of village women or *gram sabha*-nominated committees with women members rather than the village headman alone, lower or no interest rates, and other such changes that would make it more accessible to the poorest people and more ecologically sustainable;
- iv. Through these and other schemes and programmes, set up a gene bank in each village or settlement, and one consolidated District Gene Bank, starting with a representative sample in each agro-ecological zone and eventually moving towards one in each settlement; control over these facilities must vest with local community institutions, in association with Krishi Vigyan Kendras, local NGOs, and government agencies guided by the NBPGR;





- v. Provide women and other underprivileged sections with the capacity to manage these gene banks;
- vi. Promote the exchange of community members to each other's gene banks, and encourage the sharing of seeds and other genetic resources amongst various communities;
- vii. Promote small-scale enterprise linked to these gene banks, for exchange of seeds at minimal prices;
- viii. Ensure sustained financial support to such efforts where necessary, while simultaneously encouraging financial self-sufficiency where possible;
- ix. Honour the best Community Gene Banks at various levels in the country (*panchayat*, block, district, state, regional, and national levels), on the basis of a set of parameters which can include the range of traditional germplasm they have in store, the rate at which they are used and renewed, how much they are controlled and managed by women and other marginalised sections, and other such criteria.

Ongoing Relevant GOI Schemes/Programmes:

- The Programme on 'National Gene Bank' of NBPGR.
- The Programme on 'Protection of Tribals from Starvation: Village Grain Bank Scheme' of Ministry of Tribal Affairs. This scheme would need modification to incorporate the suggested steps.
- The proposed Grain Bank Scheme of GOI, through TRIFED, with appropriate modifications as suggested above.

2. Create or Strengthen State, Agro-Ecozonal, and National Gene Banks

Establish, or strengthen where already existing, a network of gene banks for every state, for every agro-ecological zone, and at the national level. Special focus should be given to regions and crop species/groups that are threatened in the field (though not as a replacement for their *in situ* revival and conservation). The network should include relevant culture collections of agriculturally relevant micro-organisms.

Justification: While there already exist a number of gene banks at the national level, there are very few that have been set up to cater to the needs and diversity of a state. Even those at the national level suffer from lack of funds and facilities and other problems. Finally, public access to these gene banks, and in particular the access of farmers to their collections, is limited. These shortcomings need to be removed through a series of actions.

Suggested Responsibility: The National Bureau of Plant Genetic Resources, and the National Bureau of Agriculturally Important Micro-organisms, in association with state agricultural departments and relevant NGOs, and in consultation with farming communities.

Time Frame: 5 years

Steps:

- i. Review the existing network of gene banks at national, state, and regional levels, and assess key gaps in coverage of regions as also crop groups;
- ii. Strengthen the existing gene banks to cover the key crop group and geographical gaps; where an eco-region or state does not have such a bank, establish one or more as felt necessary, and where this is not possible, establish new banks especially to fill geographical gaps;
- iii. Facilitate linkages and exchanges of germplasm and information amongst all these gene banks, and between these and the local gene banks, on the basis of free and prior informed consent of the relevant communities, and equitable benefit-sharing arrangements as laid out in *Section 7.1.5.5*; in particular, proactively carry out repatriation of germplasm from regional and national gene banks back to centres of origin and diversity, in order to enhance availability of diverse indigenous germplasm to farmers; keep in mind the need for protecting traditional knowledge from piracy.

Ongoing Relevant GOI Schemes/Programmes:

National Gene Bank Programme of NBPGR, and programmes of NBAIM under Ministry of Agriculture

3. Create or Strengthen a Network of Domesticated Animal Breeding Centres

Create new domesticated animal breeding centres, and strengthen those already existing, to enable *ex situ* growth in the indigenous species/breeds that are facing threats. These centres should be focused on reintroducing the species/breeds back into pastoral communities, and therefore also need to have, as central actors, such communities themselves.

Justification: Given the scale of threats to indigenous breeds of livestock and poultry, ongoing initiatives in *ex situ* conservation by agencies like the National Bureau of Animal Genetic Resources are not adequate. This needs to become a much larger national endeavor, in which communities need to be empowered to eventually handle the breeding centres.

Suggested Responsibility: NBAGR and animal husbandry departments to facilitate local communities and networks like the Lokhit Pashu-Palak Sansthan (LPSS) in strengthening or setting up breeding centres.

Time Frame: 5 years to cover all threatened breeds.

Steps:

- i. Identify gaps in coverage of domesticated biodiversity in the existing official breeding centres and in *ex situ* initiatives by NGOs, communities and domestic animal care societies/institutes;
- ii. Integrate, into the ongoing animal husbandry schemes, steps to bring the missing or weakly covered breeds into the *ex situ* breeding programme;
- iii. Pay special attention to breeds most severely threatened (*see Strategy 7.2.2.2, Action 3*), while ensuring that *ex situ* conservation is never taken as a replacement for *in situ* conservation;
- iv. Facilitate and support exchange amongst the breeding centres, including between official and non-governmental or community centres.

7.2.3.2 Strategy: Integrate Domesticated Biodiversity into Existing Zoological and Botanical Gardens

Actions

1. Expand the Scope of Botanical Gardens in Each Region, to Include Valuable and Unique Agricultural Diversity

Include, in the mandate of botanical gardens, the cultivation and display of valuable, unique and threatened crop diversity specific to the region. This could be encouraged in both official and private/NGO/institutional botanical gardens.

Justification: Botanical gardens already have the infrastructure to expand their mandate to crop diversity, and are well-placed to spread awareness and concern about such diversity. This would be a valuable complementary role to *in situ* conservation and to gene banks.

Suggested Responsibility: MoEF, through state agencies, private individuals, institutions, and NGOs managing botanical gardens, in collaboration with farmer groups and networks.

Steps:

- i. Assess the potential of each existing botanical garden, to expand its scope to include crop diversity;
- ii. Designate each botanical garden for the propagation of crops specific to the region in which it is located, thereby promoting specialisation and avoiding overlap amongst gardens; this should include gardens with Forest, Agriculture, Horticulture, and other departments, as also with the armed forces;
- iii. Link up such gardens to local farmer groups and networks and to existing gene banks, to obtain genetic material for propagation;
- iv. In the case of non-official gardens (including those with private bodies, religious institutions like *gurukuls*,



- and individuals), provide appropriate incentives for this move;
- v. Set up gardens with such a focus at the level of every block or at least district, and in every municipal area, using locally available or state/central funds, and employing local farmers/botanists for the purpose;
- vi. Maintain a database on the crop diversity being grown or maintained in these gardens, integrated into the databases mentioned in *Strategy 7.1.1.2*.

Ongoing Relevant GOI Schemes/Programmes:

Programme 'Assistance to Botanical Gardens' under Conservation of Natural Resources of the MoEF.

2. Expand the Scope of Zoological Parks in Each Region, to Include Indigenous Livestock and Poultry

Include, in the mandate of zoological parks, the breeding and maintenance of valuable, unique and threatened domesticated animal diversity. This could be encouraged in both official and private/NGO/institutional zoos.

Justification: Zoos already have the infrastructure to expand their mandate to livestock (including poultry) diversity, and are well-placed to spread awareness and concern about such diversity. This would be a valuable complementary role to *in situ* conservation and to livestock breeding centres.

Suggested Responsibility: National Zoo Authority of MoEF, through state agencies, private individuals, institutions, and NGOs managing zoological gardens, in collaboration with pastoral and farmer groups and networks.

Steps:

- i. Assess the potential of each existing zoo, to expand its scope to include livestock diversity;
- ii. Designate each zoo for the propagation of livestock specific to the region in which it is located, thereby promoting specialisation and avoiding overlap amongst zoos;
- iii. Link up such zoos to local pastoral/farmer groups and networks, and to existing breeding centres, to obtain animals for propagation;
- iv. In the case of non-official zoos, provide appropriate incentives for this move;
- v. Ensure that the livestock enclosures are adequately separated from those holding wild animals, to avoid mixing;
- vi. Maintain a database on the livestock diversity being grown or maintained in these zoos, integrated into the databases mentioned in *Strategy 7.1.1.2*;
- vii. Authorise such conservation through appropriate rules or guidelines under the Biological Diversity Act, 2002.

Ongoing Relevant GOI Schemes/Programmes:

National Zoological Park programme of MoEF.

7.2.4 Domesticated Biodiversity: Strategies and Actions for Sustainable Use and Livelihoods

(**Note:** This chapter should be read in conjunction with the *Domesticated Biodiversity Thematic BSAP*, the *Livelihoods and Biodiversity Thematic BSAP*, and the *Health and Biodiversity Thematic BSAP*. Several local/sub-state level BSAPs would also be relevant, of which the *Deccan Andhra Sub-state Site BSAP* in particular should be read with this chapter. *See also Box 7.2.2.5* for recommendations from some Green Revolution states, which have relevance for the strategies below. Read also in conjunction with *Section 7.2.2*, since *in situ* conservation and sustainable use of domesticated biodiversity have substantial overlaps.)

Overall Strategies:

- 1. **Integrate local crop diversity into the food and health related schemes**, including Public Distribution System, Food for Work, Mid-day Meals, *balwadis*, *anganwadis*, and other food- and health-related schemes; in particular this will link food, nutrition, and livelihood security by ensuring a regular buy-back from farmers and a supply of nutritious foods to consumers; move towards handing the control of the PDS outlets and network to local communities, especially women;





2. **Ensure the sustainability of lands for agriculture and pastoralism**, including through regenerating and enhancing productivity of agricultural lands, regenerating grazing/pasture lands, exploring sustainable short-cycle shifting cultivation (*jhum*) areas, especially with agroforestry, ensuring water security through decentralised harvesting, and enhancing local fodder security;
3. **Enhance the sustainability of cultured fisheries, apiculture, and sericulture with indigenous species, and supplemental agricultural livelihoods**, including agroproduce based on traditional and new skills, and sensitively developed agro-tourism;
4. **Promote consumer markets and networks for organic, biodiverse agricultural and pastoral produce.**

7.2.4.1 Strategy: Use the Public Distribution System (PDS) to Relate Agro-Biodiversity to Food, Nutrition, and Livelihood Security

Actions

1. Integrate Agro-Biodiversity and Related Livelihoods into the Public Distribution System

Modify the functioning, contents, and management structure of the public distribution system (PDS), to enable a full symbiotic relationship between agro-biodiversity on the one hand and food, nutritional and livelihood security on the other. This would entail:

- i. Diversifying the food and other bio-resource-based items available in the PDS, giving special place to locally available agricultural produce linked to nutrition and livelihoods, especially of small farmers and the landless;
- ii. Encouraging public procurement of diverse and locally available agricultural produce;
- iii. Decentralising the control and management of the PDS outlets and system, by empowering local community institutions and municipal ward or residents' associations, and in particular women.

Justification: As described earlier (*see Box 5.11*), the rice-wheat based centralised Public Distribution System (PDS) has destabilised the biodiverse agriculture in the country, especially in the rainfed regions which form about 65% of India's farming area. There is an urgent need to restructure the PDS in favour of community-level production, storage (community grain banks) and distribution, giving the communities control over their food security. There must also be a decisive shift from centralised 'national' food security to household food security. Finally, there is an urgent need to link the PDS with the various nutritional requirements of communities, and in particular of the vulnerable sections within them, rather than think of the system only from the point of view of absolute quantum of food available. Such a shift in the PDS strategy would help to revive and sustain agro-biodiversity, and sustainable livelihoods (*see Box 7.2.4.1*).

Box 7.2.4.1 Restructuring the PDS: The Way to Sustainable Agriculture and Livelihoods

Taking the steps mentioned in this action point would help in the following ways:

1. The range of diverse food production systems and the soil structures that have been destroyed beyond repair in these production regions can slowly be nursed back to health by adopting more soil-friendly and less toxic diverse crop regimes.
2. Agriculture in the vast rainfed belt in the country will get a tremendous boost. The farming population in these regions, which are the poorest in the country, can get a better deal.
3. This will make available nutritionally superior local grains like finger millet, foxtail millet, sorghum etc., to each locality where the PDS operates.
4. The procurement of these grains for the PDS will provide a huge market for the farmers in the rainfed areas and will cause the revival of nutritionally superior millet farms.
5. One of the most important aspect of this PDS could be diverse grains for diverse regions.
6. The decentralised design and operation of this form of PDS can be done at the *panchayat* level, and can therefore provide a secure position for incorporating the voices of the women farmers, the poor and marginalized, whose percentage is the highest in the rainfed-agriculture regions of India.

7. Since rainfed agriculture is inherently biodiverse, biodiversity will automatically be back on the agricultural agenda.

This concept is a repeated refrain in many of the action plans under the NBSAP. The strongest endorsement came in the process of preparing the sub-state plan for agro-biodiversity in Medak District of Andhra Pradesh, where over 20,000 farmers demanded that the PDS should include millets and sorghum.

In one of the workshops on *PDS and Food Security* held by the National Institute of Rural Development, Hyderabad, attended by the chief secretaries and food secretaries of many states, academicians, food policy analysts, and NGOs, a strong recommendation was made that the PDS operations should be decentralised and each village *panchayat* should be enabled to run its own decentralised PDS system. The recommendation further said that the local communities should be enabled to procure, store and distribute the grains within their own communities. It also recommended that *dalits* and women should have a major representation in the management of this local PDS.

If this recommendation is followed, it will at once fulfil a number of worthwhile objectives: locally managed PDS, equity, gender justice and sustainability.

Suggested Responsibility: The Ministry of Consumer Affairs, Food, and Public Distribution, and Ministry of Agriculture, along with state agriculture departments, and the Planning Commission; through local community and local municipal institutions.

Time Frame: Initial representative sample of regions within the next 3 years; the rest of the country within the next 15 years.

Steps:

- i. Integrate, into the PDS policy and guidelines: (a) a central focus on procuring and stocking locally available, indigenous agricultural produce, and in particular local food crops (e.g. the ones listed for Jashpur district, Chhattisgarh, in *Box 7.2.4.2*), and, (b) devolution of the control and management of PDS outlets to local community institutions and municipal residential associations/ward committees;

Box 7.2.4.2 Items suggested to be included in PDS in Jashpur district, Chhattisgarh

Grains/ Millets/Oil Seeds

Paddy (20 varieties, with the advice of the Agriculture Department - e.g. Kodo; Kutki; Ramtili or Jatagi); Maize; Groundnut; Jowar; Chana; Ragi; Alsi; Sarson; Til; Kusum; Arandi; Surajmukhi.

Pulses

Kulthi; Urad; Lakhdi; Masoo; Sutari bean; Popat bean; Madua

Source: Bilaspur Sub-state BSAP

- ii. Replace or supplement, as appropriate, the rice-wheat dominated procurement and sale system with local foodgrains; this could be done in a phased manner by discouraging long-range movement of grains from Punjab, Haryana, coastal AP, Tamil Nadu and other such places, and simultaneously encouraging the production and procurement of local grains and other agricultural produce; there may be a necessity of somewhat higher procurement prices for some time to enable farmers to maintain, or switch back to, local crops. In the changed procurement policy enunciated by the Government in 2001, state governments have been given the responsibility for procurement of grains. This situation should be optimised in favour of agro-biodiversity, by making it possible for the state governments to procure local grains for PDS. Those state governments which opt for such procurement should get special funding support from the central government; note also that there is likely to be serious resistance from vested interests against local procurement, which will need a combination of government policies/measures and people's mobilisation to withstand;

- iii. Provide support to set up local-level grain banks, managed by village institutions, which are linked to the Food Corporation of India network; these banks can be in charge of local procurement and storage, exchange with other grain banks in the case of grains needed from elsewhere, and distribution of surplus stocks after local PDS and other needs are met;
- iv. Encourage, through appropriate incentives and measures, the use of fallows in dryland areas for foodgrains production (see Box 7.2.4.3), while ensuring that this does not lead to over-use of soils and water;
- v. Integrate the management and control of PDS outlets as a community responsibility within the legislation under the 73rd and 74th constitutional amendments, while simultaneously helping to build the capacity of community institutions, in particular women's groups, to take over such management; government officials and NGOs to help in checking the misuse of these powers by powerful sectors/individuals, especially in communities with severe inequities and politicisation;
- vi. For all the above, learn from the initiatives of community groups and NGOs, such as the Deccan Development Society in Medak district of Andhra Pradesh (see Section 6.2.3.2); facilitate exposure visits of community groups to such sites;

Box 7.2.4.3 A Local PDS Scenario: Medak District of Andhra Pradesh

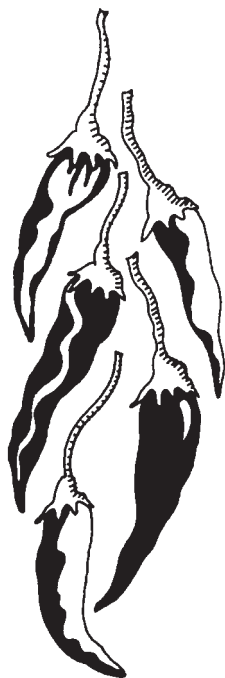
Medak District in Andhra Pradesh is a typical rainfed district. Farmers normally grow *jowar*, *bajra*, red gram, cowpea, niger and other mixed crops on their dryland farms. The district has an extensive network of PDS outlets that caters to the poor. The grain supplied through PDS is rice, whereas the traditional food here has been *jowar*.

Here is what happens if there is a shift from this external supply of an alien grain like rice to the natural food of the people like *jowar*:

- Medak currently has about 2,85,000 ration cards
- The PDS system distributes 72,000 tonnes of rice annually
- This costs about Rs 20 crores annually
- The district also has 450,000 acres land under current fallows
- If these lands are put under production through production loans and other support systems, they would produce a minimum of 135,000 tonnes of *jowar* and many other millets, pulses and oilseeds.
- This would create a vibrant biodiverse farming system in the district.
- This additional production is equivalent to twice the quantity of PDS rice supplied to the District. Moreover this would be nutritionally superior to rice.
- The cost of reclaiming these fallows will be Rs 180 crores. This is a one time investment and can eliminate the recurring subsidy offered in the present PDS.
- In terms of generation of livelihoods, the fallow reclamation can bring **an additional four crore persondays of employment every year**, worth about Rs 100 crores. This would mean an additional annual employment of 50 persondays to the eight lakh agricultural workers in the district, i.e. nearly 20% additional employment.
- Calculating at the rate of four meals per kg of *jowar*, **an additional 60 crore meals can be created from out of the 135,000 tonnes of *jowar* grown**. This roughly works out to 300 meals per capita, for the 22 lakh population of the district.
- In the nearly half million acres of regenerated fallows, **fodder can be grown to support half a million extra cattle**. If all of them are milch animals, it would mean an **additional generation of one million litres of milk per day** or milk worth Rs 8 million per day, even at the most conservative estimates.
- And finally, in monetary terms, all these gains can pay back four times the investment within one year.

Ongoing Relevant GOI Schemes/Programmes:

Targeted Public Distribution System and other related schemes of Ministry of Consumer Affairs, Food, and Public Distribution, and other ministries.



7.2.4.2 Strategy: Integrate Agro-Biodiversity into Health and Food-Related Programmes

Overall Justification: One of the most important issues that characterises food security or its absence is the issue of nutritional security. As argued in *State of Food Insecurity in the World - 2000*, an FAO publication: 'Meaningful action to end hunger requires knowledge of not just the number of hungry people around the world but also of the depth of their hunger.' In explaining its position, the publication argues, 'When dietary intake is adequate, the variety of foods is generally greater, providing more energy and better nutrition.'

Food security is also an issue of national security and sovereignty. Biodiversity in farmer knowledge systems is one of the keys to achieving such food security.

Actions

1. Integrate Locally Available Foods into the Food for Work Programme

As far as possible, ensure that the foodgrains available to participants of the Food for Work programme are obtained from the local area, ensuring that there is an appropriate mix of cereals, pulses, and other grains. In particular, local species and varieties of millets could be encouraged.

Justification: As in the case of the PDS, there is an unnecessary focus on wheat and rice in the Food for Work programme, and that too on a few varieties growing in the high-production agricultural centres of the country. Such a focus often requires transportation of grains over long distances, denies nutritionally superior food to workers, does not benefit the local economy, and does nothing to encourage local farmers to grow biodiverse foods in an organic manner. A shift to locally grown, biologically diverse food crops will be cheaper, more nutritious, and beneficial to the local economy and environment.

Suggested Responsibility: Ministry of Consumer Affairs, Food, and Public Distribution, along with the Ministries of Agriculture, Rural Development, Tribal Affairs, and Social Justice and Empowerment, to issue the necessary guidelines and circular; implementation through line departments of states and PRIs.

Time Frame: Full integration within 5 years

Steps:

- i. Prepare and circulate guidelines for the Food for Work programme, to integrate the principles and practice of making locally grown foods available to workers;
- ii. Issue a Government Order or relevant notification to all relevant line departments, and to the foodgrains procurement agencies, to procure locally grown foodgrains, especially those which are nutritionally superior; (see also caution regarding vested interests, in *Strategy 7.2.4.1, Action 1*);
- iii. Gradually replace the standardised wheat-rice package with the package suggested here;
- iv. For this, learn from a number of community-based nutrition and food security initiatives that are spread across the country, such as those described in *Sections 6.2.4.2 and 6.2.5.2*;
- v. Commission independent monitoring of the impacts of this shift on local livelihoods, nutrition and agro-biodiversity, and introduce corrective measures as necessary.

Ongoing Relevant GOI Schemes/Programmes:

- Protection of Tribals from Starvation: Village Grain Bank Schemes of the Ministry of Tribal Affairs.
- Sampoorna Grameen Rozgar Yojana (SGRY) of the Ministry of Rural Development.

2. Integrate Locally Available Foods into *Balwadis, Anganwadis, Mid-Day Meals, and Other Such Governmental Programmes*

Take steps to introduce and popularise locally available foods into the state and national schemes where food or foodgrains are distributed, including for *balwadis, anganwadis*, government hostels, the mid-day meal for

children, the Antyodaya Anna Yojana, the Annapoorna scheme, etc. These foods should be obtained from local farming and pastoral communities, with an attempt to procure these from marginal sections of these communities, and to provide incentives or encouragement to provide organically grown produce. An appropriate mix of foods, which are nutritionally superior, should be provided; this would include local millets, pulses, vegetables, and fruits.

Justification: The overwhelming emphasis on wheat and rice in government programmes meant to help the poor has partly been responsible for the declining status, use and cultivation of other grains and food crops. There is a need to promote local foods through such programmes, and re-instill in the younger generation the value of such foods. Such a change will not only ensure better nutrition for them but also future markets for a diversity of indigenous grains, pulses, vegetables and fruits.

Suggested Responsibility: For central schemes, Ministry of Consumer Affairs, Food, and Public Distribution, and Ministry of Agriculture, along with Ministry of Social Justice and Empowerment, Ministry of Rural Development, Ministry of Tribal Affairs, and Department of Women and Child Development; relevant line departments for state schemes; site-specific planning and implementation through community institutions including PRIs.

Time Frame: Full integration within 5 years.

Steps:

Modified from Action 1 above; add the need to learn from ongoing initiatives in this direction, e.g. in parts of Rajasthan where locally-produced peanuts and eggs are used for the mid-day meals.

Ongoing Relevant GOI Schemes/Programmes:

- Programmes of the Department of Women and Child Development (after ascertaining their relevance to the action): (a) Integrated Child Development Scheme (b) Nutrition Education and Orientation; Training in Home-scale Preservation of Fruits and Vegetables and Nutrition; Fortification of Food; Development and Promotion of Nutritious food under Food and Nutrition Board (c) National Nutrition Policy (d) Kishori Shakti Yojana (e) Pradhan Mantri Gramodaya Yojana (PMGY)
- The Antyodaya Anna Yojana, Annapoorna scheme, Mid-day meal scheme, and Targeted Public Distribution System, of Government of India.

3. Integrate Nutritionally Superior Local Foods into Public Health Programmes

Revamp public health programmes to include a focus on superior and balanced food inputs, as a *preventive* health care measure. As in the above actions, this would entail promotion of local millets and other foods that are nutritionally important.

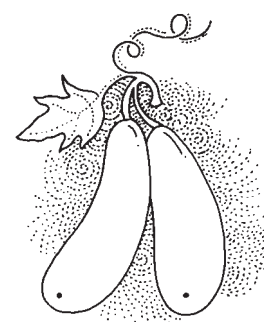
Justification: Public health programmes have rarely integrated the availability of nutritious food as a preventive measure. Linking this to local procurement could provide encouragement to farmers to grow indigenous crop varieties, and could actually reduce the costs of health care through medication and other curative actions.

Suggested Responsibility: Ministry of Health for central schemes and programmes, and state Health Departments for state-level schemes and programmes, along with relevant NGOs, and community institutions including people's health movements.

Time Frame: Full integration within 5 years

Steps:

As modified from Action 1 above, see also Box 7.2.4.4.



Box 7.2.4.4 Linking Nutrition and Biodiversity

Reviving past links, and creating new ones, between nutrition, health, and biodiversity, will require the following:

1. Widespread studies of the links between nutrition, health and biodiversity in diverse ecological and cultural situations;
2. Measures to diversify foodgrain availability, especially to provide locally grown, locally adapted nutritive traditional grains;
3. Measures to diversify food intake to cover not only grains, but also fruits, vegetables and livestock products;
4. Availability of the above in public outreach programmes, including PDS, *anganwadi*, mid-day meals, hospitals, etc.;
5. Maintaining or securing access of poor communities to 'wild foods' (or uncultivated foods) from waterbodies, forests, and grasslands.

Source: Health and Biodiversity Thematic BSAP. See also actions in Strategy 7.2.4.2 and Strategy 7.2.2.1, Action 3.

7.2.4.3 Strategy: Ensure the Sustainability of Agricultural and Pastoral Lands

Actions

1. Regenerate, Maintain and Enhance the Sustainable Productivity of Agricultural Land

Intensify and spread ongoing efforts at regenerating land, conserving its productivity, and enhancing productivity in a manner that is ecologically sustainable. This includes reclaiming lands lost to waterlogging and salinisation, severe soil erosion, and practices that have become unsustainable such as in some shifting cultivation (*jhum*) areas (see Box 7.2.4.5, on recommendations relating to *jhum* from north-east India). Attention also needs to be given in this to the role of soil/root micro-organisms. This activity should link to actions being taken under India's Desertification action plan under the UN Convention on Combating Desertification (UNCCD), and other ongoing initiatives by the National Afforestation and Ecodevelopment Board and the National Wastelands Board.

Justification: The degradation and destruction of land resources and productivity, a widespread and acutely problematic phenomenon in India, has been stated to be one of the reasons for the erosion of agro-biodiversity. Both for the sheer survival of farming and pastoral communities and for the regeneration of agro-biodiversity, the regeneration and enhancement of land productivity is crucial.

Suggested Responsibility: Community institutions, facilitated and supported by the Ministries of Rural Development, Environment and Forests, Agriculture and/or by the relevant departments at state level; with expert inputs from NGOs and institutions.

Time Frame: 15 years.

Steps:

- i. Village institutions including PRIs to be facilitated in carrying out detailed assessments of land productivity on farms in their jurisdiction, the causes of loss of productivity, and plans to revive or enhance the productivity in ecologically sustainable ways (see also Sections 7.2.9.2 and 7.2.9.3);
- ii. MoRD, MoA, MoEF, and relevant state departments to orient their budgets and schemes towards such regeneration and enhancement, placing emphasis on building on people's own knowledge and skills, using locally available resources, encouraging traditional practices that are still sustainable, and promoting ecological and culturally sound technologies (avoiding chemical or high-technology inputs);
- iii. Facilitate community exchange visits to learn from successful grassroots initiatives at regenerating and maintaining sustainability in agricultural production (e.g. visits of *jhum* cultivators to farmers who are maintaining sustainable biodiverse traditional systems, or innovating on new *jhum* systems to regain sustainability and biodiversity);
- iv. Link the above steps to ongoing measures under the Desertification action plan, programmes of NAEB and National Wastelands Board, and other departments and NGOs.



Ongoing Relevant GOI Schemes/Programmes:

- Integrated Wastelands Development Programme, (ii) Drought Prone Areas Programme (iii) Desert Development Programme, of the Ministry of Rural Development
- National Watershed Development Project for Rainfed Areas under Rainfed Farming Systems Programme, (ii) Centrally Sponsored Scheme of Soil Conservation for Enhancing Productivity of Degraded Lands in the Catchments of River Valley Projects and Flood Prone Rivers (RVP & FPR)-Subsumed under Macro-management under Natural Resource Management Programme, of the Ministry of Agriculture.
- National Afforestation and Eco-Development Board, under MoEF.

Box 7.2.4.5 Jhum: Towards Sustainable Strategies

(Recommendations on Shifting Cultivation in North-eastern State BSAPs)

North-East Ecoregional BSAP

'The variety and variability in shifting cultivation (e.g. tribe-specific variabilities, Boon and *Alder jhum*) and terrace land cultivation (e.g. irrigated terrace and bench terrace with stone wall) practices make the agro-ecosystem diversity of the north-east quite rich.'

The following key actions are recommended:

- Adoption, development and testing of modified shifting cultivation models for different edapho-climatic regions and socio-economic set-ups of the north-east
- Popularization of modified shifting cultivation practices such as *alder jhum* cultivation, SALT, SWEET and ICAR 3-tier models, various agroforestry models including traditional ones, tree-cardamom models etc.

Meghalaya State BSAP

'...*jhumming* as it exists today will continue for quite some-time more till the long term measures are able to provide permanent means for weaning away the *Jhumias* from these practices...'

Arunachal Pradesh

'...Shifting cultivation or *jhumming* is a way of life for the hill people deeply interwoven with culture. Proper analysing of their practice and evolving a method for enhanced production through *jhumming* should be explored. Instead of banning the system, methods of improving it need to be explored...based on local traditions and practices with organic farming.'

Assam

'Some of the *jhum* cultivating families have already taken up measures to check soil erosion in the *jhum* fields by introducing plantation crops like banana and bamboo. The need...is a systematic and scientific effort to evolve a workable and socially acceptable package aimed at improving the condition of the *jhumias* so as to enable them to avoid the adverse effects of shifting cultivation.'

Tripura

'...Various measures adopted to halt the practice of *jhumming* have not been able to wean away the tribal people from this practice. Rehabilitation programmes in the past have not been successful to the desired degree. It is therefore important to adopt integrated programmes involving all development departments...'

Mizoram

'...To increase productivity, a clear policy to control shifting cultivation (*jhumming*) needs to be evolved by the State, as the present policy has not given desired results. The schemes and programmes under implementation by Rural Development, Agriculture and other Departments for control of shifting cultivation need to be constantly reviewed or modified, based on experience gained, to make them more effective. Simple or appropriate technology with minimal financial involvement should be introduced to the farmers, keeping in mind the position of the poor farmers.'

Manipur

'...Practice of shifting cultivation should be confined to well-defined zones outside Reserved Forests. The abandoned *jhum*

land should be developed through sustainable agricultural practices. Van Vigyan Kendras and demonstration centres should be established at block/sub-division level for providing extension services and necessary inputs to the people. [We must] search for alternatives to shifting cultivation (*jhumming*) and implement at the three tier system of agroforestry (e.g. the top portion of hills/mountain to be stocked with forestry, the middle for horticulture and the base for agriculture), so as to develop socio-economic conditions and potential production of soil sustainably....'

Nagaland

[Recommendation is] 'a package comprising of planting trees as a *jhum* crop, land shaping to control soil erosion and cultivation of shade-tolerant commercial crops such as black pepper, betel vine, cardamom, ginger, turmeric etc. under the trees to bring income from the same *jhum* fields during the gestation period of the trees. By this, the income per unit area of *jhum* field per unit time can be increased manifold. Agro-forestry is therefore, proved to be the main tool for sustainable economic development, which can transform the destructive force of *jhum* cultivation into a generative force of economic growth.'

2. Ensure Water Security for Agriculture Through Decentralised Means

Ensure security of water through decentralised water harvesting, conservation, and management, including participatory watershed management. Such tapping of water should be ecologically appropriate and diverse in nature, depending on the cropping patterns that are suitable to the agro-ecological conditions, rather than one standard prescription throughout the country (*see also Section 7.1.7.2*). Water harvesting should also be linked to the protection of catchment vegetation and other measures that could conserve biodiversity. Successful initiatives towards this from various parts of the country need to be learnt from and built upon.

Justification: Agriculture in many parts of the country has suffered from severely inadequate water supplies, on the one hand, and surplus supplies on the other. In both these cases, agricultural land and resources are degraded, and/or over-exploited. It is important to move away from the notion that the more the water, the better for agriculture and human welfare. The approach should be built on an understanding of how much water needs to be tapped/stored, for it to meet human needs, to ensure that essential ecosystem functions are not destroyed, and to sustain non-human species as well.

Suggested Responsibility: Ministry of Water Resources, in association with other relevant ministries including Environment and Forests, Rural Development, and Agriculture; relevant departments at state level; all these through local community institutions, with help from NGOs and individuals.

Time Frame: 10 to 15 years to cover the entire country

Steps:

- i. Document, or disseminate existing documents on, successful community initiatives towards decentralised water harvesting and storage (such as the Tarun Bharat Sangh in Rajasthan, *see Arvari Sub-state Site BSAP*) and equitable water distribution (such as the Pani Panchayat in Maharashtra); analyse these cases for their relevance to the above action;
- ii. Make a national roster of community-level experts, including water 'diviners', with known expertise who can advise on where best to build water harvesting structures;
- iii. Formulate joint teams of formal and community experts, for each block in each state where water scarcity is a problem, to exchange with each other different methods of judging water availability and designing the harvesting structures;
- iv. Ensure that all proposals for major dams and canals are preceded by an exploration of decentralised and community-managed water harvesting and management systems, which should be adopted unless absolutely unfeasible;
- v. Train local community members, where necessary, in constructing water harvesting and management structures;
- vi. Commission independent, participatory monitoring, to assess the impacts of the above measures on biodiversity and livelihood security.



Ongoing Relevant GOI Schemes/Programmes:

- (i) National Watershed Development Project for Rainfed Areas, Watershed Development Fund, and Externally Aided Projects under Rainfed Farming Systems Programme, (ii) Scheme of Watershed Development Project in Shifting Cultivation Areas (WDPSCA) under Natural Resource Management of the Ministry of Agriculture.
- (i) Watershed Development Programme (WSD) of CAPART (ii) Integrated Wastelands Development Programme of the Ministry of Rural Development.

3. Ensure Fodder Security for Pastoral and Agricultural Communities

Adopt a range of measures to ensure secure fodder availability to pastoral communities, including pasture regeneration and conservation, access rights to and community based management of fodder resources, and provision of fodder from outside where local availability is inadequate. (see also Section 7.1.2.1, including Box 7.1.2.1, on grassland conservation and Section 7.1.4.1 and 7.1.4.3 on sustainable use).

Justification: One of the stated reasons for the decline of a number of indigenous breeds is the destruction of pastures or the denial of access to grasslands due to development and conservation projects; another stated reason is the decline in fodder availability and quality. It is therefore important that attempts be made to revive pastures where degraded, and provide access to grazing lands where it is currently denied, while keeping in mind the requirements of pasture sustenance (and the survival of wildlife dependent on them) and the need to provide quality fodder in areas of scarcity. Also critical is that such initiatives involve and are eventually managed by pastoral communities.

Suggested Responsibility: State Departments of Animal Husbandry, Revenue, and Forests, along with relevant grassland and pasture research institutions including the Indian Grassland and Agroforestry Research Institute; through local community institutions and pastoralist associations; assistance from Ministry of Rural Development, and MoEF.

Time Frame: 10 years.

Steps:

Adapted from Action 2 above

Ongoing Relevant GOI Schemes/Programmes:

- (i) Drought Prone Areas Programme, (ii) Desert Development Programme, (iii) Watershed Development Programme of CAPART (iv) Integrated Wasteland Development Programme of the Ministry of Rural Development.
- (i) Area Oriented Fuelwood and Fodder Projects Scheme of NAEB (ii) Grants-in-aid Scheme for Voluntary Agencies (iii) Trees and Pasture Seed Development Scheme under National Afforestation and Ecodevelopment Board of the Ministry of Environment and Forests.

4. Facilitate the Availability of Adequate Organic Manure and Draft Power

Take steps to increase and sustain the availability of organic or farm-yard manure (FYM), especially to small and marginal farmers.

Justification: Absence or reduction in numbers of cattle in the villages in several regions of India has been cited as a major reason for the failure to adopt biodiversity-friendly practices by a large number of farmers in different regions of the country. Cattle or farm-yard manure (FYM), and cattle-based draught power are very important for traditional cropping systems. This situation must be retrieved and the cattle population in such villages must be enlarged through a series of actions, while being mindful that there are no negative repercussions on natural ecosystems and wild species. Where an adequate number of cattle already exist, programmes to orient their use towards agro-biodiverse agriculture need to be devised.

Suggested Responsibility: State animal husbandry departments, through community and pastoralist institutions, with assistance from Ministry of Agriculture, and Ministry of Rural Development.

Time Frame: All needy regions within 10 years

Steps:

- i. Government income generation programmes to encourage farmers to increase their cattle herds in their villages, in regions where cattle population has seriously declined, and where fodder can be made available without damaging local ecosystems, through appropriate loans and other encouragement. Special loans for purchase of bullocks to be a part of the lending policy of banking institutions and state programmes like DRDA, DPAP, etc.;
- ii. Supplement current subsidies on chemical fertilisers with subsidies on farm-yard manure (FYM) in the short run; also extend loans for purchase of FYM to small and marginal farmers. Such subsidies could be gradually shifted in favour of FYM; (iii) Set up units for production of bio-fertilisers using cattle dung and other biological wastes in all villages; with adequate building of capacity, these can in many cases be backyard units run by households.
- iv. Publicise the full value of FYM, amongst farmers and pastoral communities (see Box 7.2.4.6).

Ongoing Relevant GOI Schemes/Programmes:

- National Project on Development and Use of Bio-Fertilisers of the Ministry of Agriculture.
- Biotechnology Based Programme for Women and Rural Development, under Biotechnology Based Programmes for Society, of the Department of Biotechnology.
- Biotechnology Complex for Women under Training, Capacity Building and Awareness Generation Projects, of the Department of Biotechnology.
- Technology Development Extension and Training (TDET) under Other Schemes of Wasteland Development Programme under Ministry of Rural Development.

Box 7.2.4.6 Manure is Gold

People know what they are saying

Eruvaa! Adokka Laxmi ('Manure! That is goddess of wealth') is a popular saying among the small farmers of Andhra Pradesh. A small survey done in village Pastapur, Zaheerabad Mandal, Medak District, Andhra Pradesh, brings to light a truly the economic dimension to this statement.

The survey was done on March 5, 2002 and covered 79 out of 412 households in the village, constituting a sample of about 20% of all households. The sample was distributed equally among the big and the small farmers as well as the landless. The big farmers in the sample constituted 12 households, small farmers 37, whereas the landless and marginal accounted for 29 households in the sample.

According to the findings of the survey, the 12 big farmers who were sampled used nearly 1100 tonnes of farm-yard manure (FYM), of which their own heaps produced about 485 while they bought 570 tonnes from other villagers. In terms of the financial worth of the FYM, the big farmers in the sample contributed about Rs 85,000. This also generated about 1600 person-days of wages amounting to about Rs 48,000. In terms of cart hire they paid Rs 25,000.

The small, marginal and landless farmers produced, used and sold 779 tonnes of FYM worth Rs 62,000. They also generated about 1050 person-days of labour, equivalent to about Rs 32,000.

When applied to the entire village, the FYM transaction every year was worth about Rs 12,72,040. Considering that the

annual budget of the Pastapur *panchayat* (Village Council) is Rs 15,00,000, the FYM transaction was equal to about 75% of this budget.

It is not for nothing that people say '*Eruvaa! Adokka Laxmi!*'!

Source: DDS staff, personal communication 2003

7.2.4.4 Strategy: Encourage Sustainable Pisciculture, Apiculture, Sericulture, and Supplemental Agriculture-Based Livelihoods

Actions

1. Facilitate Agro-Biodiversity-Based Enterprise and Livelihoods

Develop, facilitate and spread a range of agro-biodiversity-based enterprise and livelihood options. These would include traditional and new processed foods/beverages, agro-waste-based products, medicinal/aromatic/cosmetic products, etc., including value-added items. These options should be based on the following principles:

- i. Building on existing knowledge and skills;
- ii. Introducing technologies that are ecologically and socially appropriate (including being small-scale, non-resource intensive, and low power-dependent), and can be absorbed/learnt by communities;
- iii. Deriving lessons from biodiversity-based organic farming;
- iv. Empowering marginal farmers and the landless, and in particular women amongst them, to manage the enterprises and to equitably derive the benefits;
- v. Catering first to local markets, and only then to national and international markets, with least dependence on the latter.

Justification: A substantial number of livelihoods based on farming are seasonal, and as agricultural lands get more and more fragmented, there is a need for supplementary livelihood activities. Conventional attempts at promoting these have largely been delinked from, or actually destructive of, biodiverse organic farming. They have also often been dominated by corporate and big farmer interests. Initiatives that avoid these pitfalls and promote ecologically sustainable enterprises based on a diversity of agricultural products are beginning to emerge. Such initiatives could be built upon and learnt from, for popularising an alternative to conventional agro-produce development.

Suggested Responsibility: Local community institutions and farmer networks, with support from Ministries of Agriculture, Rural Development, Handicrafts, and Environment and Forests, along with All India Handicrafts Board, Department of Indian Systems of Medicines and Homeopathy (National Medicinal Plants Board) and institutions like CAPART, CART, Indian Institute for Rural Industrialisation, and relevant NGOs..

Time Frame: Ongoing

Steps:

- i. Collate a list of supplemental agro-biodiversity-based enterprises and livelihoods that already exist in different agro-ecological conditions, and assess their suitability to areas/communities that need such inputs;
- ii. Add to this list new enterprises and livelihoods that are being developed in public and private sector institutions, including ideas for value addition to traditional produce that is currently under-valued;
- iii. Provide advice and orientation (including on the principles stated above) to relevant community-level institutions and networks, on options for such livelihoods;
- iv. Provide support (financial, technical, human) through agricultural extension services, KVKs, NGOs, and other community-level institutions, to promote such livelihoods;
- v. Facilitate exchange amongst communities to share experiences and expertise.



Ongoing Relevant GOI Schemes/Programmes:

- Central Scheme for Development and Cultivation of Medicinal Plants, of the Department of Indian Systems of Medicine and Homeopathy.
- Operational Guidelines for Financial Assistance through National Medicinal Plants Board, National Medicinal Plant Board.
- Swarnajayanti Gram Swarozgar Yojana (SGSY), under the Activities in North East Programme, of the Ministry of Rural Development
- (i) Science & Technology for Weaker Section, Science and Technology for Women DST and Special Component Plan (SCP) schemes under Societal programme, under Department of Science and Technology
(ii) Biotechnology based programmes for Scheduled Caste and Scheduled Tribes under Biotechnology Based Programmes for Society, of the Department of Biotechnology.

2. Promote Sustainable Cultured Fisheries

Encourage sustainable inland and coastal pisciculture, through traditional and new techniques that are ecologically friendly and culturally appropriate. Use indigenous species rather than exotic ones, and reintroduce species that were originally present but were pushed out by exotics or other factors.

Justification: Fish culture, either by itself or in association with agriculture, is an important source of food and livelihood for poor people across India. Market forces or inappropriate schemes have however in many cases forced it into unsustainability through over-exploitation of the ecosystem and species, or the introduction of exotics that have displaced indigenous diversity. Simultaneously big commercial actors have in many places pushed out the traditional fisherfolk or farmers. There is an urgent need for reviving sustainable cultured fisheries and ensuring livelihoods to small landholders and landless farmers.

Suggested Responsibility: Fishworker and farmer organisations, with support from Central Inland Fisheries Institute, Central Institute of Freshwater Aquaculture, Central Institute of Brackishwater Aquaculture, NBFGR, MoA, state Fisheries Departments, and other relevant institutions.

Steps:

- Conduct state-level and national surveys of ongoing pisciculture practices, the threats to these, and the potential for encouraging sustainable fish culture;
- Conduct research into the potential for culture of indigenous species that are not currently being cultured or are under-used, including threatened species that may benefit from culturing;
- Provide support mechanisms, including financial, technical, and humanpower inputs, to communities engaging in, or wanting to engage in, sustainable fish culture; this should include enhancing the availability of indigenous fish seeds;
- Promote fisheries-farming and other mixed practices such as paddy-pisciculture, which would enhance diversity and create greater livelihood and food security;
- Ensure tenurial rights to traditional fisherfolk and farmers engaged in this activity (*see also Strategy 7.2.5.1*);
- Conduct participatory monitoring to assess impacts of such activities on biodiversity and on livelihoods.

3. Promote Sustainable Apiculture

Encourage apiculture for honey production and for crop/tree pollination, using native species/strains of bees, and maintaining/enhancing ideal hive sites, including appropriate trees.

Justification: Honey production from apiculture has been an important source of livelihood for farmers, plantation managers and landless people across the country. Additionally, apiculture has been a critical element of crop and tree pollination in organic and biodiverse farming. However, in many parts of India the indigenous bee species have lost out to exotics, or been affected by serious diseases and habitat loss. They need to be brought back into focus, and the ecological conditions for their growth and propagation need to be revived/strengthened. Non-violent honey collection should be promoted as an alternative to conventional practices that destroy the beehive.



Suggested Responsibility: Farmer and other honey producer associations and networks, with support from MoA, Bee Research Institutes in various states, consumer networks and marketing institutions such as the Khadi Village Industries Commission (KVIC).

Time Frame: Ongoing

Steps:

- i. Collate available studies on the current status of indigenous bee species (such as *Apis cerana*) and their use in honey production, and assess the key gaps;
- ii. Collate studies and observations on sustainable honey production methods, including traditional and new 'non-violent' techniques;
- iii. Disseminate the results of these studies widely amongst farmer and honey producer groups, in local languages;
- iv. Support honey production using indigenous species through various means, including provision of pure line indigenous bees, financial and material incentives, assured higher market price, assistance with planting/protecting appropriate plant species, etc.;
- v. Facilitate fair marketing of the honey through consumer associations, KVIC outlets and other such government and non-government networks;
- vi. Ensure that plantation and regeneration activities, on degraded lands, use species that are favoured by indigenous bees; provide incentives to private parties and NGOs to do the same.

4. Promote Sustainable Sericulture

Encourage sericulture, in particular through non-violent means, using indigenous silkworm species and host plants.

Justification: Sericulture has been a major source of livelihoods for several million people in India, but emphasis on non-violent methods and on indigenous species of silkworm and host plants has remained weak. The potential for achieving forest and plant diversity conservation in connection with sericulture is not adequately tapped.

Suggested Responsibility: Farmer and artisanal communities, with support from the Central Sericulture Research and Training Institute (Mysore), Central Silk Technological Research & Training Institute (Bangalore), Central Tasar Research and Training Institute (Ranchi), and other R&D institutions and NGOs.

Time Frame: Ongoing

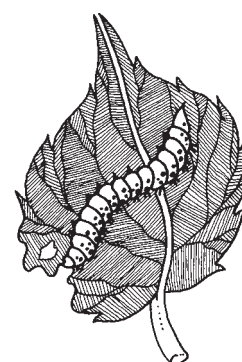
Steps:

- i. Document (or build on available documentation of) diverse sustainable methods of sericulture already being practiced in India;
- ii. Promote through incentives, exchange visits, marketing links and other means, the above or newer methods;
- iii. Coordinate with relevant forestry institutions (governmental and community-based) to work out models of conservation and sustainable use of host plant species (as in the work promoted in the Garhwal Himalaya by the Biodiversity Conservation Network project, see Box 6.32).

5. Promote Sensitive Tourism Based on Agro-Biodiversity

Take steps to encourage tourism based on agro-biodiversity, including cultural tours through cultivated landscapes and agro-biodiversity hotspots (see Section 7.2.2.1), the promotion of traditional and local cuisine based on local crops in tourism ventures, and holding agro-biodiversity festival and fairs (see Section 7.2.6.2 Action 2). In so doing, keep in mind the cautions and steps recommended in Strategy 7.1.4.5.

Justification: Ecotourism has so far concentrated on natural ecosystems, and cultural tourism has been restricted to the promotion of arts and crafts; however, in none of these have the practices and cultural aspects of agro-biodiverse farming and pastoralism been highlighted. Such tourism is beginning to become popular in some other countries, e.g. in South and Central America, and there is every likelihood that it could become popular in India as



well. It must be ensured, however, that the initiative is managed by farming and pastoral communities themselves, for which appropriate policy/programmatic support and capacity building may be necessary. Cultural and ecological safeguards, as appropriate to any form of ecotourism, will also need to be in place (see *Strategy 7.1.4.5*).

Suggested Responsibility: Farming and pastoral community institutions and associations, with support from the Ministry of Tourism, relevant agricultural and animal husbandry institutes and departments, and help from NGOs and institutions working on agro-biodiversity.

Time Frame: Ongoing, starting with a few representative sites over the next 5 years.

Steps:

- i. Set up a working group, hosted by the Ministry of Tourism and consisting of farming/pastoral community representatives, NGOs and other relevant ministries/departments, to identify a set of sites/regions in India which have such tourism potential, including a shortlist for initial exploration, and to formulate guidelines to promote agro-biodiversity-based ecotourism at these sites;
- ii. Carry out EIAs and social impact assessments of tourism proposals for these sites;
- iii. Initiate capacity building exercises amongst the farming and pastoral communities at these sites, to manage tourism in an ecologically sustainable and socially equitable manner;
- iv. Support the development of appropriate facilities, starting with basic adventure tourism type infrastructure managed by the communities;
- v. Introduce, on a small scale to start with, tourism activities at these sites;
- vi. Conduct participatory monitoring and assessment of these activities, over 5 years, and then, based on lessons learnt, extend the activities to other sites.

7.2.4.5 Strategy: Promote Organic Consumer Networks and Markets

Actions

(see also Section 7.2.10.1, on Organic farming technologies)

1. Promote Organic Food and Agro-Produce Markets

Promote organic agro-produce, including food, cotton, milk, and other items, through appropriate public sector outlets and networks such as Khadi Gramodyog, Amul, Mother Dairy, and private sector outlets. In so doing, learn from the experience of a number of NGO and private stores that have come up in major metropolises, and from the recently initiated *Desi Ahar* brand of the Khadi and Village Industries Commission.

Justification: One of the most common complaints of farmers who still practice organic, biodiverse agriculture, or those who want to switch to such agriculture, is that the markets are not available or accessible. With state facilitation, this could be to an extent solved, especially in conjunction with the actions suggested on the PDS and other government food/health schemes (see *Sections 7.2.4.1 and 7.2.4.2*). This move would also have enormous health benefits, given the rising number of illnesses relating to toxic chemicals in food.

Suggested Responsibility: Ministry of Agriculture, Ministry of Commerce, Ministry of Consumer Affairs, Food, and Public Distribution, the Handicrafts Board, KVIC, along with consumer groups, retail and shop-owner associations, and linking to relevant farming communities and groups such as Beej Bachao Andolan, Navdanya, and Green Foundation.

Time frame: 3 years for first representative set of outlets across major towns/cities of India; ongoing thereafter.

Steps:

- i. Collate information (through the proposed National Institute of Organic Farming) on existing organic produce outlets in the public and private sector, and assess key gaps in geographical or product-wise coverage;
- ii. Provide incentives to small-scale, local outlets, preferring them over the large market chains which would





- otherwise monopolise this growing sector;
- iii. Encourage restaurants to serve traditional and indigenous recipes made from organic produce and indigenous varieties, and where possible to access their agricultural produce directly from organic farmers;
 - iv. Provide, through agricultural service centres, KVKs, etc., reasonably priced facilities for transportation, packaging, quality control, etc.; build on existing initiatives such as those for developing organic animal husbandry standards by APEDA, Ministry of Commerce and Industry;
 - v. Provide special attention to 'marginal' areas (mountains, coasts, forested belts, and so on), which still retain considerable organic cultivation, and where such steps could help to reverse the process of conversion to chemical-intensive, monocultural practices;
 - vi. Monitor the trends to see if the above steps are resulting in an increase in organic, biodiverse farming, in greater access of consumers to organic produce, and in an expanding market for organic produce.

2. Encourage Organic Consumer Networks

Provide encouragement and support to consumer groups, including at residents' associations, clubs, and other existing citizens' forums, to promote organic agro-produce. In so doing, learn from existing consumer groups or networks of this type that are already accessing organic agro-produce.

Justification: Consumer groups are today generally unaware of the organic farming issue, but could, if adequately informed and supported, provide a major incentive to farmers to practice organic, biodiverse agriculture.

Suggested Responsibility: Ministry of Agriculture, Ministry of Consumer Affairs, Food, and Public Distribution, in association with consumer movements and groups across India, the mass media and relevant NGOs.

Time Frame: Ongoing

Steps:

- i. Document and learn lessons from the ongoing initiatives at mobilising consumers to access organic agro-produce;
- ii. Identify consumer networks, residents' associations, ward committees, etc., at local and state level, that could be approached to become guaranteed organic produce buyers;
- iii. Offer incentives, both financial and material (e.g. transport and quality control facilities at subsidised costs, at least to start with), to farmers and consumers to link up with each other on a direct basis (including through field visits for consumers to the organic farms);
- iv. Provide widespread publicity to the availability of organic produce, and its ecological, health, and livelihood benefits (this is especially necessary as such produce may initially be more expensive than the conventional produce).

7.2.5 Domesticated Biodiversity: Strategies and Actions for Equitable Access, Use and Sharing of Benefits

Overall Strategies:

1. **Ensure security of tenure to lands and waters on which traditional farmers, pastoralists and fisherfolk depend**, including by updating and clarifying land records, removing vested interest encroachments on grazing/pasture and other common lands (while treating encroachment in the nuanced manner laid out in *Strategy 7.1.5.2*), redistributing surplus lands to landless and marginal farmers, facilitating marginal farmers to consolidate their lands while retaining control, etc.;
2. **Facilitate inter- and intra-community equity**, including in land/water relations (modelled on *Strategy 7.1.5.3*); in particular, **ensure gender equity in agriculture**, including through incorporation of women's perspectives in agricultural planning, increasing women's role in agricultural extension, guaranteeing or granting land/water rights to women, etc.;
3. **Ensure livelihood security for nomadic pastoralists**; this would entail security over grazing or other migratory routes, renewed relations and arrangements with settled communities, etc.;

4. **Protect traditional agriculture-related knowledge**, including actions contained in Strategy 7.1.5.4;
5. **Ensure equitable benefit-sharing in the case of agricultural material and knowledge of communities** that is used by outsiders, including actions contained in Strategy 7.1.5.5; in particular, clarify the ownership of *ex situ* seed collections and ensure equitable benefit-sharing to the original holders of the seeds, through the repatriation of information and material to the original holders, entering into agreements for the transfer of material, and other such measures.

Box 7.2.5.1 Equity Aspects in the Agriculture Policy

'Indian agriculture is characterized by predominance of small and marginal farmers. Institutional reforms will be so pursued as to channelise their energies for achieving greater productivity and production. The approach to rural development and land reforms will focus on the following areas:

- Consolidation of holdings all over the country on the pattern of north-western States.
- Redistribution of ceiling surplus lands and waste lands among the landless farmers and unemployed youth with initial start-up capital;
- Tenancy reforms to recognize the rights of the tenants and share croppers;
- Development of lease markets for increasing the size of the holdings by making legal provisions for giving private lands on lease for cultivation and agribusiness;
- Updating and improvement of land records, computerization and issue of land pass-books to the farmers; and
- Recognition of women's rights in land.

'The rural poor will be increasingly involved in the implementation of land reforms with the help of Panchayati Raj Institutions, Voluntary Groups, Social Activists and Community Leaders.'

National Agriculture Policy 2000

7.2.5.0 Strategies Adapted from Section 7.1.5

Many of the strategies and actions given under Section 7.1.5, on equity issues relating to wild biodiversity, are relevant to domesticated biodiversity as well. They can be adapted with minor modifications (including for instance 'Suggested responsibilities', which in the case of the strategies below will also lie with farmer/pastoral/fisherfolk groups/networks, people's movements, revenue and other district authorities, agricultural ministries/departments, and so on). This overlap is especially true of the following:

- Section 7.1.5.2, on **Encroachment**, in so far as many customarily and traditionally cultivated lands with significant agro-biodiversity (including many shifting cultivation areas) are considered encroachments due to the non-recognition of the ancestral rights of local (especially adivasi) communities while declaring their lands as state-owned revenue or forest lands, but also because encroachments by vested interests and settlers from outside have often been on valuable pasture and common lands, reducing their contribution to agro-biodiversity. This is an issue that needs to be sorted out balancing conservation and livelihood requirements (see also Strategy 7.2.5.1, Action 3);
- Section 7.1.5.3, on **Inter- and Intra-community equity**, in so far as inequity, particularly gender based, affects land/water relations in agriculture as well, and it is crucial that this be tackled if household food and health security based on sustainable biodiverse agriculture are to be achieved (see also Strategy 7.2.5.3);
- Section 7.1.5.4, on **Traditional knowledge**, in so far as protection of women and men's knowledge relevant to agro-biodiversity is of critical and urgent significance;
- Section 7.1.5.5, on **Equitable benefit-sharing**, in so far as the wider use of traditional knowledge on agro-biodiversity should bring in benefits to communities on principles of socio-economic and gender equity, and communities should have equitable access to the market (see also Strategy 7.2.5.5);

These are hence not being repeated here, unless it is necessary to do so in relation to another point. **It is therefore important to read the strategies and actions contained here in conjunction with and additional to the ones listed above.**

7.2.5.1 Strategy: Ensure Secure Tenure to Women and Men Farmers, Pastoralists, Artisans and Fisherfolk Over Land/Water

Actions

1. Clarify and Update Land Records

Clarify and update land (and water) records, including customary and traditional rights to agricultural lands, common pool lands and waterbodies, marine/coastal resources, the boundaries of these rights in the current context, and the responsibilities that would accrue with these rights. This exercise should be carried out in a transparent, participatory manner. It should especially focus on the customary rights of nomadic communities, of *adivasi* communities, and other underprivileged sections, ensuring explicit attention to women's rights within all groups, since in most of these cases there are poor written records and/or no formal recognition of customary rights at all.

Justification: Land records in India are mostly outdated or confusing, often the source of jurisdictional disputes even between different government departments. Given the rapid changes that have taken place regarding land/water use in the last few decades, it is imperative to update and clarify the current status of land/water rights including common pool land/freshwater/marine resources. However, this has been an extremely difficult exercise even when attempted, partly because of extremely poor existing records, lack of transparency in the exercise of discretionary authority by revenue functionaries, fraud by vested interests, and/or political expediency. It is important to find innovative ways of doing this, as have been used for instance by a District Collector in Maharashtra recently where the land records of thousands of farmers in Amravati District were corrected through public hearings, or by states like Kerala and West Bengal (see Section 6.2.5.2, and Box 6.75), or as recommended in the case of forest lands by the Commissioner of Scheduled Tribes and Scheduled Castes in 1990 (Sharma 1990).

Suggested Responsibility: Ministry of Agriculture, Ministry of Irrigation, Ministry of Rural Development, Ministry of Tribal Affairs, Ministry of Environment and Forests, Ministry of Social Justice and Empowerment, along with State departments of Forest, Tribal Welfare, and Revenue, land survey organisations, local NGOs and community organisations/ federations, and *panchayat* bodies/*gram sabhas*.

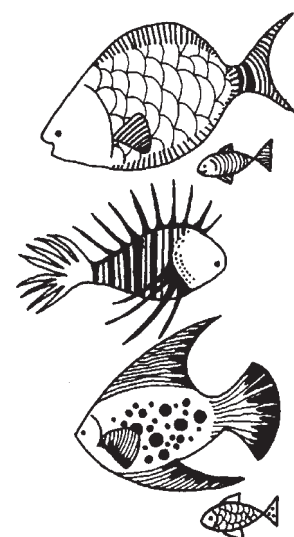
Time Frame: 5 years.

Steps:

- i. Collate and make publicly available existing land (including wetland) records at village level, including records of common pool resources;
- ii. Conduct a series of public hearings in each village, to discuss and resolve conflicts over competing claims, unsettled rights, encroachments and other disputes, with special provisions to ensure that underprivileged sections get an adequate chance to be heard;
- iii. Clarify the discrepancies and disputes between forest and revenue departments, or other relevant departments including irrigation, panchayat, public health (for drinking water), fisheries and animal husbandry;
- iv. Assess the possible ecological impacts of changes that are proposed in existing land/water rights based on the above exercises;
- v. Prepare clear, village-scale maps, using informal and formal mapping methods including GIS and GPS, and a database of the updated land records;
- vi. Computerise these records, as also make them available in hard copy in each hamlet/village at a prominent public place; build the capacity of local women and men to upgrade the records from time to time, including when land transactions or inheritance takes place.

2. Provide Secure and Clear Tenure Based on the Above Update

Provide secure and clear tenure to traditional farming, pastoral, artisanal and fishing communities. This should include both common property rights over pastures, forests, wetlands, and other lands, as also individual



rights of women and men over agricultural fields. In particular, this should also include the common traditional or customary rights enjoyed by nomadic communities, in whose case adaptations in the exercise of their rights for conforming to changing conditions will need to be negotiated/ done in consultation with resident communities (e.g. for deciding on mutually acceptable migration routes). In all cases, granting and confirmation of rights should be in keeping with considerations of ecological sustainability incorporating community criteria of sustainability, and social/economic and gender equity, and should be accompanied by a set of responsibilities relating to these considerations.

Justification: Millions of peasants, pastoralists, artisans and fisherfolk today exist in a state of uncertainty, because they do not have a title deed to the lands and waters that they have traditionally or customarily used for agricultural, pastoral, artisanal and fishery-based livelihoods. This situation often creates a lack of stake in maintaining and enhancing biologically diverse and sustainable farming, pastoral, and fishing practices.

Suggested Responsibility: Ministry of Agriculture, Ministry of Rural Development, Ministry of Tribal Affairs (for guidelines and incentives); and State government departments dealing with agricultural, *de facto* pasture lands and common lands/water resources, along with *panchayat* bodies and *gram sabhas* (or other relevant traditional institutions in adivasi and indigenous people's areas) and local people's organisations, women's groups, social activists and NGOs.

Time Frame: 10 years

Steps:

- i. Following up on the exercise in Action 1 above, grant clear joint or individual titles to women and men, combined with unambiguous common property rights to the village/hamlet or user group;
- ii. Enable the actual use of the title by the right-holders in cases where they were earlier denied this right, through appropriate state and NGO support.

3. Remove Encroachments by Vested Interests on Grazing Lands, Make Legal Land Classification Compatible with Actual Uses, and Develop a Pasture Land Policy

(Read with *Strategy 7.1.5.2* on encroachments in general, and *Strategy 7.2.5.2* on land reforms.)

Rationalise land use classification by redesignating *de facto* and customary village grazing lands from 'wastelands' to pastures; empower and assist institutions of rightholders and gram sabhas to evict land-grabbing encroachers (vested interests such as the land mafia, big landlords, industrial/urban interests, etc.), while settling the rights of long-standing users; where possible remove developmental incursions on village grazing lands; develop a clear grazing/pasture land policy to prevent diversion of grazing land to other uses without the prior and informed consent of the right holders.

Justification: One of the major causes of the decline in indigenous livestock diversity is the loss of grazing lands and pastures, especially since many of the indigenous breeds are adapted to free-range grazing. A part of this loss is due to encroachments, often encouraged by powerful vested interests, sometimes abetted by official agencies. Another part is due to diversion for development projects, for rehabilitation of displaced people or for privatization through land distribution programmes, often due to the classification of grasslands/pastures/rangelands as revenue 'wastelands', considered readily available for other uses. This kind of loss has to be stemmed and stopped; otherwise the decline in indigenous breed diversity and the diversion of grazing pressure on to more sensitive ecosystems like forests will only intensify. Secure pasture/grazing lands with clear CPR rights are equally important for supporting agro-pastoral livelihoods of most small, marginal farmer households, the landless and poor women.

Suggested Responsibility: State Revenue, Forest and Animal Husbandry departments, *panchayat* bodies and *gram sabhas*, and pastoralist and farmer associations.



Time Frame: Removal of encroachments and, where possible, developmental incursions, within 10 years; protection of pastures ongoing through developing legislation protecting them from conversion to other uses or from privatization through land distribution.

Steps:

- i. Consolidate available village level maps of both *de facto* and *de jure* pasture and grazing lands (including revenue 'wastelands' and 'forest' lands), which show the diversion or encroachment that has taken place; make fresh maps where these do not already exist or are outdated;
- ii. Get the revenue land category changed to pasture land in the land records where appropriate;
- iii. Integrate strict protection measures for such lands into relevant laws;
- iv. Devolve clear authority to user groups at hamlet/village level through *gram panchayat/gram sabha* or other local institution of governance as in the north-eastern states, and empower/assist them to take action against vested interests in land;
- v. In extremely serious cases of loss, penalise the relevant department and/or *panchayat*, as appropriate, after verifying the records through a multi-departmental/stakeholder forum in a transparent manner)
- vi. Remove encroachments and, where possible, development infrastructure, and hand over the pastures to pastoralist associations and/or *panchayat bodies/gram sabhas*, with a facilitation and monitoring role by the Revenue and Animal husbandry departments in association with democratic pastoralists/community associations and other stakeholders; in so doing, ensure that the traditional rights of access of other landless, marginal/small farmers who own livestock are secured.



7.2.5.2 Strategy: Move Towards Land Consolidation and Redistribution for Underprivileged Sections

Actions

1. Redistribute Surplus Lands Amongst Landless and Marginal Farmers

Identify surplus agricultural or cultivable lands (those above the land ceilings, agricultural lands lying fallow for considerable periods, or those which are truly wastelands not being used for survival purposes and not important for wildlife; redistribute these lands amongst the landless and marginal farmers giving *pattas* in the names of individual women and men where single, or jointly where married. In attempting this, learn from lessons of the failure of past land reforms in many states, and the successes achieved by other states like Kerala and West Bengal (see Section 6.2.5.2 and Box 6.75), or where people's organisations have been active. Encourage farmers given this surplus land to adopt biologically diverse, organic farming by providing incentives and support (as listed in Sections 7.2.2.4, 7.2.4, and 7.2.9.2). Also encourage home gardening in redistributed plots that are small, especially by providing support to women farmers and home gardeners (see Action on Home gardens, in Section 7.2.2.5).

Justification: While a substantial section of the peasant population has to survive on increasingly smaller and more fragmented landholdings, or has no land at all, there still remain extremely large holdings in many states of the country. As discussed in Chapter 5.2, this has a strong bearing on agro-biodiversity and on neighbouring forests and wetlands. Unfortunately, the past record of most state governments has been poor in attempting to balance out this inequity through land reforms. In addition, the current phase of globalisation and liberalisation is leading to policies and programmes in which corporate and contract farming is being encouraged, often increasing the inequities as some big farmers and corporate houses corner larger and larger chunks of land. There is a clear need to reverse these policies, and to vigorously implement land redistribution based on more innovative methods.

Suggested Responsibility: *Panchayat* bodies, with support from state governments and relevant central ministries, and guidance from NGOs, women's groups and community institutions who have experience in gender- and equity-sensitive land redistribution.

Time Frame: 10 years

Box 7.2.5.2 Gender Aspects in the Agriculture Policy

'Mainstreaming gender concerns in agriculture will receive particular attention. Appropriate structural, functional and institutional measures will be initiated to empower women and build their capabilities and improve their access to inputs, technology and other farming resources....The approach to rural development and land reforms will focus on...Recognition of women's rights in land.'

National Agriculture Policy 2000

'Wherever women do not have rights in land or forest, they should be provided immediately.'

Report of the Planning Commission Task Force on Greening of India

7.2.5.3 Strategy: Integrate Gender Equity into Agriculture

Overall Justification: In all discourses on gender and empowerment, the issue of agro-biodiversity should be made central, as in many communities in fragile ecosystems women are central actors in agricultural production and ensuring household food security. Biodiversity in agriculture is one of the key instruments which has enabled women to combine nutritional diversity, health and food security. Women have historically played and continue to play a key role in seed selection, conservation and crop planning, and in maintaining indigenous livestock, especially in rainfed farming systems. Such systems have remained central to agrodiversity in India. However, women's lack of independent land and resource rights, and the neglect of their central role in traditional farming systems by the formulators of policies, have resulted in their progressive disempowerment and marginalisation, the erosion of their critical skill base, and the loss of a critical part of their intellectual leadership of the community. These factors have also resulted in erosion of agro-biodiversity itself.

Therefore, all policies on making agriculture gender sensitive should concentrate on creating a major space for diversity in cropping and livestock systems built on foundations of secure resource rights; conversely, all programmes aimed at sustaining and enhancing agro-biodiversity should concentrate on empowering women through land rights and access to other resources (see Box 7.2.5.2).

Actions

1. Introduce Women's Perspectives on Yield and Biodiversity into Agricultural Extension and Information Dissemination Work

Infuse agricultural extension and information dissemination work with the unique perspectives of women farmers and pastoralists, in particular small-holders. This needs not only the integration of women into the extension services, but more than that, a re-orientation of extension and information workers along the lines of gender-sensitivity (including the knowledge, rights, needs, and cultural and natural links of women).

Justification: The perspectives of women farmers and pastoralists are often different from those of men. The latter seem to be more inclined towards the outside market, towards commercial production and maximising revenue, whereas the former are more concerned about their own domestic requirements for food, shelter, livestock, entertainment etc. (which are met from biologically diverse agricultural systems). Women argue that conventional, monocultural agriculture often deprives themselves and their children of a) adequate food, b) nutritious food, c) variety of foods, and, d) safe foods, all of which would be possible in their own biodiverse agriculture. They also frequently assert that in organic, biodiverse agriculture, there is nothing called a weed. All such plants are food, fodder, or medicine.

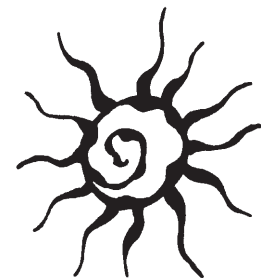
Women's view of what an agricultural system should look like is, therefore, often more sensitive to biodiversity than that of men who have gained market and 'outside' access. Yet, such perspectives have not been built into agricultural education and extension programmes.



Suggested Responsibility: MoA and state agricultural extension agencies, with women farmer groups such as DDS, other organic farmers networks and NGOs working on gender issues.

Steps:

- i. Devise curricular and extra-curricular inputs into agricultural extension training programmes;
- ii. Identify resource persons from amongst communities, institutions and NGOs to undertake orientation sessions in such programmes, both for in-service extension workers and for new ones;
- iii. Arrange visits of extension workers to communities and groups where women-oriented agricultural work is being carried out.



2. Move Towards Women Occupying At Least Half of the Agricultural Extension Personnel Positions

Set a target of at least 50% of agricultural extension personnel being women. Even among these, it should be ensured that there is a significant induction of women farmers from the small and marginal sections, by making the recruitment qualifications more flexible if this is needed. This action will bring a range of agro-biodiversity expertise into the extension system.

Suggested Responsibility: Ministry of Agriculture with state agriculture departments.

Time Frame: 10 to 15 years

3. Integrate Gender Aspects Centrally into the National and State Level Policy and Strategy Documents

Following up from the overall thrust in the National Agriculture Policy (NAP) 2000, gender aspects need to be centrally integrated into all national and state level agricultural strategies and programmes. The links between women's rights/roles and agro-biodiversity need to be clearly brought out in these.

Justification: Both in the NAP 2000 and in the Planning Commissions' Approach Paper to the 10th 5-Year Plan, while there is a thrust towards women's rights and roles, this is not clearly linked to agricultural schemes and programmes, or to the issue of agro-biodiversity. This critical gap needs to be filled urgently.

Suggested Responsibility: MoA, Ministry of Social Justice and Empowerment, Ministry of Rural Development, PRIs/Gram Sabhas, Planning Commission, and relevant state departments.

Time frame: 3 years

4. Secure Land and Water Rights for Women

In the process of land redistribution and consolidation (*see Section 7.2.5.2*), ensure that the Government of India's longstanding policy, that at least 40% of new land *pattas* must be in women's exclusive names and the rest in joint names of husband and wife, is implemented. This should also be implemented while granting land titles to those who do not yet have them, during settlement operations or while regularizing pre-1980 forest encroachments, so that women are prime beneficiaries. It also needs to be ensured that uncertainties in current landholdings by women, where they often do not have the title deed, are ironed out in their favour. Laws and policies relevant to land inheritance, at the centre and in states, need to be reviewed from this point of view.

States like Andhra Pradesh have introduced a scheme of land purchase at a subsidised price for women from Scheduled Castes. Schemes like this must be promoted and enlarged. Women, especially from the marginalised sections of society, as owners of farmlands and independent water rights are very likely to conserve and enhance diversity on their farms. However, care must be exercised that the personnel from agricultural extension and DRDA do not force them to raise crops in the conventional monocultural and chemical intensive way. In several cases, pressure is brought upon women (and other marginalised land owners) to practice floriculture or other monocultural cash cropping, when they would have themselves preferred or could have been encouraged to cultivate food crops. Instead, the security over land should be linked to providing incentives for bio-diverse, organic farming (*see Action 5 below*).

Suggested Responsibility, Time Frame, Steps: As in *Strategy 7.2.5.1*

5. Provide Incentives to Women for Maintaining Agro-Biodiversity

Social, material, and financial incentives should be extended to those women farmers who are committed to growing diverse food crops on their lands. This will not only give them the much needed financial assistance but also enhance their self-esteem and build confidence that they are practising the right thing and that the state endorses their practice. Such incentives should include social recognition, awards, material inputs including farm tools, educational and other facilities for their children, subsidies to offset opportunity costs, and other such measures (see also *Section 7.2.9.2* on Incentives).

Justification, Suggested Responsibility, Time Frame, Steps: As in *Section 7.2.9.2* below.

6. Establish Rural Enterprises Based on Traditional Crops

Hulling and grinding can by themselves be profitable enterprises. There are also demands for some of the ready to eat foods like *papads*, *murukkus*, biscuits and such other preparations for urban people who either do not know how to cook millets or do not have enough time on hand. Once such enterprises start, there can be a ripple effect, with new enterprises coming up. Women's groups taking up such activities could federate to set up their own marketing federations with the support of GOs and NGOs with the necessary competence.

Set up dehusking mills in the villages to process millets because millets are tiny and hard-shelled. The normal pounding and milling mechanisms do not work for millets. Earlier people used to hand pound or grind the millets wrapped in leather sheets. But the habit of hand pounding and grinding has disappeared from most parts of rural India. Therefore we need special dehusking mills, which exist but not in sufficient quantity.

(For other details, see recommendations on Enterprise in *Section 7.1.4.4, Action 6*, and *Section 7.2.4.4 Action 1*).

7. Take Culturally and Ecologically Appropriate Measures to Reduce Drudgery of Agricultural Practices

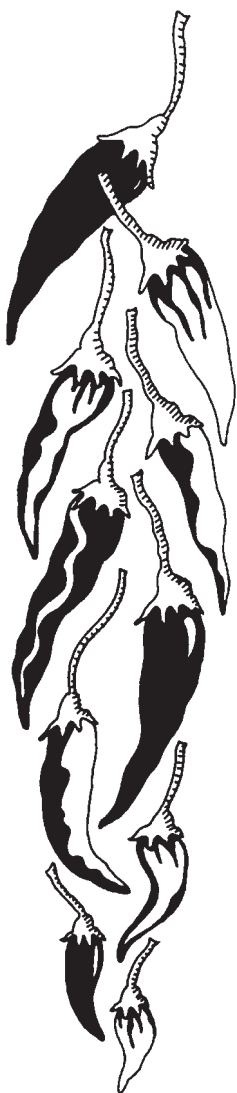
Introduce modifications in current agricultural practices that involve unnecessary drudgery on the part of women (and men), ensuring that the modifications are ecologically and culturally sensitive. This would include practices relating to weeding and hoeing, sowing, fuel and fodder collection, maintaining/enhancing fertility of the soil, etc.

Justification: Traditional, biodiverse agriculture can often involve hard labour through the day, much of the burden falling on women. In changed circumstances relating to labour, families, links with the external world, alternative livelihoods, etc., such agriculture might increasingly seem to be a less attractive option than others. Finding and propagating drudgery-reducing measures, especially those that involve modifications in existing practices and are therefore likely to be culturally and ecologically more sensitive, could be a major factor in retaining interest in biodiverse organic farming.

Suggested Responsibility: Community groups that are innovating on traditional practices, *jan vigyan* (people's science) networks, networks like Honeybee, rural technology institutions and agencies like CAPART, CART, Centre for Science for Villages, National Institute of Rural Industrialisation, PPST, Forum of Scientists, Engineers, and Technologists (FOSET), NIF, etc.

Steps:

- i. Collate information on available innovations in reducing drudgery in agricultural practices (e.g. see *Nahin Kalan Sub-state BSAP*), and spread this information widely amongst agricultural communities, in local languages;
- ii. Initiate programmes in the above-mentioned institutions and agencies, in collaboration with community groups and individuals that have already been active in this, to conduct R&D on this subject;
- iii. Spread the existing and new practices amongst farming communities through appropriate extension channels, after conducting participatory assessments of their ecological and cultural appropriateness in each local context.



Ongoing Relevant GOI Schemes/Programmes:

- The Science and Technology for Women under Societal Programmes, Department of Science and Technology.
- The (i) Biotechnology based programmes for Scheduled Caste and Scheduled Tribes, and (ii) Biotechnology Based Programme for Women and Rural Development, of the Department of Biotechnology...both appropriately modified.
- National Agricultural Technology Project of Ministry of Agriculture.

7.2.5.4 Strategy: Enhance Livelihood Security of Nomadic Pastoralists

(Adapted from: *Nomadic Pastoralists and Biodiversity Sub-thematic Review*)

Overall Justification: The main problems faced by nomadic pastoralists, which are leading to the erosion of their culture and loss of biodiversity, are:

- Official Perception of Common Property Resources:** Pasturelands have officially been viewed as either 'degraded forest lands' or 'wastelands'. Therefore, exotic species have been introduced in an effort to green the 'wastelands', leading to loss of biodiversity and valuable silvipastoral systems. Local people are not consulted before undertaking such conversions.
- Existing Breeding Policies:** These are designed to maximise milk and meat production, leading to indiscriminate cross-breeding with exotic breeds, which in turn destroys the gene pool of local breeds preserved by the pastoralists. Such government schemes/policies do not favour the pastoralists/local breeds.
- Role of Actors in Conservation – Government Functionaries:** Government functionaries have not fully understood the role of pastoralists, because of which forest officials often exclude, threaten or penalise the pastoralists in their efforts to protect forests. There is no effort to address problems or resolve conflicts in a participatory manner.
- Failure of Education System:** Educated local/pastoral youths prefer to move out to the city for jobs or even to work as unskilled labour. Pastoralists are therefore finding it increasingly difficult to manage their stock.

Actions (and Suggested Responsibilities)

In order to recognise and enhance the role of pastoralists in conserving local livestock breeds of animals, the following actions are needed:

1. Ensure Secure Access to Pastoral Resources While Ensuring Conservation

- Restoring traditional resource rights of communities (*gochar* lands in Rajasthan, '*Meichal*' *purambokku* land in Tamil Nadu, British/*Jameen* recognised pasture lands allotted for traditional pastoralists such as Raikas, Toda tribals, etc.), as ecologically appropriate.
- Natural ecosystem restoration programme by empowering right holding pastoral communities to remove some of the exotic tree species for regenerating the original local species of grasses suitable for pasture lands.
- Participatory management of common property resources, ensuring that the women and men of nomadic pastoralist communities and other users are also involved. For this mapping of existing rights and use patterns must precede the development of any new plan for an area (e.g., in the Nilgiris, the Tamil Nadu Forest Department should expedite removal of eucalyptus and return the Toda's original pasture land to them for ensuring their social and livelihood security).
- Joint conservation management emphasizing, wherever feasible, the co-existence of wildlife, domestic animals and local people through democratic, bottom-up process approach, rather than imposing top-down prescriptions.
- Conflict management between nomadic groups and local resident people through networking and promoting multi-stakeholder conflict resolution forums, attempts to revive traditional arrangements or enter into new ones that are mutually acceptable, while ensuring the conservation requirements of the area where such rights are to be restored.

2. Review Existing Breeding Policy Through Consultative Process Involving all Stakeholders

- Promotion and development of local institutions and breeders associations (tasks for the NGOs, Animal





- Husbandry Department, National Bureau of Animal Genetic Resources, Karnal, NDDB, Anand).
- b. Undertaking impact study of breeding policy implemented for the last 5 decades (tasks for NGOs and state-level Biodiversity Forum).
 - c. Documenting local institutions conserving livestock breeds (tasks for NGOs/volunteers of communities, ICAR and Agricultural Universities)
 - d. Recognizing livestock keepers conserving local breeds and involving them in future plans (Ministry of Agriculture, Central Herd Registration Scheme)

3. Develop Role Model Facilitation for Government Functionaries

- a. Training, orientation and exposure visits for government functionaries for sensitising them to initiate participatory approaches in development work (tasks for officials of Forest Department and Animal Husbandry Department)
- b. Implementation of watershed or conservation work through CBOs and people's organisations in association with strengthened PRIs and *gram sabhas* (linking PRIs, SHGs and CBOs)
- c. Documentation of indigenous knowledge and grassroots innovation, and learning from such innovations (tasks for Faculties of University and Research Scholars and Junior officers of DRDA)
- d. Enhancing and strengthening the capacity of local institutions and herders/pastoralists groups (tasks for NGOs and DRDA).

4. Provide Recognition and Rewards for Conservers of Local Breeds

- a. Recognition and rewards for individuals or groups conserving outstanding local breeds
- b. Revitalizing social institutions responsible for conservation
- c. Improving economic situation of local livestock conservers (this could be done through developing niche markets for the special products of pastoral communities -market surveys would be needed for the same).
- d. Awareness and support for marketing the products of indigenous animal breeds.

5. Bring Changes in the Educational System

- a. Incorporating indigenous knowledge and biodiversity conservation in the curriculum of agricultural universities and veterinary educational institutions.
- b. Promotion of value-based education instead of job-oriented at school level, so that educated youth will return to their villages.
- c. Providing fellowship for undertaking biodiversity conservation to students returning to rural life.

6. Enhance Networking, Documentation and Dissemination

- a. Networking with NGOs, CBOs, and scientific Institutions for awareness raising and dissemination of information (including description and characterization of local breeds) about preservation of local livestock breeds.
- b. Economic empowerment of poor livestock keepers through linkage with various actors and identified niche markets, to facilitate the conservers to develop their own self-governing co-operatives which add value to their produce prior to marketing.

Overall Responsibility: Ministry of Agriculture, state Departments of Animal Husbandry and Forests.

Time Frame for all Actions in this Section: 5-10 years, or ongoing, as relevant.

7.2.5.5 Strategy: Clarify Ownership of Seed Collections and Ensure Equitable Benefit-Sharing From their Wider Use

Actions

1. Repatriate Information on *Ex Situ* Accessions to the Communities of Origin

Consolidate and clarify the 'passport' information of all accessions in *ex situ* collections, and repatriate this information to the communities where the accessions have originated, where this is known. This will need to be done

in local languages, and in modes that are understood by the communities concerned. The implications of the storage of their material in *ex situ* collections should be explained, including past and potential uses of this material for wider commercial or public purposes.

Suggested Responsibility: Ministry of Agriculture, through National Bureau of Plant Genetic Resources, National Bureau of Animal Genetic Resources, ICAR institutions holding seed/gene banks, and other *ex situ* collection holders.

Time Frame: 5 years.

2. Clarify Ownership of the Genetic Material in *Ex Situ* Collections, and Ensure Equitable Benefit-Sharing

(Read with *Strategy 7.1.5.4, Action 5*)

Make provisions under the Biological Diversity Act, 2002, or the Protection of Plant Varieties and Farmers Rights Act, 2001, or a *sui generis* legislation on traditional knowledge, providing for a layered system of ownership or trusteeship with the following principles:

- i. Where origin can be traced to a single distinct community (including units within communities), provision of intellectual right to such community over the concerned material; such right would entitle the community to have a predominant say in the wider commercial use of the material, to be named/recognised in any wider use the material, and to receive the primary benefits of such use;
- ii. Where origin can be traced to several distinct communities, provision of intellectual right to all such communities over the concerned material; such right would entitle the communities to have a predominant say in the wider commercial use of the material, to be named/recognised in any wider use the material, and to receive the primary benefits of such use; this would require some facilitation to enable the communities to take joint decisions in relevant matters if possible, and where not possible or where far too many communities are involved, for the relevant state/central governments to act as trustees on their behalf in a fully transparent manner;
- iii. Where origin cannot be traced as above, provision of intellectual right to the Government of India as trustee for the people of India; this would entail that any benefits arising from the wider use of this material is to be used for the purpose of conserving and propagating indigenous genetic resources and related knowledge (linked to *Strategy 7.2.9.3*);
- iv. Formulation of appropriate benefit-sharing arrangements (as elaborated in *Strategy 7.1.5.4, Action 6*, and *Strategy 7.1.5.5*).

Suggested Responsibility: Ministry of Agriculture, with Ministry of Environment and Forests, state agriculture departments, Ministry of Commerce, and relevant national institutes, NGOs, and community groups working on agro-biodiversity and *ex situ* collections.

Time Frame: Legal steps within 3 years, implementation beginning immediately where ownership is clear.

7.2.6 Domesticated Biodiversity: Strategies and Actions for Enhancing Capacity

Overall Strategies:

1. **Build capacity of a range of formal sector functionaries** on domesticated biodiversity issues; this includes public functionaries and governance institutions, the scientific community, etc.; model this on the basis of *Strategy 7.1.6.1*, and also introduce necessary changes in the course curricula of agricultural training;
2. **Build capacity of rural communities** on domesticated biodiversity issues, including through locale-specific approaches, agro-biodiversity festivals and contests, and community/people's biodiversity registers;
3. **Build capacity of other relevant actors** on domesticated biodiversity, including **NGOs, urban residents, workers and labour unions, media, corporate/business entities, judiciary, armed forces, and financial institutions**; model these on *Strategies 7.1.6.3, 7.1.6.6, 7.1.6.8, 7.1.6.9, 7.1.6.10, 7.1.6.11, 7.1.6.12, and 7.1.6.13*;



4. **Integrate domesticated biodiversity into formal and non-formal education/awareness programmes**, and in particular through the involvement of farmer/pastoral communities and experts themselves; model these on *Strategies 7.1.6.4 and 7.1.6.5*;
5. **Use Public Spaces and Forums for Spreading Awareness** about domesticated biodiversity, including the mass media, public transport, agro-biodiversity-rich or important sites, etc.; model these on *Strategies 7.1.6.2 and 7.1.6.15 Action 4*;

7.2.6.0 Strategies Adapted from Section 7.1.6

Many of the strategies and actions given under *Section 7.1.6*, on enhancing capacity of actors relating to wild biodiversity, are relevant to domesticated biodiversity as well. They can be adapted with minor modifications (including, for instance, in the 'Suggested responsibilities', which in the strategies below will lie with farmers/pastoralists/fisherfolk groups and networks, relevant public sector agriculture ministries/departments/institutes including those in the ICAR/IARI network and the National Bureaus of Plant, Animal and Fish Genetic Resources, NGOs and academic institutions working on agricultural issues, etc.). This overlap is especially true of the following:

Strategy 7.1.6.1 on building capacity of **public functionaries** and **governance institutions**, especially of district administration bodies dealing with agriculture and allied activities, agricultural extension workers (see also *Strategy 7.2.6.1, Action 2*, below), Krishi Vigyan Kendra staff, *panchayat/gram sabha* and other village-level governance institutions, etc.

Strategy 7.1.6.3 on strengthening the capacity of **NGOs**, especially those in the field of development, to be more aware of issues of livestock and crop diversity.

Strategy 7.1.6.4 on integrating biodiversity issues into the **formal education systems**, as locale-specific issues related to domesticated biodiversity are currently almost totally absent in educational curriculum.

Strategy 7.1.6.5 on strengthening **non-formal education** methods for spreading awareness

Strategy 7.1.6.6 on spreading awareness amongst **urban residents**, as awareness of domesticated issues in most urban communities is currently much weaker than even in the case of wild biodiversity, and also since consumer awareness relating to the agricultural produce they use can be a powerful tool for promoting organic, biodiverse farming and sustainable pastoralism.

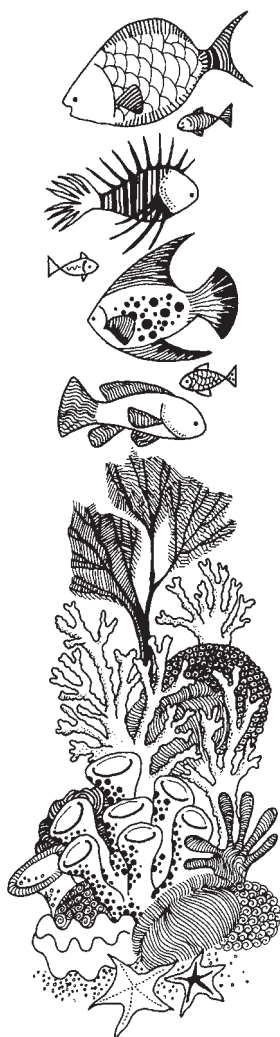
Strategy 7.1.6.8 on building capacity of **workers and labour unions**, in particular agricultural labour organisations, to encourage practices that enhance/maintain domesticated biodiversity.

Strategy 7.1.6.9 on building the capacity of **the judiciary and legal functionaries**, to help build agro-biodiversity components into cases concerning development projects, land disputes, and others.

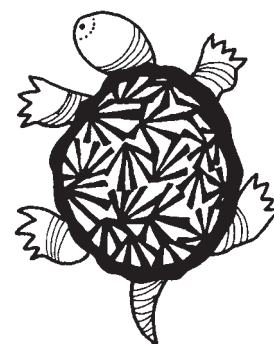
Strategy 7.1.6.10 on orienting **financial institutions**, whose financial policies are often detrimental to the conservation of domesticated biodiversity, to encourage them to provide positive incentives for organic, biodiverse farming and sustainable pastoralism.

Strategy 7.1.6.11 on building capacity of the **armed forces**, to sensitise them to the interests and rights of pastoral communities whose seasonal grazing grounds fall in areas under their control and jurisdiction, and to integrate agro-biodiversity into the development programmes they take up for local communities.

Strategy 7.1.6.12 on building the capacity of the **corporate and business** sector, especially to make them sensitive to impacts of their practices on domesticated biodiversity, and to encourage their participation in promoting domesticated biodiversity through procurement and other economic arrangements with farming and pastoral communities that are continuing to use such biodiversity.



Strategy 7.1.6.13 on building the capacity of the **media**, which has so far played a big role in fashioning the food choices of communities towards preference for branded homogenised foods, specially those in urban areas, and which therefore has a responsibility to reorient its messages towards promoting produce that encourages domesticated biodiversity. Special attention should be paid to the use of vernacular languages through NGO newsletters (e.g. the Honeybee Network, which publishes newsletters in several regional languages), and propagation through scientific journals like *the Indian Journal of Plant Genetic Resources*, newsletters and journals like *Yojana* and *People's Action* that the central government brings out, ICAR-related periodicals like *Indian Journal of Agricultural Sciences*, *The Indian Journal of Animal Sciences*, *Indian Farming*, and *Indian Horticulture*, in English; three house journals, viz. *ICAR News*, *ICAR Reporter* and *ARIS News* in English; and *Kheti* (monthly), *Phal Phool* (quarterly) and *Krishi Chayanika* (quarterly) in Hindi. All these and NGO/private journals which deal with agriculture and rural development should be encouraged to include sections on agro-biodiversity.



Strategy 7.1.6.15 Action 4, on using **public transport** as an educational tool, in particular while going through agro-biodiverse landscapes (including those identified under the 'Cultivating landscapes' Action in *Section 7.2.2.1*).

These points are therefore not being repeated here, except brief mentions where relevant for any of the points below. **It is therefore important to read the strategies and actions contained here in conjunction with and additional to the ones listed above.**

7.2.6.1 Strategy: Build Capacity of the Scientific Community to Address Domesticated Biodiversity Issues

Actions

1. Make Necessary Modifications to the Curricula of all Courses in Agricultural and Health Education

Justification: Many of the training and educational programmes related to agriculture at the national level are purely economic or preservationist as they are shaped by conventional agricultural and technological models. However issues like equity, gender, food and nutritional security, along with the cultural and ethical aspects associated with agricultural diversity, are much broader socio-political issues. Training and education of health workers and professionals also does not integrate such aspects. To address these, socio-political sensitization of the scientific community is very essential.

There is a need to evaluate to what extent biodiversity concerns are integrated into agricultural and health education, which must include the concerns of conserving domesticated biodiversity, agro-ecosystems, issues of livelihood and food security of agriculture-based populations, nutrition-related concerns etc. The educational syllabus also needs to incorporate wider definitions of 'productivity', 'yield', 'input-output ratio', etc., which go beyond a single-produce concept to multiple (economic, cultural, ecological, and nutritional) values and benefits, and the energy efficiency of different cropping/husbandry systems.

Suggested Responsibility: Ministry of Agriculture, Ministry of Health, Indian Council of Agricultural Research, state agriculture universities, SAUs, IARI, state agricultural universities, health training institutes, with inputs by Ministry of Environment and Forests.

Time Frame: 2 years

Steps:

- i. Commission studies that would assess to what extent current agricultural and health educational courses cover domesticated biodiversity concerns;
- ii. Modify course syllabi accordingly, and restructure field experience and projects to include biodiversity studies;

- iii. ICAR, IARI, and Ministry of Health to work with MoEF and relevant national NGOs and institutions like NBPGR, NBAGR, NBFGR, National Institute of Nutrition, and state agricultural universities, to identify and contract agencies to develop appropriate instruction material for different courses, for which appropriate resources to be made available;
- iv. Identified agencies to work for instructor orientation;
- v. In all of the above and in the agriculture educational courses at all levels, involve innovative farmers and farming communities, pastoralists and pastoral communities, and traditional health workers, in imparting training/knowledge regarding biodiverse practices.

Ongoing Relevant GOI Schemes/Programmes:

- The Post Graduate Teaching Programmes, of the National Bureau of Plant Genetic Resources
- The Post-Graduate Teaching, Post MD/MS Training and Post-Doctoral Fellowship sub-programme under Human Resource development component of the Department of Biotechnology.

2. Build Capacity of Agricultural Extension Workers

Justification: There is a need to sensitise agricultural extension work to the issues of domesticated biodiversity, like the importance of indigenous varieties, the role of biodiverse agricultural systems in rural livelihoods, the critical role of women, etc. An attitudinal change is necessary to shift the current focus from technologies that improve production to those that look at rural systems in their totality, and hence look at agro-biodiversity conservation. The training of agricultural extension workers will have to take into consideration the specific needs of the area.

Suggested Responsibility: Directorate of Extension of MoA, its Centres of Excellence for Training, SAUs, Gram Sevak Training Centres, Extension Training Centres and Farmers Training Centres, Department of Science and Technology, Department of Biotechnology

Time Frame: 5 years

Steps:

- i. Assess the practices and technologies that are currently being promoted by agricultural extension to see which ones are supportive of and which detrimental to domesticated biodiversity conservation;
- ii. Publicise widely the positive technologies, such that the learnings from these are incorporated into the agricultural extension training;
- iii. Strengthen the linkages with NGOs and community organisations working at grassroots level, to bring in valuable experiences of biodiversity conservation into the capacity-building training of agricultural extension workers;
- iv. For the above, document and learn lessons from innovative experiences such as those of the extension and public outreach by DDS and the KVK in Pastapur run by DDS.

Ongoing Relevant GOI Schemes/Programmes:

- The Societal Programmes, Department of Science and Technology.
- The Biotechnology Based Programmes for Society, Department of Biotechnology.

7.2.6.2 Strategy: Build Capacity of Rural Communities to Address Domesticated Biodiversity Issues

Actions

1. Enhance Awareness of Larger Biodiversity Issues Among Local Communities

Identify biodiversity issues regarding which there is lack of awareness amongst communities, in particular

regarding wider processes that impact them, and devise programmes to spread such awareness.

Justification: There is often a lack of awareness or lack of information among communities on issues such as IPRs, biotechnology, impacts of alien invasive species, hybrids, impacts of macro-economic policies and globalisation, etc. Material on such issues in vernacular languages is hard to come by. Such information could be disseminated through simple booklets with a lot of examples and illustrations, and awareness sessions through various media.

Suggested Responsibility: NGOs and farmers' and pastoral groups, with support from MoEF and MoA, through schemes like NEAC.

Time Frame: Ongoing

Steps:

- i. Identify the issues that need to be highlighted relating to domesticated biodiversity, with the help of NGOs and community organisations with grassroots experience;
- ii. Develop booklets on these issues in the relevant vernacular languages, with help from NBT and other publicly funded institutions;
- iii. Develop a programme of workshops and use of other media, to spread awareness on these issues; build such aspects into development extension work carried out by NGOs in villages.

Ongoing Relevant GOI Schemes/Programmes:

MoEF's National Environment Awareness Campaign, National Green Corps (Eco-clubs), and Grants-in-Aid to Professional Societies, Environmental Information System (ENVIS) programmes.

2. Organise Local, State, and National Biodiversity Festivals

Organise biodiversity festivals, as a powerful way of reviving interest in agro-biodiversity (and wild biodiversity), building rural capacity regarding its continued use, and promoting exchange of material and knowledge. Encourage such festivals at local levels amongst clusters of villages and at *taluka*/district, state, ecoregional, and national levels. Learn from ongoing initiatives started during the NBSAP process (see Box 6.77). Integrate such processes into existing agricultural, animal husbandry and cultural fairs.

Justification: As witnessed during the NBSAP process, cultural festivals centred on biodiversity are a powerful and entertaining method of reviving interest in biodiversity. This is a seriously under-utilised method of education, exchange and building of capacity on various fronts.

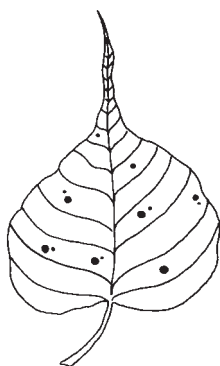
Suggested Responsibility: Community groups and farmers' associations, with support from MoA, MoEF, state departments of agriculture, horticulture, animal husbandry, forestry, and fisheries, NGOs working on agricultural issues, agricultural universities and KVVKs.

Time Frame: Ongoing

Steps:

- i. Community-level organisations including PRIs to explore forums for organising local-level biodiversity festivals, including existing cultural, agricultural and animal husbandry fairs held by state agencies or by communities and institutions; where existing forums do not exist, consider such festivals as independent initiatives; relevant government agencies to consider supporting such festivals, financially and in other ways;
- ii. Appropriate state- and national-level institutions, such as the National Museum of Man, Bhopal, to organise state- and national-level biodiversity festivals once a year, with support from relevant government agencies; planning for this to be carried out by farmers groups, NGOs with experience in holding festivals such as Deccan Development Society and the relevant state/national institutions;





- iii. NGOs to document ongoing and proposed initiatives, and assist in their public and media outreach.

3. Promote the Documentation and Revival of Traditional Knowledge Through Agro-Biodiversity Contests

Justification: Domesticated biodiversity has increasingly become a 'dead' topic for local communities, especially the younger generation, and its erosion is not seen as a serious loss. One way of reviving interest is organising biodiversity contests amongst youth and adults.

Suggested Responsibility: NGOs and CBOs, with support from MoA, MoEF, and others in collaboration with State agricultural departments, SAUs, Department of Elementary Education and Literacy, Ministry of Tribal Affairs, Ministry of Agriculture, National Bioresources Development Board, National Foundation of India

Time Frame: Ongoing

Steps:

- i. States that have a network of NGOs like the Honeybee network, IIM Ahmedabad, and the Hittalagida network, UAS Bangalore, in Gujarat and Karnataka respectively, could be tapped for wide coverage, and for their experience in conducting biodiversity and kitchen garden diversity contests.
- ii. Build these into district educational programmes (including adult education and neo-literate education).
- iii. Set up funds in each district/state or use the proposed biodiversity funds under the Biological Diversity Act, to support NGOs/CBOs and *gram sabhas* to take up such activities.

Ongoing Relevant GOI Schemes/Programmes:

- Ministry of Human Resource Development: (i) National Bal Bhawan, and (ii) Environmental Orientation to School Education, under Department of Elementary Education and Literacy.
- Ministry of Environment and Forests: Programmes on National Environment Awareness Campaign, National Green Corps (Eco-clubs), Grants-in-Aid to Professional Societies, and Environmental Information System (ENVIS).
- Information Education and Communication Scheme, of the Department of Indian Systems of Medicines and Homeopathy.
- Information and Mass Media programme of the Ministry of Tribal Affairs.
- The programme on Awareness Generation among Tribal and Rural Youth, General Public and School Children under Training, Capacity Building and Awareness Generation Projects, National Bioresources Development Board.

4. Document Traditional Knowledge Through Community or People's Biodiversity Registers (CBRs)

(Note: This should be linked to and put in the context of the overall strategy on protecting traditional knowledge, see *Strategy 7.1.5.4*)

Justification: One of the most powerful tools that can be used to mobilise communities around their biodiversity and related knowledge systems is the Community or People's Biodiversity Register (CBRs or PBRs). All over the country, especially in the agrodiversity-rich *adivasi* and dryland belts of the country, there is an immediate need to produce CBRs, both to document community knowledge and protect it from being eroded and/or misused (including for Intellectual Property Rights) by unscrupulous commercial interests and transnational corporations. More importantly, the production of CBRs needs to be used for mobilisation of rural communities to generate awareness about the enormity and value of their knowledge of biodiversity. It must not end up being a government-run programme, and must not have unrealistic or distorting targets.

Suggested Responsibility: MoA and MoEF in collaboration with MHRD and Ministry of Rural Development, NGOs and community-based organisations, PRIs, NBPGR, etc.

Time Frame: Ongoing

Steps:

- i. A system of full protection for the knowledge that is documented must be put in place, as a notification under the Biological Diversity Act 2002, or as a *sui generis* law on traditional/indigenous knowledge (see Strategy 7.1.5.4, Action 5).
- ii. A national fund for the creation of CBRs should be set up by MoEF and Ministry of Agriculture, to support local communities, CBOs and NGOs. Wide publicity to be given to this through the public announcement and media channels used by the government for agriculture, water, and rural development programmes.
- iii. Communities to be supported in the creation of the CBRs by NGOs, CBOs, agricultural extension workers, KVKs and SAUs in the area of taxonomy; sensitive use of local terms to be encouraged (e.g. 'Bhuiyan Registers', or Earth Registers, as described in the *Bilaspur Sub-state Site BSAP*).
- iv. Flexible formats in local languages to be developed with community inputs, and used by communities in the way they feel is appropriate; care is needed not to create straitjacketed, single national models for documentation, storage, and analysis but to facilitate the full creativity of communities being expressed;
- v. Schools in the community could be asked to participate in the exercise and help with the documentation as a means of enhancing the awareness levels of the youth. The experiences of CES in Karnataka and Ramakrishna Mission in West Bengal in involving schools in such documentation should be used.

Ongoing Relevant GOI Schemes/Programmes:

- Programmes of the Conservation and Survey division of the Ministry of Environment and Forests.
- Exploration and Germplasm Collection activities being undertaken by the Division of Plant Exploration and Collection, of the National Bureau of Plant Genetic Resources.

7.2.7 Domesticated Biodiversity: Strategies and Actions for Inter-Sectoral Coordination and Integration

Overall Strategies:

1. **Orient the plans and programmes of all relevant non-agricultural sectors, to be sensitive to domesticated biodiversity as a central concern;** this should include formulation of guidelines for water development (including watershed), horticulture, energy, infrastructure, mining, and other sectors; model this on the strategies in Section 7.1.7, Strategy 7.2.8.3 Action 2, and Box 7.1.8.3; see also Section 7.3 on integrating domesticated and wild biodiversity;
2. **Ensure integration of domesticated biodiversity into international relations,** including foreign aid, trade, investments, and agreements/treaties; model this on Strategy 7.1.7.5.

7.2.7.0 Strategies Adapted from Section 7.1.7

Many of the strategies and actions given under Section 7.1.7, on Inter-sectoral coordination relating to wild biodiversity, are relevant to domesticated biodiversity as well. They can be adapted with minor modifications (including, for instance, 'Suggested responsibilities', which in the case of the strategies below will also lie with farmer/pastoral/fisherfolk groups/networks, people's movements, agricultural ministries/departments, all other relevant ministries/departments including those of water, irrigation, power, infrastructure, mining, urban affairs/development, environment/forests, tribal affairs, panchayat, and so on). This overlap is especially true of the following:

Strategy 7.1.7.1, on formulating **guidelines** for inter-sectoral coordination, in so far as wild and domesticated land/waterscapes have to be integrated through zonation and other strategies at various levels;

Strategy 7.1.7.2, on **water planning**, in so far as planning for river basins, wetland catchment etc., would necessarily have to integrate agricultural systems and agro-biodiversity values (see also Strategy 7.2.7.1, Action 1);



Strategy 7.1.7.3, on **energy and infrastructure planning**, in so far as agro-biodiversity needs to be a critical component in impact assessment and siting decisions for these sectors;

Strategy 7.1.7.4, on **mining**, in so far as mining locations and impact assessments need to take into account agro-biodiversity, and areas that are critical for agro-biodiversity should be declared off-limits to mining;

Strategy 7.1.7.5, on biodiversity integration into **international relations**, in order to ensure that agro-biodiversity concerns are centrally integrated into the foreign aid and investment programmes related to agriculture, and into international agreements to which India is party, which have an agricultural component or impact.

Reference should also be made to *Section 7.2.8*, where the integration of biodiversity into the policies and laws relating to other sectors is discussed; *Section 7.0*, where landscape/seascape planning is described; and *Section 7.3*, where the integration of wild and domesticated biodiversity is discussed.

These strategies and their component actions are not being repeated here, except where necessary in the context of particular actions given here.

7.2.7.1 Strategy: Integrate Domesticated Biodiversity into Relevant Sectoral Plans and Programmes

Actions

1. Integrate Agro-Biodiversity into Watershed Development

(Read with *Strategy 7.1.7.2, Action 1*)

Ensure that agro-biodiversity concerns are centrally integrated into the guidelines and programmes for watershed development.

Justification: Considerable agro-biodiversity loss is probably being caused in watershed development programmes that result in enhancement of irrigation and a thrust towards non-food cash cropping. This is because biodiversity has never been a central concern or criterion of success in such programmes. Given that watershed development is now being promoted vigorously all over the country, there is a very urgent need for integration of such concerns into the guidelines and programmatic plans for watershed.

Suggested Responsibility: Ministry of Rural Development in consultation with MoA and MoEF

Time Frame: One year for revision of guidelines; implementation ongoing thereafter

Steps:

- i. MoRD to set up a group with agro-biodiversity experts, including representatives of farmers/pastoralists' groups working on this issue, to review the Watershed Development Guidelines, 2001, as also relevant watershed development state level guidelines and programmes;
- ii. The group to consult with key NGOs, institutions and communities working on watershed development;
- iii. The group to prepare, or commission the preparation of, a manual on integration of biodiversity into watershed development plans;
- iv. MoRD to issue revised guidelines based on the group's recommendations, and institute a process of participatory monitoring to periodically review the progress of implementation.

2. Integrate Agro-Biodiversity into Horticultural Programmes

Review horticultural programmes and integrate biodiversity conservation and related issues of sustainability and equity into them. Instead of supplanting the local production system with its biodiversity, the first preference should be given to identifying and focusing on native fruits (e.g. the large diversity of berries found in the Himalayan belt), and other horticultural species.



Justification: Horticultural development is a high potential strategy for hill areas. Unfortunately its success is usually at the cost of agro-biodiversity, as in Himachal Pradesh. There is a need for carefully thought out, focused and monitored interventions which are not in opposition to traditional agro-biodiversity. Therefore it is important that the policy and programme support for horticulture at state levels is based on the above points (see, for instance, *Box 7.2.7.1* on such a strategy from a NBSAP site).

Suggested Responsibility: MoA (Horticulture Department), and Ministry of Rural Development, in consultation with relevant NGOs that have worked on this issue.

Time Frame: One year for revision or framing of guidelines; implementation ongoing thereafter

Steps:

- i. MoA to revise guidelines, if any, for horticulture development, or frame new guidelines, for integration of agro-biodiversity into the programmes at centre and state levels;
- ii. In so doing, learn from ongoing initiatives, if any, at promoting indigenous fruits as part of horticulture development.

Box 7.2.7.1 Integrating Fruit, Medicinal and Other Plants into the Agro-ecosystem

(Excerpts from Nahin Kalan Sub-state BSAP)

[In the Himalayan belt], there is a strong case for a careful, gradual and studied introduction of fruit, medicinal, aromatic, and natural dye plants into the local agro-ecosystem.

Horticultural development is a high potential strategy for hill areas. Unfortunately, its success is usually at the cost of agro-biodiversity, e.g. as in Himachal Pradesh. Carefully thought out, focused and monitored horticultural interventions do not have to be at the cost of traditional agro-biodiversity. Policy and programme support for identification, cultivation and marketing need to be carefully designed.

Key recommendations:

- In the selection for appropriate plants for cultivation, primacy and preference to be given to native wild plants - medicinal and aromatic, fruit/berry, etc.
- Other critical criteria for selection of species will be agroclimatic suitability, hardiness, local utility, economic value and non-preference by wild animals.
- A short-listing of the most promising fruit tree species has been done, including sources for planting materials. This includes: Citrus family (especially lime and lemon, *mausambi*), Walnut, *Anar* (both wild varieties (*darhim*) and cultivated), Peach, Pear, Plum, Banana, and, for lower elevations, Papaya, and Guava.
- Identification of rare and economic value medicinal plants is under way.
- The local communities are extremely keen to experiment with cultivation of medicinal and other plants of economic value, especially on distant terraces abandoned due to crop-raiding and because they are difficult to protect. On these lands, selection of plants not preferred by animals will be the critical criteria.
- Other appropriate and promising locations for fruit trees are the small and sloping terraces and *kalnas* (slopes between terraces).
- Fruit trees that are not preferred by wild animals but are otherwise suitable can be planted on terraces around and near habitation, for greater protection.

7.2.8 Domesticated Biodiversity: Strategies and Actions for Policy and Legal Measures

Overall Strategies:

1. **Integrate, or strengthen the focus on, domesticated biodiversity in relevant existing policies**, including those on agriculture, water, wildlife, and forests; and formulate a comprehensive new policy on domesticated biodiversity, and one on grazing;

2. **Integrate, or strengthen the focus on, domesticated biodiversity in relevant existing laws/rules**, including those on seeds, pesticides, water, fisheries, plant varieties protection, environment (including EIAs), and biodiversity; and **formulate a comprehensive new law (or rules under the Biological Diversity Act) to protect domesticated biodiversity**;
3. **Strengthen mechanisms for the implementation of relevant legislation**, including through appropriate access and capacity-building of farming/pastoral/fisheries communities; model this on *Strategy 7.1.8.7*;
4. **Integrate domesticated biodiversity into panchayat and other village development laws, and provide legal backing to relevant customary laws/practices**; model this on *Strategies 7.1.8.5* and *7.1.8.6*;
5. **Ensure public right to all information relevant to domesticated biodiversity**; model this on *Strategy 7.1.8.8*.

7.2.8.0 Strategies Adapted from Section 7.1.8

Several strategies for wild biodiversity in *Section 7.1.8* are relevant for domesticated biodiversity as well, including:

Strategy 7.1.8.5, on **panchayat legislation**, in so far as such legislation should provide powers and responsibilities to panchayat institutions to conserve domesticated biodiversity and related knowledge;

Strategy 7.1.8.6, on **customary laws**, in so far as such laws are relevant to domesticated biodiversity conservation;

Strategy 7.1.8.7, on **stronger mechanisms for implementing existing laws**, adding the need to build capacity of farmers and pastoral groups, and authorising them to implement, the provisions of the relevant policies and laws.

Strategy 7.1.8.8, on **right to information**, in so far as farmer/pastoral/fisherfolk communities and other citizens should have full access to relevant information, including through the use of the Freedom of Information Act. These are not being repeated below except where necessary.

7.2.8.1 Strategy: Integrate Domesticated Biodiversity into Existing Policies

Overall Justification: As described in Ch.6, there are close links between agro-biodiversity and wild biodiversity, including forests and wetlands. Additionally, activities in a whole range of other sectors, including those related to development and human welfare, impact on agro-biodiversity (see Ch. 5). Issues of soil fertility, crop pollination, wild relatives of crops and livestock, forest-based green manure, cropping patterns which favour wild biodiversity, the continuum of knowledge relating to various land/water uses that local communities have, semi-wild and wild foods and medicinal plants, etc., are all aspects that need to be dealt with in the policies of each relevant sector.

The discussions in Chapter 5, recommendations emerging from a number of local, state and ecoregional action plans produced under NBSAP, and the *Domesticated Biodiversity Thematic BSAP* clearly indicate the need to review and revise existing policies of the Central and State Governments which have a direct or indirect bearing on domesticated biodiversity.

Actions

1. Integrate Domesticated Biodiversity into Policies Relevant to Agriculture

Review the policies relating to agriculture, including National Agricultural Policy, 2001, National Seeds Policy, 2002, and others relating to biotechnology, fertilisers, animal husbandry, and other agricultural aspects, from the point of view of agro-biodiversity (see also *Section 6.2.8.2*, and *Action 3* below regarding the National Water Policy, 2002). In particular, these policies need to:

- i. Recognize the importance of traditional indigenous seeds and breeds, and the conservation efforts of several farming communities and NGOs (see *Sections 6.2.2.2, 6.2.3.2, and 6.2.4.2*) across the country;



- ii. Introduce incentives for such conservation efforts, both *in situ* and *ex situ* (see Strategies 7.2.2.1, 7.2.2.2, 7.2.4.4, and 7.2.9.2);
- iii. Build in a site- and region-specific approach, rather than one uniform model for the entire country; special attention needs to be paid to agro-biodiversity-rich areas and hotspots/hotspecks (as partially identified in Strategy 7.2.2.1), and to highly specialised practices such as coastal and mountain agriculture;
- iv. Provide a central decision-making role to farming and pastoral communities at all stages including planning, R&D, implementation, and monitoring.

Justification: A number of policies directly relating to agriculture are weak in their focus on agro-biodiversity. For instance, as mentioned in Section 6.2.8, the National Seed Policy, 2002, states that the encouragement of import of useful germplasm and the boosting of exports would be the key elements of the policy, and does not focus on indigenous seeds and knowledge, and local markets. The National Agricultural Policy, 2001, has welcome provisions for agro-biodiversity, but also a series of other stronger thrusts that could negate these provisions. The National Water Policy, 2002, does not incorporate an explicit concern for agro-biodiversity. Hence the urgent need for revisions and integration.

Suggested Responsibility: Ministry of Agriculture, in conjunction with MoEF and other relevant ministries, and relevant national NGOs and farmers' groups.

Time Frame: Two years for results of consultative process; four years for policy changes.

Steps:

- i. MoA to constitute an expert working group to examine and revise relevant policies and laws, to integrate agro-biodiversity as a central principle and concern into each of them, and to draft new policy and legislation where necessary (the mandate of this group would extend to all the strategies in Section 7.2.8, given below). The group should consist of relevant government officials from centre and states, national NGOs working on agro-biodiversity, and representatives from some key farmers' and pastoralists' organisations working on this issue (taking care not to restrict this to major nationally-known organisations that are politically affiliated, but also to include groups like Beej Bachao Andolan and Lokhit Pashu-Palak Sansthan);
- ii. The working group should organise a series of public consultations and hearings across the country, and incorporate the results into their findings;
- iii. The working group's recommendations for changes in policy should be widely circulated for public review;
- iv. The outcome of the above should form the basis for the changes in policy, which the MoA needs to bring in;
- v. States should carry out similar processes for state-level policies; in so doing, they could learn from innovative activities such as the *Prajateerpu* public jury process carried out in Andhra Pradesh to assess the state government's Agricultural Vision, 2020 (<http://www.ddsindia.com>).

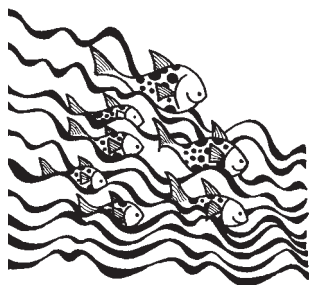
2. Introduce Reforms in Forest and Wildlife-Related Policies to Protect Agricultural Livelihoods and in Agricultural Policies to Conserve Forests, Wetlands, and Their Wildlife

(adapted from Domesticated Biodiversity Thematic BSAP)

Review and revise forest and wildlife policies to incorporate sensitivity to agricultural livelihoods, especially of traditional small-scale sector; conversely review and revise agricultural policies to centrally incorporate conservation priorities.

Justification: Tribal and other forest-dwelling communities do not make a sharp distinction between agriculture and forests or wetlands, and harbour unique knowledge systems that connect these ecosystems. However, current forest-related policies laws do not recognize these practices and in many cases act in opposition, as in the case of shifting cultivation, and the ongoing move against forest 'encroachments' (see Chapter 5.2.2, Box 5.21). Conversely, agricultural policies do not recognise the enormous importance of conserving forests, wetlands, grasslands, and other natural ecosystems to the well-being of agricultural and pastoral communities. Therefore there is a need to first analyse and make necessary changes in these policies to reconcile and modify them.





Suggested Responsibility: MoEF and MoA, along with Ministry of Rural Development, and Tribal Affairs, and in association with relevant NGOs and farmers' groups.

Time Frame: Two years

Steps: (as in No. 1 above using the same expert group).

3. Reorient the Water Policy, 2002, Towards Domesticated Biodiversity and Decentralised Water Harvesting/Use

Modify or bring in interpretational guidelines to the Water Policy 2002, to stress the conservation of agro-biodiversity and the empowerment of local communities in all water development programmes, including the move towards decentralised water harvesting/use. (*see also Strategy 7.1.8.1*).

Justification: A number of NGOs and people's groups, including those gathered under the Jal Biradari network (*see Section 6.2.8.2*) have stressed that the National Water Policy should strengthen people's control over water resources; conservationists have argued that biodiversity issues including agro-biodiversity also need to be squarely integrated into the Policy. Though the Policy of 2002 has greater provisions for this kind of new thrust, there are not many specific instruments that could help in implementing them. *Chapter 5* has highlighted the importance of water tenure and rights, the absence of which can be one of the root causes for the loss of biodiversity and livelihoods.

Suggested Responsibility: Ministry of Water Resources

Time Frame: Two years

Steps:

- i. The MoWR to set up a group consisting of relevant officials, representatives from groups and networks such as Jal Biradari and others, to recommend changes in the water policy to enable greater decision-making powers to local communities, and to integrate critical aspects of agro-biodiversity and wetland biodiversity;
- ii. In its work, the group should build on the number of suggestions and recommendations that people's groups have already made;
- iii. The group's process should be similar to that mentioned in Action No. 1 above.

7.2.8.2 Strategy: Formulate New Policies for Aspects Not Yet Covered at Policy Level

Actions

1. Formulate a Comprehensive Policy on Domesticated Biodiversity

Formulate a policy on agro-biodiversity that encompasses crops, livestock and pets. This policy should contain provisions for:

- i. Conservation of the full range of domesticated biodiversity and of indigenous/community practices relating to it;
- ii. Elements of sustainable agriculture including land/water/soil use, availability of critical inputs, markets, home gardens, etc.;
- iii. Concerns relating to equitable access, use and benefit-sharing, including the protection of agro-biodiversity-related traditional knowledge;
- iv. Aspects such as ethnoveterinary medicine (*Domesticated Biodiversity Thematic BSAP*).

Justification: There is at present no national policy on agro-biodiversity, which can provide a long-term vision and direction to agricultural development. In the absence of such a policy, agricultural programmes and schemes are often not integrated with each other, or with other sectoral programmes and schemes. Hence there is a need for such a comprehensive policy.

Suggested Responsibility: Ministry of Agriculture and MoEF, with the central involvement of farmer/ pastoral/fisherfolk organisations and networks, NGOs and academic institutions/researchers working on agro-biodiversity.

Time Frame: 3 years

Steps:

- i. The expert working group suggested in *Strategy 7.2.8.1* to take up this task, and carry it out with the same process suggested there;
- ii. The draft Policy thus formed to be placed in Parliament for endorsement.

2. Formulate a National Grazing Policy

Formulate, through a process of widespread consultation, especially with grazier communities and ecologists, a National Grazing Policy. This policy should lay out:

- i. Broad principles, directions and measures to secure the grazing rights and responsibilities of traditional grazier communities, including nomadic pastoralists;
- ii. Broad principles, directions and measures to ensure that such grazing is sustainable and does not lead to biodiversity loss, including the participatory designation of areas off-limits to grazing;
- iii. Measures for the provision of ecologically and culturally appropriate alternatives where grazing is no longer sustainable;
- iv. A thrust to ensure that decisions with regard to grazing are taken based on species-specific and site-specific considerations;
- v. A clear direction that measures relating to grazing should protect, maintain and enhance domesticated biodiversity, in particular that of indigenous breeds.

Justification: In the absence of a national policy on grazing, there is no clear direction in the measures that central and state governments take vis-à-vis graziers. On the one hand, grazier rights to critical resources for livelihood are curtailed, or important grazing lands are lost; on the other, over-grazing or inappropriate grazing in many ecologically sensitive areas is causing serious damage. A clear national direction based on principles of ecological and livelihoods security is therefore needed, through formulation of an appropriate policy.

Suggested Responsibility: As in Action 1 above

Time Frame: Three years

Steps: As in Action 1 above

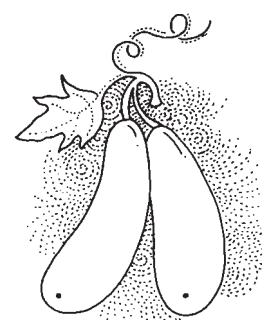
7.2.8.3 Strategy: Integrate Domesticated Biodiversity into Laws and Associated Rules, Regulations and Notifications

Actions

1. Review and Revise Laws Relevant to Agriculture, to Integrate Agro-Biodiversity into Them

At the Central level, the following laws need to be reviewed from the point of view of agro-biodiversity, including the various aspects related to conservation, sustainable use, and equity:

- i. Seeds Act, 1966;
- ii. Insecticides Act, 1968;
- iii. Water (Prevention and Control of Pollution) Act, 1974;
- iv. Fisheries Act, 1897;
- v. Protection of Plant Varieties and Farmers' Rights Act, 2001;
- vi. Destructive Insects and Pests Act, 1914, with a special focus on The Plants, Fruits and Seeds (Regulation of Import into India) Order, 1989, under the Act;



- vii. Essential Commodities Act, 1955 with a focus on The Fertilizer (Control) Order, 1985. under the Act;
- viii. Land Acquisition Act, 1894;
- ix. Geographical Indications (GI) of Goods (Registration and Protection) Act ,1999.

In the case of each of these laws, the questions that should be asked include: (a) does it directly or indirectly encourage the conservation and sustainable use of agro-biodiversity (especially threatened species/varieties/breeds); (b) does it lead to greater equity in the use of agro-biodiversity resources (including issues of traditional knowledge and biopiracy); (c) does it enable the empowerment of farmers/pastoralists/fisherfolk to use the laws and otherwise benefit from policies and laws to secure their livelihoods and rights; and (d) where there are provisions that go against these thrusts, what changes are needed?

Justification: Without legal backing to agro-biodiversity, its conservation and related aspects will remain on a weak footing. Most existing laws are, however, not conducive to this, and hence need review and modifications.

Suggested Responsibility: MoA, with MoEF, along with relevant NGOs and representatives of farming, pastoral, and fishing communities.

Time Frame: Three years

Steps:

- i. The expert working group proposed under *Section 7.2.8.1* above, to be entrusted with this task as well, to be carried out in the same manner as prescribed therein;
- ii. If necessary, this would have to be followed up by lobbying and awareness-creation exercises amongst law-makers for bringing about the said amendments.

2. Integrate Agro-Biodiversity into EIA and Clearance Procedures

(read with *Section 7.1.8.3 Action 3*)

Build in agro-biodiversity impacts as a core criterion and element in existing procedures for environmental impact assessment and environmental clearance. If need be, the provisions on EIAs in the Biological Diversity Act can be used to back this up (*see also Section 7.2.8.4*).

Justification: The present process of Environment Impact Assessments in India (*see Sections 6.1.1 and 6.1.8*) does not comprehensively look at the impacts of development projects (including those listed under the EIA notification) on the agro-biodiversity of an area. As a result, the loss of agro-biodiversity (including critical agro-ecosystems) is almost never taken into account while granting environmental clearance to a particular project.

Suggested Responsibility: MoEF in consultation with MoA, and relevant NGOs and academic institutions.

Time Frame: Two years

Steps:

- i. MoEF to entrust an existing EIA committee to carry out such integration;
- ii. Draft new EIA notification and guidelines to be made public for inputs, and, based on comments, finalised and issued.

3. Make EIAs Relating to Agro-Biodiversity Mandatory for Agricultural Projects and Processes

Extend the current EIA notifications and procedures to all projects and processes relating to agriculture, including those for introducing new technologies and practices into an area. This should incorporate provisions for rejecting projects and processes that are irreversibly damaging to agro-biodiversity, for appropriate mitigatory measures, and for the full involvement of farming and pastoral communities in the planning and EIA process.



Justification: Most agricultural projects and processes are not currently subject to EIA procedures, and therefore often have serious negative impacts which are later impossible to reverse. Clearly, if agro-biodiversity is considered vital for the country's health and future, a stringent EIA procedure for such projects and processes is necessary.

Suggested Responsibility: MoEF in consultation with MoA, and relevant NGOs and academic institutions.

Steps: As in Action 2 above

4. Provide Legal Protection to Agro-Biodiversity-Rich Areas, Including Hotspots and Hotspots

(see also Section 7.2.2)

Use the provision for Ecologically Sensitive Areas under the Environment Protection Act, 1986, and the provision for Biodiversity Heritage Sites under the Biological Diversity Act, to extend legal protection to areas that are identified as being critical for agro-biodiversity. This should start with regions mentioned in Section 7.2.2.1, and subsequently cover other regions. Such protection should prohibit all projects or processes that would be irreversibly detrimental to the area's agro-biodiversity, and put into place procedures for screening all other activities with the active involvement of the farming/pastoral communities. *It is vital, however, that the current model of protected areas is not extended as it is to such areas, particularly due to its tendency to alienate humans and wildlife, and to ignore the traditions, customs, and practices of local communities.* Such legal protection should in fact reaffirm the traditional practices and knowledge of agro-biodiversity where still existing, help revive them where eroded, and spread them much wider.

Justification: Biodiversity experts and advocates have so far focused only on wild biodiversity when designating 'hotspots' and providing them legal protection; this has caused serious neglect of the equally important regions of agro-biodiversity richness. The rapid erosion of this diversity and of these regions have continued unabated partly due to the lack of legal protection.

Suggested Responsibility: MoEF and MoA, with inputs from relevant NGOs and farmers/pastoralists' groups.

Steps:

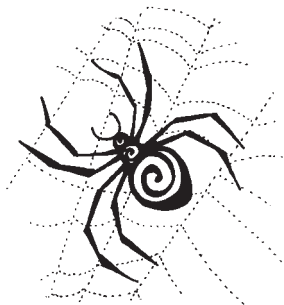
- i. MoEF to request NBPGR and NBAGR to provide, with the inputs of relevant NGOs and farmers'/pastoral groups such as the Beej Bachao Andolan and Navdanya's Jaiv Panchayats, a national list of agro-biodiversity-rich areas that need protection (building on the list given in Strategy 7.2.2.1);
- ii. MoEF to integrate agro-biodiversity as a criterion/indicator under relevant ESA notifications, and to specify the aspects mentioned above;
- iii. MoEF to set up a group to draft a notification and/or rules, to be used with the Biological Diversity Act provision on Heritage sites, and to identify particular sites to which these could be extended.

5. Enhance Biodiversity and Farmers' Rights Protection in the Protection of Plant Varieties and Farmers' Rights Act, 2001, and Geographical Indications Act, 1999

Build into the rules and where this is not possible, through amendments of the Protection of Plant Varieties and Farmers' Rights (PPVFR) Act, 2001, and where applicable under the Geographical Indications (GI) of Goods (Registration and Protection) Act, 1999, the following components:

- i. Environmental impact assessment of plant varieties for which IPR protection is being sought, with the provision that those likely to cause agro-biodiversity or wild biodiversity loss and related livelihood loss would not be accepted for registration in their proposed form (such losses should be considered to be against 'public interest');
- ii. Prior informed consent of farming and other local communities, and other traditional holders of resources/knowledge, when accessing their genetic material or biodiversity-related knowledge, and pro-active sharing of benefits when such access is made by others (in line with the Convention on Biological Diversity);
- iii. Stronger provisions for protecting traditional knowledge related to agro-biodiversity;
- iv. Periodic monitoring of the operation of the PPVFR Act and GI Act, to assess their impacts on agro-biodiver-





- sity and related livelihoods, and its modification or repeal if there is evidence of damage to these caused by this law, or if no benefit is accruing to small farmers from it;
- v. Any other additions that would make it more biodiversity- and farmer-sensitive.

Justification: The introduction of privatised intellectual property rights into the biodiversity arena is fraught with risks. However, since India has gone into one such regime, it is important to safeguard both biodiversity and the livelihood rights of small farmers from these risks, and enhance the pro-farmer provisions already in the legislation. The concept and practice of farmers' rights, currently not integrated into national/state level policies and programmes, needs strong backing in these laws.

Suggested Responsibility: Ministry of Agriculture

Time Frame: Two years

Steps:

MoA to:

- i. Review the submissions made to the Parliamentary Committee reviewing the PPVFR Act, to judge whether some of the above elements are given therein;
- ii. Consult with relevant national NGOs, farmers' groups, and others working on issues of traditional knowledge and farmers' rights, on what provisions of the PPVFR and GI Acts, to add/change by appropriate rule-making or amendments;
- iii. Use the recommendations of the relevant NBSAP documents, including the on Access, Benefit-sharing and IPR Thematic BSAP, and the Domesticated Biodiversity Thematic BSAP, in the rules or amendments.

7.2.8.4 Strategy: Formulate New Acts for Missing Elements

Actions

1. Enact Legislation on Protection of Domesticated Biodiversity

Enact a legislation, or subsidiary notification under the Biological Diversity Act, for the protection of domesticated biodiversity. This should deal with crops, livestock, and pets, and mandate that all activities that could threaten domesticated biodiversity should be subjected to stringent clearance procedures (which need to be laid out). It should also provide for the explicit role of farmer, pastoral, and fisherfolk communities in decision-making relating to domesticated biodiversity.

Justification: The current absence of virtually any legal backing to domesticated biodiversity has left a huge gap in efforts to conserve it. Nobody can be held accountable for loss of such biodiversity, and there are no avenues for officials or citizens to regulate activities threatening it. Hence the urgent need for a separate law, or a notification under the Biological Diversity Act, on this subject.

Suggested Responsibility: MoA (in particular NBPBR, NBFGR and NBAGR), in consultation with MoEF, and relevant national NGOs and farmers' groups.

Steps:

As in Section 7.2.8.1, Action 1 above, and the same process as proposed therein.

7.2.9 Domesticated Biodiversity: Strategies and Actions Relating to Financing

Overall strategies:

1. **Review and re-orient macro-economic and financial policies and schemes relevant to agriculture, or having an impact on domesticated biodiversity**, including credit and lending policies, subsidies, etc.; for this, use Strategy 7.1.9.1 as one base;

2. **Phase out perverse incentives and replace them with positive ones**, such as for organic and biodiverse farming; for this, also use *Strategy 7.1.9.1* as one base;
3. **Reorient national and state budgets**, to ensure greater integration of domesticated biodiversity into various schemes, and to enhance the budgets directly meant for domesticated biodiversity conservation; model this on *Strategy 7.1.9.2*;
4. **Empower local governance institutions** to access and control funds relevant for this sector; model this on *Strategy 7.1.9.3*;
5. **Set up dedicated domesticated biodiversity funds**, with inputs from a variety of sources, including some recommended in *Strategy 7.1.9.4*; give special attention to funding the renewed sustainability of shifting cultivation and nomadic livelihoods.

7.2.9.0 Strategies Adapted from Section 7.1.9

Many of the strategies and actions given under *Section 7.1.9*, on Financial measures for wild biodiversity, are relevant to domesticated biodiversity as well. Indeed, domesticated biodiversity is already integrated into a number of the actions suggested therein. Others can be adapted with minor modifications (such as adding to the 'Suggested responsibility' the Ministry of Agriculture, relevant institutions of ICAR/IARI, agricultural universities, state departments including Agriculture, Rural Development, Animal Husbandry, and Panchayats, financial institutions like NABARD, NGOs and academic institutions working on agriculture, and village institutions including PRIs). This overlap is especially true of the following:

Strategy 7.1.9.1, on **macro-economic policies and programmes**, in so far as these have a significant impact on the direction taken by agriculture, and therefore require to be infused with agro-biodiversity concerns; e.g. perverse incentives that promote unsustainable practices like fertilisers and pesticides need to be phased out, and more positive ones such as those supporting the use of organic inputs need to be brought in (see also *Strategies 7.2.9.1* and *7.2.9.2*);

Strategy 7.1.9.2, on **re-orientation of state and national budgets**, in so far as such budgets tend to be anti-biodiversity in their impacts, or unsupportive of agro-biodiversity; in particular, natural resource budgeting into which the true ecological, evolutionary, and other values of agro-biodiversity ought to be integrated;

Strategy 7.1.9.3, on **financially empowering local institutions**, in so far as such empowerment could be a critical component of community-level action to regenerate and maintain the productivity of agricultural and pasture lands;

Strategy 7.1.9.4, on **generating new resources**, especially by introducing appropriate benefit-sharing measures into the wider use of traditional agro-biodiversity and related knowledge, and other such measures (see also *Strategy 7.2.9.3*).

These strategies and their component actions are not being repeated here, except where necessary in the context of particular actions given here.

7.2.9.1 Strategy: Reorient Credit and Lending Policies in Agriculture

Review the current set of lending and credit policies and programmes for agriculture, and orient them towards agro-biodiversity. Such policies should make it easier and more convenient for farmers and pastoralists to get loans for the continuation or revival of practices relating to agro-biodiversity.

Overall Justification: Presently, the lending policies of the government and of banks are more favourable towards the Green Revolution model, and ignore traditional agricultural practices and crops, and innovative organic farming and sustainable pastoralism initiatives. This must be corrected through appropriate modifications in the lending policies, first to create a level playing field among support programmes to various kinds of agriculture, and then to actually favour agro-biodiversity-based farming and pastoralism. The financial lending policy, which supports commodity crops like sugarcane, horticulture etc. must also be extended to the traditional biodiversity farming systems.



Actions

1. Re-Orient Public Sector Lending to Agriculture and Animal Husbandry

Conduct a thorough review of the lending policies of NABARD (and its subordinate rural banks) and other public sector lending institutions relevant to agriculture. This review should be done along the parameters of EIA (with biodiversity parameters fully integrated). Based on this review, NABARD and other institutions must initiate a new lending policy, which increases the share and quantum of loans to farmers who practise organic bio-diverse agriculture and pastoralists who maintain indigenous breeds in ecologically sustainable ways. The policy should simultaneously reduce lending to practices that promote monoculture, ecologically unsustainable methods, and a high dependence on outside markets.

Justification: As described in *Section 5.2* and elsewhere, current lending policies and programmes predominantly promote agriculture and pastoralism that is ecologically unsustainable and tends to erode biodiversity. In so doing they also often go against the long-term interests of small farmers, and the nutritional and other needs of women and children. Such lending policies therefore need to be completely overhauled.

Suggested Responsibility: NABARD and subsidiary banks, and other public sector lending institutions, in consultation with agro-biodiversity experts.

Time Frame: Three years to reorient the policies and programmes; implementation ongoing thereafter.

Steps:

- i. NABARD to commission agro-biodiversity and sustainable farming experts to review its lending policies and programmes in the agricultural sector;
- ii. The policies and programmes to be appropriately modified to facilitate organic, biodiverse farming and pastoralism.

2. Provide Crop and Livestock Insurance for Organic, Biodiverse Farming and Sustainable Pastoralism

Provide adequate insurance to farmers who practice organic, biodiverse farming using indigenous seeds, especially in the transition phase from chemical farming to such farming and in situations where the organic farm is surrounded by conventional cropping farmland. Provide livestock insurance to pastoral communities that maintain populations of indigenous breeds, especially threatened breeds of livestock (including poultry).

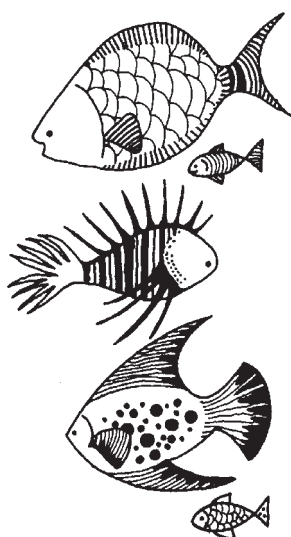
Justification: Currently most insurance cover is offered to monocultures and commodity crops, or to intensive dairying operations, often using exotics and hybrids. Food crops, polycultural farming, traditional animal husbandry with indigenous breeds, etc., get very paltry or no insurance cover. In addition, crop insurance follows an area-based approach, so that farmers get compensation only if an entire area has faced crop failure. This policy must be thoroughly reviewed. The kind of risks that dryland farmers cultivating diversity on their lands take, or the risks that pastoral communities (especially nomadic ones) take must be thoroughly understood and analysed. Their contribution to the larger cause of biodiversity and the future of agricultural environment must also be understood and analysed. In recognition of this, they should get adequate insurance cover so that they feel confident in pursuing their current practices. Individual farmers and farmer units who practice organic biodiverse farming should also be eligible.

Suggested Responsibility: Insurance companies in the public and private sector, and local credit institutions like Regional Rural Banks, Farmers' Credit and Service Cooperative Societies, guided and facilitated by the MoA and MoRD.

Time Frame: Two years to initiate

Steps:

- i. Reorient current insurance policies and schemes, to provide special status to organic, biodiverse farming and sustainable pastoralism;



- ii. This may need the eligibility criteria to be changed from an area approach (in which compensation is provided when an entire area is affected by 'crop failure') to an individual or community farm approach so that individual farming families and villages are encouraged to take up or continue organic, biodiverse agriculture;
- iii. It would also need integration of schemes for nomadic peoples (pastoral and agricultural), who are otherwise usually not covered by insurance schemes;
- iv. The insurance schemes should be decentralised, with functions being taken over by institutions like regional rural banks, farmers' credit and service co-operatives, self-help groups, village-level savings groups, etc.



3. Introduce Micro-Credit Schemes to Encourage Biodiverse Farming

Reorient current micro-credit schemes, and introduce new ones, to encourage organic, biodiverse farming, and sustainable pastoralism with indigenous breeds. In particular, provide such micro-credit to women farmers and herders, to landless or marginal farmers, and to nomads. Encourage institutional structures amongst these communities that can self-manage such micro-credit schemes.

Justification: Most current micro-credit schemes in rural development and agriculture, or other sectors, are insensitive to domesticated biodiversity issues. Given their increasing reach and impact, a re-orientation of such schemes could have significant positive results both for biodiversity and for the livelihood security of small farmers and marginalised pastoral people.

Suggested Responsibility: Farmer and pastoral groups/networks, and village level institutions, with support from Ministry of Agriculture, Ministry of Rural Development, state agriculture/animal husbandry and rural development departments, financial institutions such as NABARD and micro-financing bodies, and relevant NGOs involved in micro-credit programmes.

Time Frame: Reorientation of existing relevant schemes in 2 years, new schemes in 3 years.

Steps:

- i. List the major ongoing micro-credit schemes relevant to agriculture, both from central and state governments, and financial institutions and NGOs, and assess them from a biodiversity and livelihoods point of view;
- ii. Introduce changes or new measures in such schemes, and new schemes as relevant, to mainstream biodiversity;
- iii. Conduct participatory and independent monitoring to assess the ecological and social/economic impact of such schemes.

Box 7.2.9.1 Financial Schemes in Agriculture: Need to Simplify

The Department of Agriculture and Cooperation (DAC) has 182 attached/subordinate/ autonomous offices under it. All this is notwithstanding the fact that Agriculture is a state subject. As of the 9th Plan, the Department ran 147 schemes, related to cereals, pulses, oilseeds, commercial crops and horticulture. Its work is split into crop-specific schemes - and even within a particular crop into various activities - thus multiplying the activities for virtually all the components.

In each scheme related to a crop, there are common components for providing subsidies and loans. There are subsidies on many components such as seed and planting material, production of breeder, foundation and certified seeds and also for distribution, apart from subsidy for transportation, front line and field demonstrations, farmers' training, subsidy on agricultural implements, micro-nutrients, and the like. In ICDP (Integrated Conservation and Development Projects) rice, subsidy is on many of these components and when a scheme is considered for pulses or oil-seeds, the same components also figure there. This results in overlapping of subsidy on different crops under various schemes; a cluster of farmers in a particular area, then, could avail subsidy on implements, on micro-nutrient or on sprinkler sets under more than one scheme. Further, for training, frontline demonstration and field demonstrations expenditure could have been minimised to a large extent if these were organised on cropping system-based approach instead of a crop-specific approach.

From the early 1960s/70s, schemes are being implemented without any evaluation of their shortcomings or impact, including on the sustainability of farming and on agro-biodiversity.

The Department needs to carry out a detailed exercise on convergence and weeding out of existing schemes. Instead of the 147 schemes that are currently in operation, it would appear that 8 or 9 schemes may suffice to address the problems in the agriculture sector in a focused and cost-effective manner. Simultaneously, all these schemes need to be reviewed and changed to facilitate organic, biologically diverse agriculture and a range of livelihoods based on this.

The incentive being given to farmers by way of higher minimum support prices could lead to high costs in future as farmers use more fertilizer and pesticides (apart from possible use of inferior land) to increase output of only two crops (rice and wheat) in preference to others. This will discourage exports and at the same time lead to higher prices for the consumer. The net result is likely to be even greater excess supply, which is not matched by demand, and even greater surplus of cereal stocks with FCI. Instead, the approach being advocated in this report, on encouragement of a diversity of farming (and pastoral) systems to suit diverse agro-ecological and cultural conditions, sustaining a diversity of crops and livestock through appropriate organic inputs and marketing links, should be the focus of the Ministry of Agriculture's schemes.

Source: Adapted from GOI 2000.

7.2.9.2 Strategy: Provide Financial Incentives to Biodiverse Farming

Actions

1. Provide Financial Incentives for Sustainable and Biodiverse Farming

Provide a range of financial incentives for sustainable, biodiverse farming. This would include the following:

- i. A conservation bonus to farmers who produce on the principle of biodiversity, on the model of 'set aside' subsidies that are offered to British and Swiss farmers for organic agriculture. This will encourage a large number of farmers to revert back to their traditional forms of ecological agriculture, or adapt new forms as appropriate. The conservation bonus will have the effect of offsetting this distortion and creating a level playing field and offering farmers some options. Such a programme may even not attract any punitive action from the WTO regime, and could offer the Indian biodiverse farmers a competitive advantage in the international food market.
- ii. Special rewards at state and national levels, for innovative work on organic, biodiverse farming, and sustainable pastoralism; build on such initiatives already in place by groups like Green Foundation (Bangalore), National Innovations Foundation (Ahmedabad), and Deccan Development Society (Hyderabad/Pastapur).
- iii. Higher procurement prices, at least for an initial period, for indigenous crops and produce (milk, wool, eggs, etc.) from indigenous animal breeds. To begin with, price support can be envisaged in crops such as *ragi*, *jowar* and *amaranthus* which have high implications for equity, and food and livelihood security. These could be linked to the strategy (Section 7.2.4.1) on PDS.
- iv. Incentives for cultivation of crops with high nutritive value and those with lesser demands on water and energy inputs (National Conservation Strategy).

This should go hand in hand with the phasing out of perverse incentives that undermine agro-biodiversity, including subsidies on chemical-intensive agriculture, bank loans and financing schemes, etc. (see Section 5.1.2 and Box 5.15, see also Strategy 7.1.9.1).

Justification: Current financial incentives are available only for conventional, Green Revolution kind of agriculture. Given the widespread realisation of the unsustainable and inequitable nature of this model, it is an appropriate time for a major shift in emphasis.

Suggested Responsibility: MoA, state agricultural departments, Agriculture Prices and Costs Commission, financial institutions, PRIs, and farmer/pastoral groups; NGOs too could be encouraged to provide such incentives.

Time Frame: Ongoing

Steps:

- i. Document the existing initiatives towards providing financial incentives for organic, biodiverse farming and sustainable pastoralism (see Sections 6.2.2 and 6.2.4), and distil lessons for their upscaling and spread;
- ii. Build such incentives into relevant central and state agricultural programmes, schemes, and budgets;
- iii. Monitor the impacts of such incentives, and modify the schemes/programmes containing them, where there are defects or loopholes;
- iv. Facilitate NGOs, PRIs, and other institutions and organisations to initiate such incentive schemes.

2. Explore Domestic and International Markets for Organic, Biodiverse Agricultural Produce, Keeping in Mind Ecological and Equity Imperatives

Conduct market surveys within and outside India, to explore the potential demand for organic, biodiverse agricultural produce. However, such markets can at some stage completely distort the production and consumption pattern of the rural biodiverse communities. This aspect of carefully designed markets, which allow the local communities to have the first choice and option to consume the safe and diverse foods they produce, has to be ensured very meticulously. The market should be organised on a priority basis at the following levels:

- Household consumption and local ecological sustainability to be the first priority of the production system.
- Local village markets to be the first recipients of the surplus produce.
- Local *mofussil* and urban consumers to be the second targets.
- The export markets should be the last choice, because they are fickle, faddy and unreliable. They may not be sustainable for these very reasons.

The concept of food miles which argues against the long range travel of food from the location where it is produced to the location where it is consumed, must be always borne in mind when such policies are framed and markets are targeted.

Justification: The organic market in the world is evolving into phenomenal proportions of several billion dollars of annual trade. During the last decade there has been a remarkable shift in the food preferences of the consumers in the West, particularly in Europe. In recent years the threat of being flooded with GM foods has intensified this.

The biodiverse farmers of India can provide an answer to this search. Their fields, which are rich in diverse foods, can not only be the source of safe food but also provide the kind of variety that the knowledgeable consumers of the Western consumer movement are seeking. It is this emerging market that agricultural policy designers and economists should carefully look at, and prepare a strategy to tap with the full participation of farming and pastoral communities, keeping in mind the above safeguards.

Suggested Responsibility: MoA and state agriculture departments, along with Integrated Tribal Development Agencies, appropriate market analysis agencies and consumer groups.

Time Frame: Two years

7.2.9.3 Strategy: Set Up Agro-Biodiversity Funds

Actions

1. Create Domesticated Biodiversity Promotion Funds

(read with Strategy 7.1.9.4, Action 12)

Set up Domesticated Biodiversity Promotion (DBP) Funds at national and state levels, to support many of the above-mentioned incentive activities, and other initiatives aimed at agro-biodiversity conservation and equi-



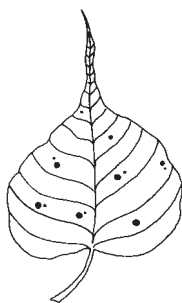


table use. Such Funds could be part of or linked to the funds being proposed under relevant biodiversity and plant varieties laws.

Justification: There are currently no specially earmarked funds for agro-biodiversity; even if and when appropriate budgets are put into this topic, there would be a need for an independent fund unlinked to government schemes and budgets. Such a Fund could also help to channelise inflow from diverse sources like biodiversity collection fees, royalties and share of commercial benefits from community germplasm or knowledge, etc.

Suggested Responsibility: MoA and MoEF, with NABARD or equivalent institution, under the guidance of the proposed National Biodiversity Authority; and state agricultural departments along with relevant state level institutions.

Time Frame: Within 2 years of coming into force of Biological Diversity Act.

Steps:

- i. Explore the feasibility and best possible structure of Domesticated Biodiversity Promotion (DBP) Funds, at central and state levels, including identifying the appropriate institution within which to house them, linked to or part of the proposed National and State Biodiversity Funds under the Biological Diversity Act, and also linked to the National Gene Fund under the Plant Varieties and Farmers Rights Act;
- ii. Initiate the DBP Funds with core money put in from the relevant centre and state budgets;
- iii. Search for other sources of augmenting the DBP Funds, including taxation on seed and other agro-based industries, donations from Indian and foreign sources, fees/royalties and other benefit-sharing arrangements that are not directly going to communities of origin, etc. (*see Strategies 7.1.9.5 and 7.2.5.5*);
- iv. Set up a transparent system of utilising the DBP Funds, with management committees at centre and state levels that consist of national/state level farmers'/pastoralists' groups/networks, NGOs and academics, and relevant government officials.

2. Create a Shifting Cultivation and Nomadic Pastoralism Fund

Within the above-mentioned Agro-biodiversity Promotion Fund, or separately, set up a Fund for Shifting Cultivation and Nomadic Pastoralism, aimed at facilitating farmers and pastoralists to (i) maintain traditional *jhum* and pastoral practices that are still sustainable, or, (ii) experiment, where *jhum* or pastoralism have become unsustainable, with lengthening the fallow period on land, agroforestry models, reducing excessive herds of 'nondescript' livestock and improving indigenous breeds, and searching for other viable alternatives to ecologically destructive practices. The food and economic deprivation that some of these steps may entail, e.g. by not bringing the land under cultivation for a period, can be met through the support from the fund. This fund must be administered by the local communities at the community level, through equitable institutions involving both women and men, so that they exercise the right to encourage this practice.

Justification: Given that in many parts of north-east and central/eastern India, shifting cultivation cycles have drastically reduced, and given also that this practice is otherwise inherently sustainable and crucial for livelihoods, there is an urgent need to provide incentives for reviving longer-cycle *jhum* practices and/or going into alternative forms of *jhum*, such as crop-tree combinations. This can only happen if there is some buffer that can be availed of by farmers in taking up these modifications. Similarly, situations of unsustainability in relation to nomadic pastoralists, due to growing livestock numbers or fragmentation of migration routes, can be partly addressed through appropriate financial help (in both cases, it should be kept in mind that financial measures are only a part of the solution, and that more important would be measures relating to tenurial security, tackling inequities, and others dealt with elsewhere in this report).

Suggested Responsibility: MoA, along with regional organisations like North-East Council, state agricultural departments, and *adivasi* groups.

Steps: Similar to, or part of, Action 1 above

7.2.10 Domesticated Biodiversity: Strategies and Actions Related to Technology

Overall Strategies:

1. **Promote technologies for organic and biologically diverse agriculture**, through a mix of complementary traditional and modern technologies; make other agricultural technologies more ecologically sensitive;
2. **Introduce new conservation technologies, and enhance the use of existing ones**, for controlling ecologically destructive phenomena like disease, pollution, and alien invasives, for *ex situ* conservation, for information generation and storage, for species rehabilitation, etc.; model this after *Strategy 7.1.10.2*;
3. **Ensure that development of biotechnology and biotechnological products promotes traditional methods, is in tune with the principles of organic and biodiverse farming, and does not cause adverse impacts on biodiversity, health, and livelihoods**; this should include a full public and long-term scientific scrutiny of proposed genetic engineering products and processes; for traditional biotechnologies, model this on *Strategy 7.1.10.3*.

7.2.10.0 Strategies Adapted from Sections 7.1.4, 7.1.7, and 7.1.10

Some action points on technology as given for wild biodiversity in *Section 7.1.10*, are also relevant for Domesticated biodiversity, e.g.:

Strategy *7.1.4.4*, on **technologies related to agro-based enterprises** (see also *Section 7.2.4.4*);

Strategy *7.1.7.3*, on **integrating biodiversity into energy and infrastructure projects**, with a focus here on agro-biodiversity;

Strategy *7.1.10.1*, **making existing agricultural technologies more ecologically sensitive**, and searching for **alternative eco-friendly technologies**, including those for energy, water, and waste management.

7.2.10.1 Strategy: Promote Technologies for Organic and Biodiverse Agriculture

Actions

1. Promote Organic and Biodiverse Agricultural Technologies

Encourage the widespread application and revival of organic, biodiverse farming technologies, and pastoral/ethno-veterinarian techniques, in India. This should include existing traditional and modern ones, as also the development of new ones (see *Section 6.2.10.2*). The entire range of sustainable farming and pastoral technologies, available in natural farming, permaculture, biodynamic farming, organic animal husbandry, and other such approaches/models needs to be tried out and propagated as appropriate.

Justification: There is a wide range of technologies available for organic, biodiverse farming and animal husbandry. Unfortunately a considerable portion of this has already been lost, or is rapidly declining, under the onslaught of non-organic agriculture. What is left needs support and encouragement, and needs to be spread back into areas where it was previously in use; in addition, new technologies of this kind are needed to cope with changed circumstances, such as the need for increased production.

Suggested Responsibility: Farming and pastoral groups and networks, MoA, MoEF, APEDA/Ministry of Commerce and Industry, and state agriculture/animal husbandry departments, with guidance and help from relevant NGOs and institutions, and agricultural universities.

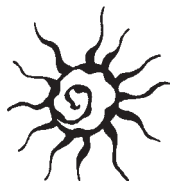
Time Frame: Ongoing; fix 5-yearly targets for the area covered by such farming.

Steps:

- i. Build on existing documentation of organic farming technologies already in use, such as the *Organic Farming Sourcebook* of the Other India Press, and put together a comprehensive database on such technologies (traditional and new).



- ii. Encourage the spread of such existing technologies, to areas/farming communities where they are not in use, after assessing their ecological and social viability; the National Agricultural Technology Project of ICAR should be used for this (see Section 6.2.10.2);
- iii. Conduct on-farm research on standardised protocols for feasible cropping systems and their package of practices.
- iv. Identify all sources of organic material, including industrial wastes that can be used as inputs for organic farming; for wastes that presently cannot be so used, identify gaps in technology that prevent the utilization of these wastes.
- v. Facilitate community-based certification of organic farms, their products and products along with providing logos and accreditation by government-authorised agencies. These agencies could function under the purview of a regulatory authority that would be empowered to provide a framework for the quality of all products that are marketed as organic and also those inputs that are recommended and marketed for use in organic farming. There is a need for making the certification process simple and accessible to the small and marginal farmers, for them to reap the benefits of organic farming. Initiatives such as the development of standards of organic animal husbandry by APEDA/Ministry of Commerce and Industry could be used as a broad framework.
- vi. Develop awareness and training programs along mutual learning principles, by initiating R&D liaison between some chosen R&D institutions and farmers, traders and small scale entrepreneurs for long-term technology development.
- vii. Involve institutions like NIRI to maintain interaction with cottage and small-scale entrepreneurs for setting up commercially viable production units, facilitating financial aid for setting up the unit, providing scientific and technology assistance and monitoring quality of the product.
- viii. Prepare training modules and impart training to NGO representatives and farmers.
- ix. Set up training centres in agricultural colleges and Krishi Vigyan Kendras across the country, imparting training on the input chain of organic farming like farmyard manure, bio-fertilisers and bio-pesticides.
- x. Set up input chain for products like vermicompost, trichocompost, biopesticides and biofertilizers at the village level that would help in promotion and adoption of organic farming and generate employment opportunities at the village level.
- xi. Establish a Centre of Excellence under the National Agricultural Research System that would document indigenous knowledge and technologies adopted by research centre/NGOs/individual farmers in order to promote widespread organic farming; link this to the proposed network/federation of organic domesticated biodiversity initiatives (Section 7.2.2.1, Action 4).
- xii. Encourage research on micro-organisms with special reference to their role in various functional aspects such as nutrient cycling, decomposition, etc.



7.2.10.2 Strategy: Ensure that Genetic Engineering Products and Processes Do Not Cause Adverse Impacts to Biodiversity, Health and Livelihoods

(see also Strategy 7.1.10.3)

Actions

1. Ensure that Genetically Engineered or Modified Organisms Used in Agriculture and Health, are Safe for Biodiversity and Human Health

Justification: Genetically modified organisms (GMOs) can be divided into those that are promoted under controlled conditions, and those promoted in 'wild' or 'open' conditions. The former can again be divided into those that can survive in the wild and those that cannot. With respect to the latter category, risks of contamination to natural and agricultural biodiversity are probably insignificant (though there remains scientific uncertainty about this), and safety concerns primarily arise during their handling. With the other category, however, there are several risks. Such GMOs can have significant impacts on ecological, livelihood and economic security. Major fears include dislocation, loss and contamination of wild biodiversity, contamination of indigenous domesticated biodiversity, and health impacts amongst people, livestock, and wild fauna. Given such concerns, and given that India has already gone into a programme of introducing GMOs with the release of Bt cotton, there is an urgent need for stringent safety measures to be introduced and strengthened.



Steps:

- i. Strengthen the infrastructure, humanpower, and capacity (building on what is already in place) to monitor the ongoing introduction of Bt Cotton into farmers' fields and its ecological impacts, and to ensure that its illegal spread into areas it is not cleared for, does not take place;
- ii. Undertake mass awareness campaigns amongst farmers and others, regarding the safety aspects of new biotechnological products, building on the programmes already in place;
- iii. Build into the conditions for release and use of any GMOs, a strict liability on the introducing seed company for any adverse impacts on the environment, human and livestock health, and gene flows that the company has assured would not take place;
- iv. Introduce a system of labelling all products that contain GM technology and components, including seeds, drugs, etc.;
- v. Subject all further consideration of GE products or foods to (i) long-term studies by independent agencies, in various agro-ecological conditions, on their ecological, health, and social impacts; (ii) full disclosure to all stakeholders, including farmers and consumers, on the potential risks involved in the introduction and use of GE/GM products/processes; and, (iii) a nation-wide process of awareness-generation and consultation on the potential risks and benefits, especially amongst farmers and consumers;
- vi. Based on the above-mentioned monitoring process and the above-mentioned consultations, take a decision on whether any GMOs should be cleared for use, and whether the existing use of Bt cotton should be continued or withdrawn (as already provided for in the conditions of its clearance);
- vii. Involve, with full access to information and decision-making processes, independent experts, NGOs, and farmers groups in all processes of screening and clearing GE/GM products and processes, including in the GEAC.



Suggested Responsibility: MoEF, MoA (ICAR), and DBT, in collaboration with relevant state agencies and institutions, and involving farmers' organisations, through the Genetic Engineering Approval Committee (GEAC).

Time Frame: Monitoring and liability measures within one year; implementation ongoing thereafter.

Box 7.2.10.1 GMOs and Biosafety

(Recommendations in some BSAPs)

- The **West Coast Ecoregional BSAP** indicates that the 'creation and introduction of GMOs also qualify as invasive alien species.' While raising concerns about the use of GMOs, the BSAP has recommended site-specific monitoring studies in areas where exotic species have already invaded to understand their impact on the local biota and ecosystem functions. Sites near ports and coastal aquaculture farms should be intensively monitored for alien species and GMOs. It also states that precautionary approaches (biosafety) in handling, transport and maintenance of GMOs need to be strictly enforced.
- The **Andhra Pradesh State BSAP** has highlighted that the 'the State is facing immense threat with perspective of genetically modified crops.' The BSAP has several recommendations ranging from restrictions on the use of GMOs, education of farmers related to this matter, research studies etc.
- The **Karnataka State BSAP**, as part of key concerns, speaks of the 'need to deal with newly emerging challenges such as Intellectual Property Rights (IPR) issues and Genetically Modified Organisms (GMOs).'
- The **Punjab State BSAP** suggests that 'on the issue regarding introduction of GMOs, the National Policy on GMOs should be followed in Punjab and all information on manipulation, transfer, risks and use of modified living organisms should mandatorily be made public to allow local populations to accept/reject introduction of such organisms in their specific areas. Full and long-term EIAs, and public hearings, before introduction and use of GMOs, should be mandatory. Further, monitoring of impact and movement of such organisms in the environment be assessed prior to introduction.'

7.2.11 Domesticated Biodiversity: Strategies and Actions at International Forums

Overall Strategies:

1. **Advocate stronger integration of domesticated biodiversity into agriculture-related treaties and forums**, including the International Treaty on Plant Genetic Resources, and the Agreements on Agriculture of the World Trade Organisation (WTO);
2. **Advocate sensitivity towards domesticated biodiversity in non-agriculture related treaties and forums that have an impact on agriculture**, including the General Agreement on Trade and Tariffs, the General Agreement on Trade in Services, and the Trade Related Intellectual Property Rights agreement (all under WTO), and the World Intellectual Property Organisation.
3. **Encourage international civil society networking**, to input into international treaties and forums in a way that domesticated biodiversity issues are strengthened; model this on *Strategy 7.1.11.3*;
4. **Make joint use of human rights and environment instruments**, to further domesticated biodiversity concerns especially those related to traditional knowledge and the rights of farmers/pastoralists/fisherfolk; model this on *Strategy 7.1.11.4*.

7.2.11.0 Strategies Adapted from Section 7.1.11

Several strategies relating to Wild biodiversity, from Ch.7.1.11, would be relevant to Domesticated biodiversity also, e.g.:

Strategy 7.1.11.3, on **civil society networking**, in so far as community and NGO networks have already had a considerable influence on global negotiations and forums relating to agriculture, and this could be productively enhanced;

Strategy 7.1.11.4, on the **joint use of human rights and environment instruments**, in so far as these would be able to contribute to the goals of tenurial security, community control over seeds and other genetic material, community control over their traditional knowledge, and other such aspects related to agriculture.

These strategies are not repeated below.

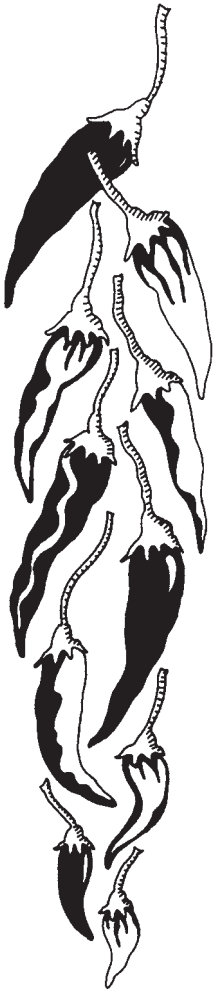
7.2.11.1 Strategy: India to Advocate Strengthening of Biodiversity Integration into Agriculture-Related Agreements and Forums

1. International Treaty on Plant Genetic Resources (ITPGR)

India to:

- i. continue insisting on the inclusion of Farmers' Rights provisions and other food security provisions in the ITPGR, including asking for Farmers' Rights legislation to be an internationally binding obligation, rather than being left to the discretion of the individual countries;
- ii. seek for ITPGR to be made into an IPR-free zone (i.e. IPRs should not be allowed on plant species that are listed in Annex 1 of the ITPGR);
- iii. seek provisions for equitable benefit-sharing independent of IPRs, especially for avenues other than monetary benefits;

Justification: Currently the language on these aspects is either vague or weak. Such aspects are left to the discretion of the Governing Body that will be constituted only after the treaty enters into force. If the treaty does become an IPR-free zone, India can then press for the expansion of the list of food crops. In the absence of such a zone, the Treaty could actually continue the historically unfair relationship in which 'free' circulation in the name of common heritage becomes a route for valuable genetic resources from biodiversity-rich countries/communities being taken away by industrial societies and then used commercially with restrictive IPR regimes for protection. Equity in access to plant genetic resources also needs to be accompanied by clear equitable benefit-sharing arrangements



Suggested Responsibility: MoA and MoEF, along with national NGOs and institutions working on related subjects, and centrally involving farmers' groups, people's organisations, and other associations of communities that could benefit or be affected by the provisions of ITPGR.

2. Agreement on Agriculture of WTO (AoA)

India to:

- i. seek an agro-biodiversity impact assessment of the obligations and provisions of AoA, including their compatibility with the CBD, with the understanding that the AoA will be entirely renegotiated, or dropped, if found to have negative implications for agro-biodiversity and small/traditional farmers;
- ii. meanwhile continue urging for AoA's formulation and implementation to be oriented towards the small and marginal farmer; and for more flexibility so that developing country governments can choose the policies which they believe will assist in pro-poor and pro-farmer development;
- iii. seek central integration of agro-biodiversity and farmers rights issues into the proposed Food Security Box.

Justification: With global trade being its central focus, the AoA is not oriented towards agro-biodiversity and small farmer issues. Such an orientation is urgently needed.

Suggested Responsibility: MoA, Ministry of Commerce, and MoEF, along with national NGOs and institutions working on related subjects, and centrally involving farmers' groups, mass people's organisations, and other associations of communities that are affected by AoA's provisions.

3. Biosafety Protocol of Convention on Biological Diversity

India to:

- i. push for rapid implementation of the protocol's provisions, in particular those relating to international movement of GMOs and related technologies/processes;
- ii. assess its existing policies and laws to enable stronger protection against illegal or damaging imports of GMOs into the country, and against its own nationals creating the conditions for such damage in other countries.

Justification: Though not perfect, the Biosafety Protocol provides some safeguards against the potential dangers of GMOs and their transfer across countries, and the sooner it is put into an implementation phase, the better.

Suggested Responsibility: MoEF and Department of Biotechnology, along with national NGOs and institutions working on related subjects.

7.2.11.2 Strategy: India to Advocate Integration of Biodiversity Concerns into Non-Agricultural Agreements and Forums

In general, India needs to push for greater harmonisation of WTO and other trade/development related agreements, with multilateral environmental treaties (MEAs), in such a way as to integrate biodiversity concerns. In particular, its needs to advocate the early implementation of the trade and environment provisions of the Doha Ministerial Declaration (9-14 November 2001), in which the relationship between WTO rules and trade obligations in MEAs is to be clarified and negotiated, and the relationship between the TRIPS Agreement and the CBD to be examined (Doha WTO Ministerial 2001: Ministerial Declaration, WT/MIN(01)/DEC/1). It should insist that this harmonisation takes place with biodiversity and related people's rights being considered centrally important and non-negotiable.

1. General Agreement on Trade and Tariffs of WTO (GATT)

- (i) India to continue and strengthen a proactive critical stand on the justification and desirability of a world trade regime of this nature.



Justification: Given the general negative impacts of trade liberalization on biodiversity, India's position with respect to WTO talks has been largely positive, including questioning the need for a round of trade talks in 1986, making objections to the launch of the Doha round, and influencing the way it was eventually agreed negotiations would be conducted. Such a pro-active position needs to continue, with appropriate stands on various aspects of the GATT and other related WTO agreements.

Suggested Responsibility: Ministry of Commerce, expanding the mandate of its existing expert committee on TRIPS and CBD, along with relevant NGOs and institutions, and centrally involving farmers' groups, mass community-based organisations, and other associations of communities that are affected by GATT's provisions.

2. General Agreement on Trade in Services of WTO (GATS)

India to:

- i. push for a position in which 'developing' countries do not have to give commitments till the assessment of the impact of 6 years of GATS (Article XIX of the agreement) is prepared, and till 'developing' country interests are taken into account in negotiations;
- ii. invoke items other than Item 6 on Mode 3 (commercial presence), which will allow as valid regional or state government policies that limit service suppliers, value of transactions, or joint ventures. In ecologically sensitive areas, for instance, limiting the levels of tourist and other such activity is critical;
- iii. reject requests from other countries (e.g. of the EC), for commitments to open up 'protection of biodiversity and landscape' under environmental services, especially because such services fall under the Government exemption clause (Article 1.3);
- iv. not make binding commitments on Mode 3, as such commitments could hamper governmental attempts to regulate foreign and domestic investment in ecologically destructive projects and processes.
- v. commit that decisions on GATS will only be taken after very careful ecological and social scrutiny (including a sectoral or project-based environment impact assessment), with public participation and scrutiny being facilitated, and on a case-to-case basis rather than opening up entire sectors. This should be clear to all relevant ministries and departments of GOI.

Justification: Since it may not be possible to go back to a pre-WTO situation, India's position should be to have no substantial GATS commitments in this phase because:

- a. the promised assessment is not done. The assessment should include both actual and potential implications of GATS commitments;
- b. there is not enough data with the government on the services sectors to make informed commitments;
- c. there is not enough time for consultations with all concerned parties (most state government WTO cells are doing very little work on the GATS);
- d. in tourism, there is not enough clarity on possible conflicts with India's commitments in the CBD; no agency is providing any inputs on possible environmental implications of GATS commitments in the tourism sector;
- e. there has been no parliamentary and state legislative scrutiny of the GATS.

Suggested Responsibility: Ministry of Commerce, MoEF, and relevant national NGOs and institutions working on this subject, such as EQUATIONS, and centrally involving trade unions, mass community-based organisations, and other associations of communities that are likely to be affected by provisions of GATS.

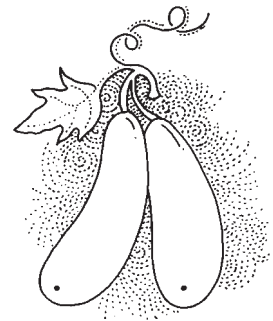
3. Trade Related Intellectual Property Rights of WTO (TRIPS) and International Union for the Protection of New Varieties of Plants (UPOV)

India to:

- i. continue asking for addition, in IPR regimes and application criteria, of disclosure of materials, and of prior informed consent;



- ii. continue pushing for Article 23 (Geographical Indicators) to be made applicable to products of 'developing' countries as well;
- iii. revive its demand that life forms be left out of the purview of TRIPS, or at the very least that Article 27(3)b relating to this be flexible to allow countries to exclude such IPRs, if such an action is found appropriate by the country;
- iv. continue a strong stand that the obligations of each country under the TRIPS be in line with the obligations under the CBD (as stated in its position to the CTE);
- v. review its decision to join UPOV, given the threat that this could cause to its commitment towards farmers' rights.



India has also offered some suggestions to reconcile these contradictions. For instance, since the CTE in 2000, India has raised the issue of biopiracy of traditional knowledge, reiterating that 'patent applicants should be required to disclose the source of origin of the biological material utilized in their invention under the TRIPS Agreement and should also be required to obtain prior informed consent (PIC) of the country of origin.'

Suggested Responsibility: Ministry of Commerce, MoA, and MoEF, with relevant NGOs and institutions, and centrally involving farmers' groups, mass community-based organisations, and other associations of communities that are likely to be affected by the provisions of TRIPS and UPOV.

