Over 79% of Bhutan's population practice subsistence farming, relying on an integrated system of crop, livestock and small-scale forest management, with the country currently meeting 65% of its food needs (NEC, 1998). The limited amount of arable land, the nature of the terrain which makes intensification difficult, a high population growth rate and the increase in urban non-farm communities are some of the constraints facing the country's efforts at biodiversity conservation.

The biggest challenge for the forestry sector is to keep up with the overall economic growth rate and thus maintain its share of production. This is, however, not the only challenge. Another one is the support to other sectors. The load and pressure from agriculture and animal husbandry is not going to ease up, even if the value-added share of those two subsectors is going down. One must bear in mind that even these sectors are still growing. The key linkage that requires forestry's attention is the supply of animal feed. The previous estimate has been that 30% of animal feed comes from forests. There are regional studies, which indicate that the portion could be up to two thirds of fodder requirements.

Agricultural biodiversity is the surest insurance against disasters provoked by biotic and environmental anomalies. Therefore, the future in food security lies with the conservation and sustainable utilization of the rich diversity in native or naturalized plant genetic resources. Much of the local germplasm falls within the primary or corresponding elite varieties. The transfer of and the breeding of desirable traits from landraces into such materials should be possible in most cases. To some extent, the presence of local forms in the proximity of cultivars could induce natural introgression thus broadening the genetic base of a particular crop.

Bhutan has ratified the Convention on Biological Diversity (CBD) on 25th August 1995. The Sustainable Development Agreement with Netherlands and other bilateral and international contracts bind the country to take necessary steps in fulfilling its share in the preservation of biodiversity and environment. The greater dependence on few plant species, about 20-30 in the national context, creates the need to conserve the native genetic resources. Agriculture for food production is the basis for sustenance and a primary source of income for the rural communities. Women play a critical role in this profession, and are comparatively more dependent on the plant genetic resources than men. Under any production system, women are intimately associated with the crops they cultivate, and thus are more informed of the crop genetic potential and the compelling environmental determinants. It is more difficult for the rural women to get employment outside the farm life. Their freedom and security are thus closely linked with the genetic value of the crop resources. Food and agriculture programs will have to be sustainable and productive in order to reinforce their rights to self-determination and equality in the society. Their indigenous knowledge should be incorporated into modern technologies and the local crop genepools need to be conserved to the effect of enhancing their livelihood and protecting their socio-economic status.

Chapter 2

Description and Assessment of Biodiversity Conservation Efforts in Bhutan

2.1. Biodiversity Conservation - Overview

Biodiversity conservation efforts are usually presented in terms of *in situ* and *ex situ* conservation. *In situ* refers to conservation within the natural habitat, whereas *ex situ* refers to conservation outside of the natural habitat. Therefore *in situ* refers to conservation of ecosystems, species and genetic materials within the parts of the environment where they are found naturally. *Ex situ* conservation involves efforts, primarily with species and genetic materials, which have been removed from the habitat where they naturally occurred.

Wild Biodiversity: With wild biodiversity, *in situ* methods involve the whole range of activities associated with protected areas including establishment, the range of management activities, research, education, buffer and enclave zones, and work with local communities. It also involves conservation efforts outside of protected areas, including such activities as regulation of hunting, integration of conservation with sustainable development activities, such as integrated conservation and development projects and integrating biodiversity conservation into forestry, grazing and agricultural activities, research, various other types of management of human-wildlife interactions, and policy development.

Ex situ conservation of wild biodiversity may involve such activities as zoological gardens, botanical gardens, captive breeding, and various methods and facilities for maintaining seeds, germ plasm and other genetic materials.

Domestic Biodiversity: *In situ* conservation of domestic plant biodiversity primarily involves conserving the wild crop relatives and wild plants for food production within their natural habitats. This involves efforts both within protected areas and outside of them, for example, in forest management and agricultural areas. Conservation efforts include research, survey and inventory, management, education, and policy development.

Ex situ efforts include planned and targeted collecting of plant genetic resources, conducting appropriate research, and maintaining them in botanical gardens, gene banks and through the use of new technologies including in-vitro methods.

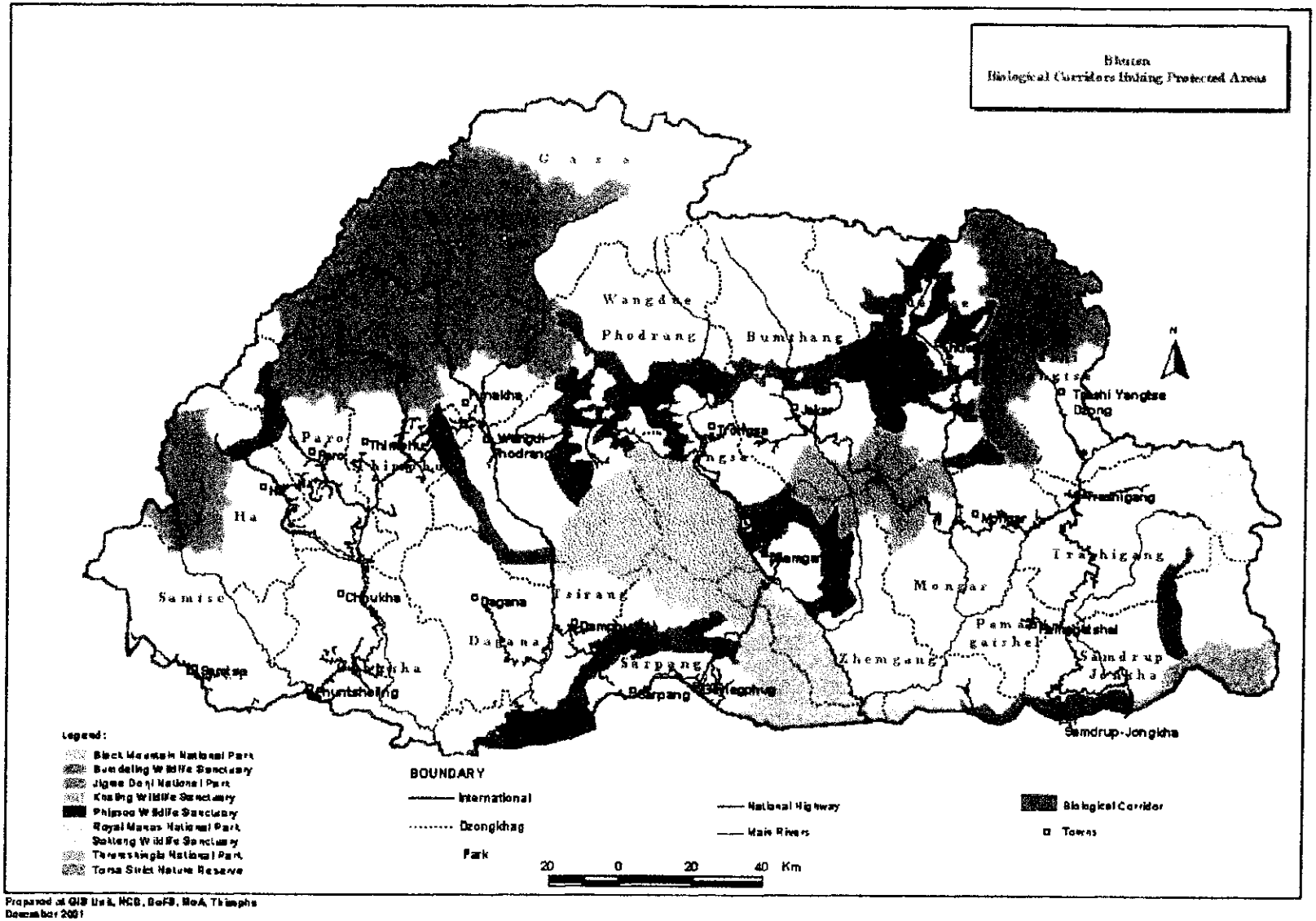
In situ and *ex situ* conservation efforts for domestic animal biodiversity generally parallel those for plants, but with the addition of *ex situ* facilities such as breeding farms.

2.2. Wild Biodiversity

2.2.1. In-situ Conservation of Wild Biodiversity In Areas Under Protection

The Royal government's policy is to maintain at least 60% of the total land area under forest cover with Conservation given priority over extraction and utilization of natural resources for economic gains. However, in a country with growing population, pressure on the forests for more agricultural land and settlement is on the increase. Realizing this constraint, the RGOB has adopted the policy of establishing protected areas to protect representative samples of the pristine Himalayan ecosystem that is still very intact, for the conservation of biodiversity and genetic resources. Thus, the previous protected area system was revised and a national protected area system consisting of four national parks, four wildlife sanctuaries, and one strict nature reserve was established in 1993. Currently the protected area covers 26.23% of the country and the responsibility for their proper management lies with the Nature Conservation Division of the Department of Forestry Services.

Map 2: Protected Areas with Biological Corridors



Prepared at GIS Unit, NCD, DoFD, MoA, Thimphu
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2.2.1.1. Bhutan's System of National Parks, Reserves and Sanctuaries

The protected area system covers a total of 10878.33sq.km as follows:

a. Torsa Strict Nature Reserve (650.74 sq. km)

This reserve protects the westernmost temperate forest of the country from broadleaf forests to alpine parks including the small lakes of Sinchulungpa. The area has no human habitation and is a security area near the Chinese border.

b. Jigme Dorji National Park (4349 sq.km)

This park represents the largest protected area in Bhutan. It is an important natural conservatory of glaciers, alpine meadows and scrublands, subalpine and temperate conifer forests, warm and cool temperate broad-leaved forests, major rivers and streams, and the flora and fauna, which inhabit these ecosystems. The park harbours some 'charismatic' species of wildlife, many of which are endangered or extinct elsewhere in the world. These include the takin, snow leopard, blue sheep, musk deer, Himalayan black bear, marmots, red panda, tiger and several species of pheasants.

JDNP is also famous for its wild flowers. Several species of plants found in the park are valuable cultivars for crops and have other horticultural uses, and a number of others have commercial, medicinal, traditional and religious significance. Over 300 plants are currently used to make indigenous medicine most of which are from the JDNP. (BTF, 1995) The area also has high potential for trekking tourism.

c. Royal Manas National Park (1022.84 sq.km)

This park is the conservation showpiece of Bhutan. Its location is strategic in that, to the north, it is adjacent to the Black Mountains National Park, and to the south it forms a trans-frontier reserve with India's Manas, which is under UNESCO's World Heritage Programme. Thus, RMNP forms an integral part of a protected area complex, which includes a range of habitats, from lowland tropical systems all the way up to permanent ice fields. It is also the only Park in Bhutan where Rhinoceros may occur. The Park contains more significant species than any other park in Bhutan and already 362 species of birds have been confirmed in the park area. Several species of plants found in the park have value as cultivars for crops and other horticultural uses, and a number of other are of commercial, medicinal, traditional, and religious significance. Thus, the park will serve as a genetic depository for these valuable plants. (NCS, 1995)

d. Jigme Singye Wangchuck National Park (1400 sq.km)

This is the former Black Mountains National Park renamed recently as Jigme Singye Wangchuck National Park on the recommendation of Her Majesty the Queen Ashi Dorji Wangchuck during her visit to the park in early 2002. It covers a wide range of habitat types from permanent ice on the peak of Dorshingla 4925m, alpine lakes and pasture, conifer and broadleaf forests. The reserve will constitute the largest and richest temperate forest nature reserve in the entire Himalayas. Surveys have already revealed 449 species of birds in this combined area of Black Mountains and Manas - more than any other reserve in Asia.

The park contains almost no permanent residents. There are a few small farms along the borders of the park along the Mangde Chu River. The only major use currently made of this area is the grazing of yaks in summer on the northern alpine areas of the park.

e. Thrumshingla National Park (768 sq.km)

This is the second major temperate park in Bhutan and contains some spectacular scenic views; beautiful forests from alpine to sub-tropical broadleaf. It also contains some protected examples of chir pine forest. The soil of this area is particularly fragile; rendering it quite unsuitable for logging

or other development but it has excellent tourism potential with a good wildlife trail from the Ura valley right down to the Bumthang valley.

f. Bumdeling Wildlife Sanctuary (1486.75 sq.km)

This sanctuary contains a rich diversity of flora and fauna. The natural ecosystems range from subtropical forests in the lower elevations to alpine meadows in the higher elevations. It also contains some of Bhutan's most scenic alpine lakes. Bomdiling valley, located within the sanctuary, is also one of Bhutan's main wintering spots for the rare black-necked crane. In addition to the wide spectrum of ecosystems, the sanctuary houses several cultural and religious sites of international significance, including the Singye Dzong and Khempa Jong, sites held sacred by Buddhists throughout the region. (BTF, 1995)

g. Sakteng Wildlife Sanctuary (650 sq.km)

The area is designed to protect the easternmost example of the temperate ecosystems of Bhutan where some endemic species are found such as the eastern blue pine, black-rumped magpie and many other species found only in the east of the country.

h. Khaling-Neoli Wildlife Sanctuary (273 sq. km)

This Reserve consists of the existing reserves of Khaling and Neoli. It is planned to combine the two areas and revise the boundaries retaining the same size. The Reserve is important for elephant, gaur, and other tropical wildlife and may be the only locality in Bhutan where pygmy hog and hispid hare occur. Both are known from the Khaling reserve on the Assam side of the border with which this reserve will form a transfrontier reserve.

i. Phibsoo Wildlife Sanctuary (278 sq.km)

This sanctuary in South-central Bhutan is known for it diverse flora and fauna and important biogeographic position in the country. Tropical fauna such as elephant, gaur, and golden langur are found here. It is the only reserve in Bhutan to have chital deer. In addition, it is the only remaining natural Sal forest in Bhutan. (FSD, 1995)

Table 8. Protected Areas in Bhutan

Name of PA	Size	Dzongkhags	Status	Donor
Royal Manas National Park	1022.84	Zhemgang Sarpang	Operational since 1995	WWF Bhutan Program 1995-2002
Jigme Singye Wangchuck National Park	1400	Zhemgang Trongsa Sarpang Wangduephodrang Tsirang	Operational since 1995	Government of Netherlands 1998-2002
Jigme Dorji National Park	4349	Gasa Thimphu Paro Punakha	Operational since 1995	UNDP/GEF 1997-2002
Bumdeling Wildlife Sanctuary	1486.75	Mongar Lhuentse Trashiyangtse	Operational since 1998	DANIDA from 1998-2003
Thrumshingla National Park	768	Bumthang Mongar Lhuentse	Operational since 1998	WWF Bhutan Program 1998-2002

		Zhemgang		
Phibsoo Wildlife sanctuary	278	Sarpang	2002	Bhutan Trust Fund WWF Bhutan Program
Sakteng Wildlife Sanctuary	650	Trashigang	2002	None
Khaling/Neoli Wildlife Sanctuary	273	Samdrup Jongkhar		None
Toorsa Strict Nature Reserve	650.74	Ha Samtse		None

2.2.1.2. Establishment and Development of Protected Areas

The earliest protected area in the country was Royal Manas which was maintained as wildlife reserve for many year prior to being notified as a wildlife sancutary in 1966. It was later upgraded to a national park and extended to link it to the Black Mountains National Park currently the Jigme Singye Wangchuck National Park (JSWNP). Consequently other protected areas such as the Jigme Dorji Wildlife Sanctuary were created in 1974. Subsequent reviews of the protected area system led to its revision in 1993 to represent all ecosystem types in the country.

At the beginning of the 7th Five Year Plan a policy decision was made to begin operationalising the protected areas in Bhutan. In 1993, a preliminary biodiversity assessment of RMNP and JSWNP was conducted by the NCD in collaboration with the WWF Bhutan Programme. The data collected from these assessments were used as baseline information for the preparation of the first management plan for Royal Manas National Park approved in 1995. During this same year, the Government of Netherlands and the RGOB signed the Biodiversity Conservation Project, which was aimed at strengthening the capacity of NCD, as well as operationalizing Jigme Singye Wangchuck National Park. Major activities in JSWNP consisted of boundary, socio-economic and biodiversity surveys.

Park Managers for RMNP, JDNP and JSWNP were appointed in 1994-1995, and while RMNP began the process of implementing its management plan, JDNP and JSWNP began preliminary surveys to gather information to prepare their management plan.

After the approval of the management plan in 1997, the RGOB and the UNDP/GEF signed an agreement to implement the Integrated Conservation of Jigme Dorji National Park Project for a period of five years (1997-2002).

In 1998 with the placement of a Park manager and field staff, a project entitled Conservation Management Planning for Thrumshingla National Park was formulated and TNP was established as an on the ground entity through support from the WWF, Bhutan Program. Also with the Bumdeling Park manager and support staff in place, the Danida supported Environment Sector Programme Support began providing assistance to this sanctuary (1998-2003). To collect necessary information needed for drafting the management plans, JSWNP, TNP, BWS carried out socio-economic, biodiversity, bird and mammal surveys from 1998 to 2000.Management plans for, Jigme Singye Wangchuck National Park, Thrumshingla National Park and Bumdeling Wildlife Sanctuary were approved recently in 2001.

The Protected Areas are in different positions as regards planning. The RMNP had a 'first generation' Management Plan based on surveys, with considerable consultant's input, and is ambitious in a sense that it could only be partly implemented. Since then all management plans have been prepared by NCD and park staff, although technical expertise has been utilised during the survey work and analyzing the information from the field. In BWS and TNP the management

plan preparation process was a consultative process involving park staff, geog and districts and NCD Headquarters. Also, biodiversity and socio-economic surveys have been more thorough. For JSWNP a one year pilot Managment Plan has been prepared that outlines a programme of surveys and consultations by which a full-fledged Management Plan will be prepared coinciding with the 9FYP.

During the 9th Five Year Plan it is envisaged that Phibsoo Wildlife Sanctuary will be operationalized while biological and socio-economic inventgories will be completed for Sakteng Wildlife Sanctuary and preliminary surveys conducted for Toorsa Strict Nature Reserve and Khaling Wildlife Sanctuary (NCD, 2002).

JDNP is in the last year of its project funded by UNDP and GEF. Future funding is not definite at the moment. The Biodiversity Conservation Project that funds NCD as well as activities of the JSWNP is also reaching completion in 2002. The project proposal for the second phase will be prepared shortly for submission to the Sustainable Development Secretariat as well as the Dutch Government. Bumdeling Wildlife Sanctuary is also reaching its last year of its first phase in 2002. The second phase of the project will be from 2003 to 2005 with continued funding from DANIDA. TNP, RMNP and Phibsoo Wildlife Sanctuary are still being supported by the WWF-Bhutan Program.

2.2.1.3. Expansion of Protected Area Boundaries

Based on field surveys and the recommendations provided by the wildlife and bird specialist an extension of boundary of Bumdeling Wildlife Sanctuary was proposed in the area around Singye Dzong and the area surrounding Dongla, Aja and Yarab. Thus the total area of the sanctuary has increased from 1300 sq.km (MoA, 1998) to 1487 sq.km. (BWS, 2001)

2.2.1.4. Boundary Demarcation and Zoning of Protected Areas.

Boundary surveys of most protected areas are underway. In the case of JDNP, prominent landmarks along the Southern boundary have been fully demarcated by the staff. To accommodate both biodiversity conservation and the needs, aspirations and rights of the people living within and around the protected areas, the protected areas will be zoned into core, buffer and multiple use zones (NCD, 1996). However, zoning has yet to be undertaken. Boundary demarcation and zoning require both time and commitment not only from park staff but also from other partners/stakeholders like Dzognkhag, Territorial Divisions, and local people.

2.2.1.5. *Management of the Protected Areas*

All parks have similar administrative organization. The Head office of the park management has three sections, one dealing with ICDP's, one dealing with research and monitoring programs, and one dealing with wildlife management. At field level, parks have warden posts and guard posts to patrol and monitor activities within that particular jurisdiction with support from the park head office. Besides the existing staff, the parks are also supported by resops (village forest guards) who are paid a fixed salary by the Department of Forestry Services. Under circumstances of staff shortage in the parks the resops provide a useful source of support. There is also considerable support and collaboration with territorial divisions and staff from Dzonkhag administrations.

a). Human resources in NCD and protected areas

Each of the PAs is now fully operational with a Protected Area Manager and supporting staff. Until this year the NCD has given higher priority to strengthening and institutional building of the protected areas. Currently there are 196 staff working in NCD and the protected areas. This excludes village forest guards and caretakers. Still an additional 100+ staff are proposed for the already established parks. With additional protected areas proposed to become operational within the 9th Five Year Plan, the number of persons involved directly in conservation activities will be even more.

b). Establishment of park infrastructure.

Strengthening of park infrastructure has been given the first priority so that park staff can be transferred to their respective warden posts. Park infrastructure include the construction of new park offices, warden posts, guard posts, check gates, staff residences, visitor centers, water supply, and development and maintenance of trails and bridges inside the PAs. In addition to this, PAs are also being equipped with office furniture, supplies and field equipment. Warden posts are provided with short-range field equipment and handsets that have greatly facilitated communication from remote warden posts.

Since the newly established PA's are in the process of establishing themselves as on the ground entities, the emphasis has been on park infrastructure development, taking over forestry activities from territorial divisions, conducting socio-economic surveys, PRAs, building rapport with Dzongkhag partners, identifying ICD programmes.

With the exception of RMNP and TNP, at the national level the operational Protected Areas have a Project Advisory/Steering committee that meets on an annual basis to review the yearly progress and discuss the next year's workplan. In preparation for these meetings, PA Managers are required to prepare and present the Financial and Physical progress reports for the first six months/one year and submit the requisitions for the next six months/one year. These committees are chaired by the Minister for Agriculture with representatives from donor agencies, Dzongkhags, National Environment Commission, Ministry of Finance, NCD and other relevant partners.

In addition to this, projects like JDNP also have a Project Advisory Group with the Head of NCD as the chairman. This group as its name implies plays a more advisory role to the park management. The Biodiversity Conservation Project and JSWNP are evaluated bi-annually while BWS is reviewed through a joint annual sector review conducted by RGOB and Danida. Occasionally technical reviews are also conducted.

Thus project performance reviews for the PAs have been based on donor requirements.

c). Lessons Learned

So far the main lessons learnt have been at the Protected areas where donor support has been concentrated and new approaches have been applied with variable lessons learnt.

So far there have been some positive efforts that have been made towards improving conservation activities in protected areas. To begin with, the clear and comprehensive park management plans provide the basis for prioritization and implementation of protected area activities. Park staffs are motivated and becoming increasingly well trained. Internal management within Parks are improving and while ICDPs are providing an opportunity for the parks and local communities to work together, there is increasing collaboration with local stakeholders.

Still there are many weaknesses that have been identified. For instance some external reviews have identified constraints in implementation of projects. These include a) Inadequate reporting system at the park and NCD level, b) need for better coordination of training, c) rapid staff turn-over, d) insufficient planning and managerial capabilities, e) limited numbers and capacity of PA staff, f) limited capacity of NCD to provide institutional support to PAs, g) insufficient staff and human resources for effective park management; and h) financial procedures are not conducive (delay in fund release, complicated procedures). Still other weaknesses identified in the draft vision and strategy for NCD include i) lack of financial sustainability and high dependency on donor funding, j) inadequate reporting (structure), k) insufficient database, limited research and l) inadequate monitoring.

In general all PA's depend largely on external donors, that provide support to individual parks for period coinciding mostly with managment plans (preparation and implementation). As different donors have different priorities there are important differences among the parks in the total amount

available as well as the allocation to various activities. The dependence on donors has raised some doubts about future sustainability, even though in most cases funding is in the process of being committed for the coming years at least.

There are quite a few differences in working processes among the parks, each one having developed in isolation to some extent. Nevertheless good progress has been nade particularly in the longer established PA's. Regarding internal management, all parks are quite satified about the internal communication, decision making processes and leadership. In general all parks have a good working atmosphere, attaching importance to teamwork, transparency and achieving planned activities.

d). Some efforts made to reduce or tackle constraints

1. Delays in fund release- Most of the protected area projects such as JDNP, JSWNP, RMNP have decentralized their funds with an account at the park level. This had resulted in the faster channelization and use of funds.

2. Inadequate reporting system at the park and NCD level. Park Managers and NCD have started to meet every four months, to update each other on the progress in the PAs as well as NCD, and discuss issues relevant to PA management.

3. Need for better coordination of training. During the park conference it was decided that the Management Planning Section would take the responsibility of identifying and coordinating training needs of all PAs and NCD staff.

4. Rapid staff turnover. With capacity building in PAs given high priority, Park Managers were nominated for further Studies, and as a result of this Park Managers were changed frequently. Now since all Park Managers have/are undergoing Masters, this problem will be solved.

5. Insufficient backstopping and service delivery by NCD and limited capacity of NCD to provide institutional support to PAs. The main reason for this was that the existing three sections in NCD were not yet operational due to staff shortage and priority being given to the PAs. Now with the three Sections in NCD, it is expected that NCD will be in a better position to provide institutional support to PAs. Also with the increase in staff strength and consultation mechanisms being established also at NCD level (monthly office meetings, quarterly park managers meetings and annual conference) the opportunities have now increased, to strengthen the link between NCD and parks

6. Insufficient database, limited research and inadequate monitoring. The need was identified to standardize the survey methodology and develop and test a biodiversity monitoring framework and guidelines. For this purpose technical assistance was sought to a) develop a Rapid Biodiversity Survey Methodology for all PAs, and b) to develop a monitoring framework for PAs, which will form an essential component of an adaptive management approach. This is explained in more detail under section 2.2.1.9.

7. Shortage of staff has been cited as a hindrance to the timely implementation of management plans. ***Human resources*** are a concern to all parks, as all have not yet received the full complement of staff according to their establishment. JSWNP feels the most acute shortage, as it has the smallest staff and the second largest area to manage. The human resource needs of the entire Department of Forestry Services as well as the Dzongkhag Forest Extension Offices have to be met from the Natural Resource Training Institute and the Bhutan Forestry Institute from which the deputy rangers and forest guards graduate. One measure to tackle this problem has been to increase the intake of forestry students into NRTI and BFI. Still another measure has been to propose hiring of ex-army-men to conduct patrolling in highly sensitive poaching areas.

8. Coordination with other agencies. Some protected areas have established working relationships with a diverse range of partners and stakeholders. Some prominent ones include RNRRC's Bajo

and Yusipang, ITMS, DoT, RSPN, Dzongkhags, local communities, local schools and donor agencies.

2.2.1.6. Strengthening NCD and PAs.

Organizational strengthening is ongoing at two levels: NCD headquarters and at the Park level. At the park level organizational strengthening concerns the planning and implementation of project and park management plans, while at the NCD level it concerns providing technical backstopping to the parks as well as support planning and policy development for protected area management These would result in mutual strengthening at the two levels.

a). Capacity Building

Capacity building of Bhutanese nationals through in-country and overseas training has been given high priority by the Royal Government. BTF funds many short term as well as long term training programs for NCD and park staff. In addition to this individual protected areas also have funds allocated from their respective donor projects to train park staff as well as park partners.

A number of park staff have undergone training in various aspects of wildlife management, survey and monitoring techniques, Rapid Rural Appraisal, Participatory Rural Appraisal, ICDPs, Forest fire protection and control, Environment and development, bird censusing, biodiversity assessment and monitoring, community forestry out of the country. Groups of park staff, extension agents, forestry staff and dzongkhag staff, park risups, and local school teachers were sent on a study tours of protected areas outside the country, to Nepal, Philippines, Australia, but mostly in the South-East Asia region. This has increased their awareness on conservation issues and protected area management

While most staff have received training in the more general PA management field, field staff now require training on specific aspects such as conducting population, habitat, distribution studies on specific species, on risk assessment, and research and monitoring techniques.

b). Park Self Assessment conducted in 2001.

Using a format based on IUCN procedures that was modified to suit the situation in our parks, self-assessment of all operational PAs except Royal Manas National Park was conducted during July and August 2001. The main objectives behind the exercise were a) to serve as an input for the development of "Vision and Strategy Document" for Nature Conservation Division which will be important in providing guidance to NCD and Protected Areas for implementing its sub-programs under the 9th Five Year Plan; b) to help set priorities for donor support particularly for the second phase of the Bio-diversity Conservation Project which will be more of a program support character to NCD and the Protected Areas; c) review the progress and constraints of protected area management, and lastly, d) to help the sections under NCD to plan for necessary assistance to the Protected Areas

2.2.1.7. Coordination/collaboration and Information Exchange

a). Forestry Technical Advisory Committee meetings.

Since it was realized that relationships that facilitate co-ordination and collaboration are still poorly developed in the Department of Forestry Services, a series of technical advisory meetings for all Divisional Forest Officers, Park Managers and senior officers has been initiated from February 2000. Till date three technical advisory committee workshops have been organized. In these workshops a wide range of issues pertaining to forestry and conservation were discussed.

b). A Conference for Protected Areas

The first Conference for Protected Areas was held in early March 2001. The aim of the conference was to encourage exchange of information between various Protected areas, to present technical

papers, assess the progress in the implementation of management plans and to share and discuss problems experienced by park staff and to seek common solutions, while learning from each other's experience.

This was funded by the Bhutan Trust Fund for Environmental Conservation and focused on updating all Park Managers on experiences in parks, on the preparation of the 9th Five Year plans and on discussing and finalizing the roles and responsibilities of the three sections of the NCD HQ. It has been resolved that such conference will be held annually.

c). Quarterly meetings for Park Managers and NCD

Quarterly meetings between NCD and Park Managers were initiated last year to keep abreast of the park activities and problems in the field.

d). Warden and staff meetings

Wardens are required to submit monthly reports on their activities. Quarterly wardens meetings are held in PAs at different warden posts on a rotational basis. This was started by JDNP in 1997/1998, and followed by JSWNP in March 2000. These warden meetings are chaired by the Park Manager. Since mid 2000 Thrumshingla National Park have also commenced with quarterly meetings involving all parks.

2.2.1.8. Biodiversity Research and Surveys in Protected Areas

Recognizing the need to make Research and Monitoring an integral element of protected area management, most PAs have recently established a Research and Monitoring Unit with clear cut responsibilities/TOR for the independent Warden/Deputy warden. Under the overall supervision of the Park Manager, this Warden will plan and prioritise research and monitoring programs for the PA, maintain the GIS database and propose management interventions to the park management, compile and maintain field data and prepare reports to be submitted to the Headquarters on a regular basis. As and when needed, these wardens will seek technical assistance from the Species Conservation, Research and Monitoring Section in NCD or work with other research partners.

Current data collection efforts are ongoing in JDNP on Takin, Leopard, Tiger, crop depredation, and medicinal plant and mushroom surveys. On a small scale Bumdeling Wildlife Sanctuary has carried out a survey on cordyceps and on the effects of pasture burning. In JSWNP data on grazing impacts and human-wildlife interactions as well as on golden langurs and tigers are ongoing. Data is also being collected on potential economic opportunities, potential ecotourism areas in the park area, background studies on fishing practises in Berti (Zhemgang), and a crop damage study in Zhemgang. There has also been limited data collection at the NCD on Tiger distribution, population, livestock depredation and Human-Wildlife interaction.

Biodiversity surveys have been conducted in all operational Protected Areas with the exception of RMNP where the present situation does not permit much survey work. Surveys in TNP, JSWNP and BWS were preliminary biodiversity surveys, with survey results being used to prepare the respective management plans.

Jigme Singye Wangchuck National Park. Biodiversity surveys in JSWNP began as early as 1993, when a preliminary assessment of Royal Manas National Park and the proposed Jigme Singye Wangchuck National Park was conducted (NCD, 1993). Subsequent surveys were also conducted. While complete biodiversity surveys have not been conducted for the entire Park, it is estimated that over 5000 species of vascular plants are to be found in JSWNP. Over 40 (19 confirmed and 21 expected) species of mammals inhabitat the park. Bird survey specifically for JSWNP has not been carried out till date but literature reviews relating to bird surveys in and around the JSWNP has revealed about 391 species of birds, of which 82 are found in the buffer zone (BMNP, 2001)

Thrumshingla National Park. In the case of TNP, wildlife surveys resulted in a provisional list of 68 mammals in the park with the exception of the Chiropterans. It needs to be confirmed whether the park contains the variable squirrel *Callosciurus finlaysonii*. A further enquiry concerning the nomenclature by the surveyor is underway to recognize if this deer species can be proposed as the 'Bhutan Shou'. Until now 622 species of plants belonging to 140 families are known in the park, which also include 152 species with medicinal values. A recent vegetation study in Thrumshingla suggested that there are 21 species that are endemic to Bhutan, *Lobelia nubigena* is the only endemic species found in one locality of the Park when entire Bhutan is considered. In addition three species in the park bear new records for Bhutan, and one globally threatened species (TNP, 2001).

Bumdeling Wildlife Sanctuary. Biodiversity surveys started in Bumdeling from 1998 and continued through 1999 and 2000. Within the sanctuary and its buffer zone among other species four globally endangered mammals, and other globally vulnerable mammals were found. The surveys also served to identify some of the most species rich habitats in the Sanctuary such as the areas around Yara, Ngalimang, Singye Dzong and Chudu. Based on Tiger evidence during the wildlife survey it was suggested to extend the Sanctuary boundary to preserve a sufficiently large tiger habitat (BWS, 2001). Bird surveys in BWS were carried out in May-June and September 2000 during which 293 species of birds were recorded in the sanctuary and its buffer zone. Five bird species of the IUCN international red list of globally threatened birds, four are globally near-threatened bird species and six are restricted range species. During the wildlife surveys, 32 species of butterflies were collected, of which 10 were common, 13 uncommon and 7 rare (BWS, 2001).

Jigme Dorji National Park. In the JDNP, an annual takin count (in summer) has been started in the Tsharijathang valley since June 1998. Besides this behavioral and habitat information is also being collected by the park (W&C, 2000), and research on Takin ecology is almost completed. Snow leopard survey training was conducted in Laya from 8-20th April 2000. At the same time information on blue sheep were also collected. Also in a joint collaboration with the ITMS, NCD, and RNR-RC Yusipang, the park has conducted a survey to study the status and habitat of medicinal plants in the Lingshi and Soe areas in July and August 1999.

While the presence of Red Panda has been confirmed in JDNP, field staff have also reported seeing Tiger evidence in Barshong (elevation 4000+) where the Snow Leopard is also found. While this has to be verified further, this may indicate that there is an overlap of snow leopard and tiger habitat in Jigme Dorji National Park.

Biological corridors. The first phase of the surveys of the Biological Corridors was completed in May 2001. This was carried out by the NCD in conjunction with the Natural History Museum of Chicago, funded by WWF Bhutan Program. The survey revealed many threatened species of vascular plants, birds as well as obscure and nocturnal mammals sightings. The boreal owl was sighted for the first time in the country at a place called Pimi in Eastern Bhutan.

Boreal Owl sighted for the first time in Bhutan

Recognizing that different PAs were using a variety of different methods to conduct biodiversity surveys, it was determined that a one consistent method should be developed for all PAs. A consultant was hired to assist NCD in developing a Rapid Biodiversity Survey methodology, which was discussed at a national workshop (15-16 January, 2002). This methodology has been adopted by Park staff and NCD as the methodology that would be used to provide information for 'Background Biodiversity Monitoring', to be repeated after every five years. For this purpose random sample plots have been identified based on GPS readings

in each protected area. While it will not be feasible to cover all sample plots, the aim is to cover at least 30 % of the selected sample plots. This methodology which has been accepted in principle has yet to be adopted by all protected areas. In the meantime, it is proposed that this methodology be tested in the JSWNP and modified to suit the situation in the protected areas.

It has also been recognized that among other vertebrate taxa, the reptiles, amphibians and fishes are poorly documented. Due to the extremely varied habitat types, detailed surveys may well reveal new endemic species. Of the invertebrate groups, the butterfly fauna is extremely rich, but needs to be inventoried in detail. The NCD is expected to begin inventories of other vertebrate taxa during the next five year plan.

2.2.1.9. Biodiversity Monitoring in Protected Areas

Although the importance of Monitoring was appreciated, it was not assigned a high priority till recently because most of the protected areas are still in their infancy. Monitoring was only touched upon during the Protected Area Survey and Monitoring Training workshops wherein an overview of monitoring techniques was provided. Even so, these were based on monitoring at species and habitat level.

Recognizing the need to build up an efficient and effective monitoring and data management system, the NCD is taking steps to make the monitoring section within NCD and the REMO (Research and Monitoring) wardens in the protected areas more operational. The critical importance of a monitoring system has been recognized as all the protected areas are relatively new and experimental in nature, more so with the newly initiated ICDPs. Also, with protected areas such as JDNP, BWS, JSWNP and TNP already implementing a number of activities in line with the management plans and project documents, the need for performance monitoring of these projects is also important so that PAs can adopt an adaptive approach whereby plans and activities are gradually improved and focused using monitoring results,

Through the Biodiversity Conservation Project, technical assistance has been sought to prepare a monitoring framework/scheme to make clear how surveys and monitoring can be part of an adaptive planning approach. The following framework proposes how different survey and monitoring methods are related within an NCD-wide protected area management cycle.

A 2-day workshop was conducted from 15-16th January 2002. The main objective of the workshop was to present and discuss the monitoring framework with Park Managers and their wardens. Prior to and during the workshop, the park wardens prepared case studies. This helped field staff to familiarize themselves with various aspects of the framework. By the end of the workshop three types of biodiversity monitoring were adopted by the participants, to be tested by NCD.

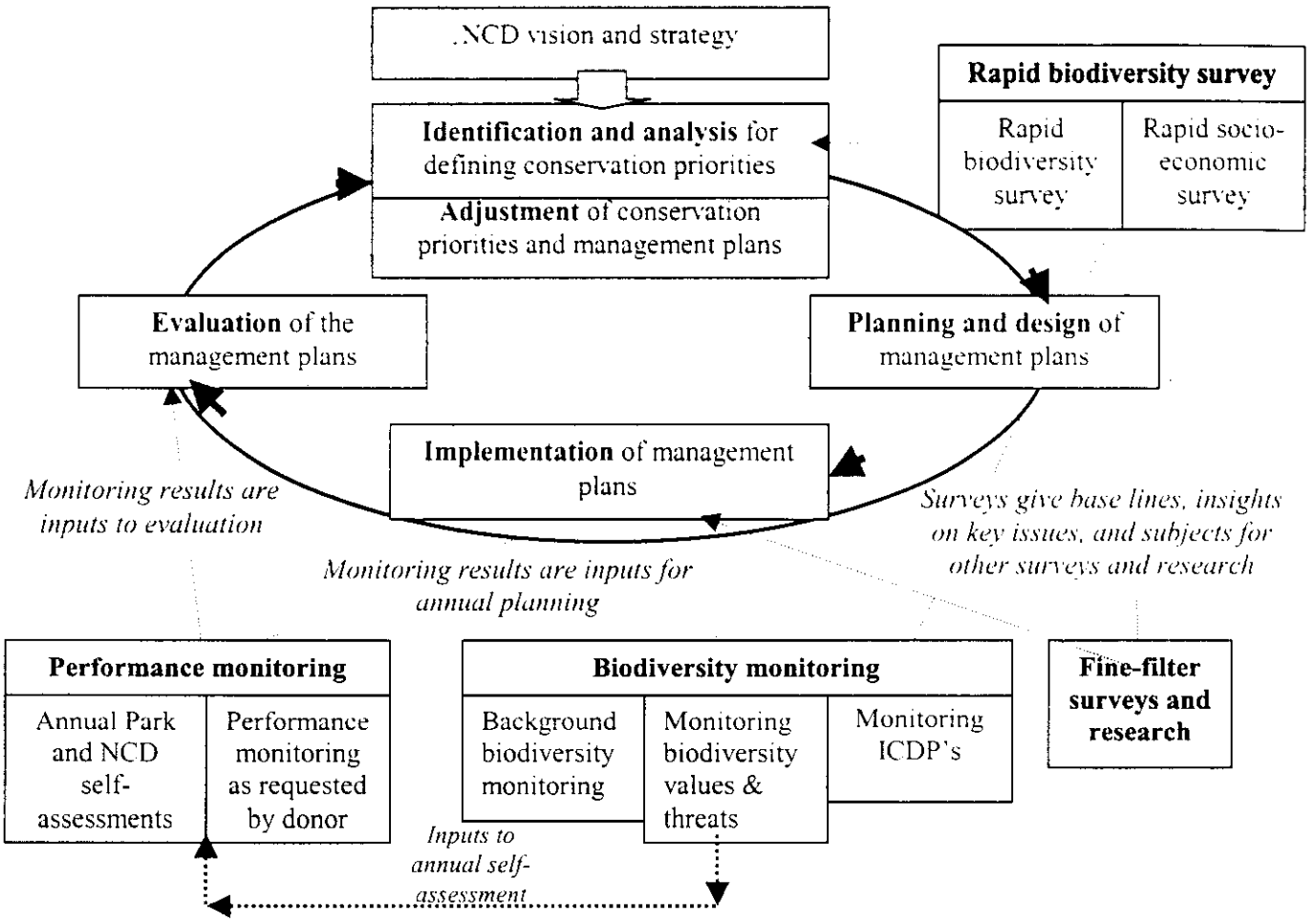
1. *Background biodiversity monitoring.* The objective is to detect changes and long-term trends with respect to biodiversity (in and possibly outside protected areas), and adjust plans and policies to avoid irreversible biodiversity changes.

2. *Monitoring of biodiversity values and potential threats.* The objective is to detect changes with respect to critical biodiversity values and potential threats (in and possibly outside protected areas), and adjust plans and policies to avoid irreversible biodiversity changes.

3. *Monitoring of ICDP's (integrated conservation and development projects).* The objective is to assess changes with respect to development – conservation attitudes and behavior and to draw conclusions on the success and sustainability of undertaken ICDP's, and based on that to adjust ICDP plans to better reach conservation goals.

a). A framework for biodiversity monitoring by NCD

The following scheme shows how biodiversity surveys, biodiversity monitoring, evaluation and research activities are integrated in the NCD management system at Parks level (Kessler, 2002)



2.2.1.10.Biological Corridors Linking Protected Areas

Declared as a "gift to the earth from the people of Bhutan" by Her Majesty the Queen Ashi Dorji Wangmo Wangchuck in November 1999, a total area of 9% (approximately 3804 sq.km) was declared as biological corridors linking all the protected areas with key support from WWF. These designated corridors were identified using the results from the feasibility studies conducted on Tiger and wildlife movement as the basis, which has been granted full recognition by the Royal Government.

The objective of designating these areas was to allow the movement of wildlife between otherwise isolated protected areas. Since their designation, the Nature Conservation Division has fielded survey teams to assess the specified areas. A survey in collaboration with the Field Museum of Natural History, Chicago and WWF was conducted in March 2001. Current survey work involves ground truthing using GIS technology, inventory of fauna and flora with information on their occurrence and habitat status, and identification of existing and potential threats to wildlife population. These surveys are expected to result in a master plan that will provide further guidance in the preparation of specific management plans for each biological corridor.
The biological corridors are not strictly protected areas and need not be included within the Protected Area Network. However, these areas are to have low intensity land uses such as Forest management Units, Community forests, agricultural lands and riparian corridors.

2.2.1.11. *Conservation Areas*

Conservation areas are multiple use areas with special values that do not need to be under the management of the Nature Conservation Division but each requires some special regulations to ensure the protection of local species of conservation importance. Conservation areas are currently constrained by lack of strong and specific regulations and activities. Of the six conservation areas in Bhutan, Phobjikha as the Black necked crane habitat in addition to being in the buffer zone of Jigme Singye Wangchuck National Park, is the only area that has been exposed to conservation initiatives. In this RSPN, the only national environmental NGO has been involved in the development and implementation of ICDP that it envisages will make conservation in the area the basis for economic well being of the residents. However, all conservation areas including Phobjikha require further concrete status that promotes their significance. The future of conservation areas needs to be guaranteed so as to make present efforts worthwhile. Respective Dzongkhags, NCD and RSPN need to collaborate and strengthen the status of conservation areas. Table 9 shows the conservation areas in Bhutan.

Table 9. Conservation Areas in Bhutan

ame	Dzongkhag	Special values
Docchula	Thimphu	Endemic rhododendrons, birds, red panda
Pele la	Wangdue	Scenery, langurs, red panda, birds
Yutong la	Trongsa	Scenery, pine forests, birds
Durtsachu	Bumthang	Hot springs, geology, scenery.
Phobjikha	Wangdue	Black necked crane habitat
Doga	Paro	Goral habitat

2.2.1.12. Integrated Conservation and Development Program (ICDP) in Protected Areas

One common feature among all the protected areas is the presence of local communities living in villages in and around the protected area. Table 10 shows the names of the geogs in the PAs and the approximate population for these areas. These communities are more or less dependent on agriculture or livestock rearing, and as such are either directly or indirectly dependent on the resources within the PA. As a result of the complex park-people relationships, any protected area policy and management decision has an effect on the local communities and their way of life.

Table 10. Geogs in the Protected Areas

Name of Protected Area	Geogs in the PAs	Approximate population
Jigme Dorji National Park	Khatey, Khamey, Laya, Lunana, Naro, Lingshi, Soe, Lango, Tsento, Twang, Kabji, Goenshari, Chhubu	6500
Jigme Singye Wangchuck National Park	Athang, Phobji, Patale, Doban, Surey, Trong, Korphu, Langthel, Tangsibji.	5,000-6,000
Thrumshingla National Park	Ura, Tang, Chumey, Kheng, Shinkhar, Saleng, Tsamang, Jarey, Metsho	10,000-11,000
Bumdeling Wildlife Sanctuary	Bumdeling, Khoma, Shermung, Yangtse, Jankhar, Tongjang, Menji, Kurtoe	+ 3000
Royal Manas National Park	Phangkhar,Tong,Ngangla, Norbugang	5,000

The objective of the National Parks *enclaves* and *buffer zones* is "to encourage sustainable development of local communities in order to alleviate pressure on the Park's natural system, and as well as ensure the survival of local communities way of life'. Integrated Conservation and Development Programs (ICDP) are a tool to reduce the impacts on biodiversity of the PA

resources use by local communities, make resource use more sustainable, reduce resource use in the core areas of the PAs while at the same time serving to improve the living conditions of the local population.

Objectives.

ICDPs serve different objectives within each PA. These include:

- Conservation of the ecological integrity of the sanctuary; through reduction of the pressures on the natural resources
- Improve the living conditions of the local people living in or near the sanctuary, and to provide alternative livelihood for people from the park area.
- To increase the awareness of local communities about conservation issues and improve natural resource management by local communities.
- To integrate bio-diversity conservation as one of the strategic considerations in planning of developmental services.

Approach.

Community involved in ICDP planning process

Different Protected Areas have adopted all or some of the objectives above for their ICD programs. The Jigme Singye Wangchuck National Park management plan spells out the policy to be followed while planning and implementing ICD programs. These include incorporation of geog plans within the Dzongkhag planning cycle, promotion of close cooperation with Dzongkhag staff, discussion and finalization of ICDP plans in the DYT, vesting the responsibility for implementing the plans with the Dzongkhags, and capacity building of Dzongkhag staff for implementation of ICDPs through internal workshops and training.

Generally speaking, all ICDP programs were initiated only after conducting Socio-Economic Surveys (SES) and extension activities like a Participatory Rural Appraisal (PRA) in the villages inside the PA boundaries. These were carried out in order to gain an understanding of the local farming systems, the uses of natural resources in the PA, understand the problems encountered by the local communities and discuss possible solutions. Procedures have now been institutionalized under the Parks to promote participatory planning. There are ICDP warden posts where staff have been trained on the job and outside the country in participatory techniques to enable them to work with local communities in the park and to develop ICDP plans involving the Dzongkhags, parks and the community.

ICDP and CBRNM activities till date.

In JDNP the ICDP team comprises of an ICDP warden, deputy warden and support staff. Community based natural resource management (CBNRM) plans were developed through Participatory Learning and Action (PLA) methods. The JDNP ICDP Team spent a number of months developing its methodology, training Park and Dzongkhag staff, and developing rapport with the Dzongdag and Dzongkhag RNR Sector heads. Pilot plans have been prepared for Laya, Soe Yaksa, Soe Yutoe, Lingshi and Lunana, with each plan focusing on a different management issues- grazing (Laya), Ecotourism (Soe), Lunana and medicinal plants in Lingshi. For Laya, PLA exercises were undertaken in five villages in July and August 1999. Since the different dzongkhags are now aware of the planning process, this is expected to be much shorter and more streamlined

in the future. Implementation of the CBNRMPs for Laya and Soe Yaksa are ongoing at the present moment. Planning for other areas like Khatey, Naro, Chubu, Shari geogs in the park are planned for the next field season.

Laya village under Gasa Dzongkhag

In JSWNP ICDP has been carried out for about two years. The first stage "identification" is fully incorporated in the park staff activities within the park boundary. In JSWNP, the aim is to involve all staff in participatory park planning, instead of restricting these activities to the ICDP warden alone. Socio-economic studies and PRAs have been completed in all the villages in three of the five districts. In Trong geog the first activities under the ICD-program were tried out on a pilot basis (livestock intensification, cane and bamboo management, corral trap trials). In total these are 6 villages in Trong geog (Zhemgang), 4 in Korphu geog, 5 in Langthel geog and 5 in Tangsibji geog (Trongsa) and 3 villages in Athang geog (Wangdue Phodrang). The villages under Tsirang and Sarpang districts (4 in total) are not yet covered.

ICDP training was conducted for park staff and partners in January 2001. It is anticipated that by the end of June 2002, all stages of ICDP planning process will be carried out in the five geogs and an ICDP plan for 2002-2003 will be written for the other four geogs.

In BWS shortly after the socio-economic surveys and PRA's in the villages were completed in 1998, activities were initiated to create goodwill and to improve relationships between the sanctuary management and the local communities. Potential areas where future ICDP are identified include intensification of the use of natural resources, finding alternatives for products presently collected from the core zone, collaborating with local and national institutions to improve natural resources management, supporting local conservation initiatives, and supporting economic activities that improve sustainability and reduce the pressure on the natural resources of the sanctuary.

Current and planned ICD activities are outlined/presented in the BWS management plan. Villagers benefiting in BWS include Bumdeling, Tarphel, Chorten Kora, Dungzam, Pantyeng, Womengang, Tshaling, Singphel, Longkhar, Ngalimang, Tshingmar, Khoma, Yangste, and Shermung geogs. CBNRM will be initiated from 2002 –2003.

In TNP, importance is being stressed on the preparation of annual ICDP plans by the park management and respective Dzongkhag, implementation by the GYT and monitoring of the development plans by the Dzongkhag to ensure that development-related benefits are equitable under the purview of the Dzongkhag Administration. Based on this framework ICDP activities under seven programs include agriculture, livestock intensification, supply of forest products and energy, service centers, economic incentives, awareness and monitoring. There are no ICDPs ongoing in TNP. These are scheduled to begin during the 9th five-year plan. Villages where ICDPs have been prioritized include Kheng Shingkhar, Ura, Saleng, Tsamang, Chumey, Sengor, Tang, Metsho, and Jarey.

Monitoring of the ICDPs and their impacts will form a crucial part of the ICDP programs. The objective is to assess changes with respect to development – conservation attitudes and behaviour, and to draw conclusions on the effectiveness of undertaken ICDP's to protect biodiversity. It is expected that this will be conducted in collaboration with the Dzongkhag and other partners. Based on lessons learnt from the field, ICDPs will be modified/adapted to meet conservation objectives without hampering the development objectives or the needs of local communities. The yearly Parks Conference is expected to provide a suitable forum for all PAs to share their ICDP experiences and learn from successful initiatives.

In the near future, a common ICDP framework will be formulated for all protected areas in Bhutan. With this common framework, new ICDP activities will be defined. The proposed ICDP activities will then be funded through an ICDP basket funding judged by a technical committee. This is anticipated during the second phase of the Bio-diversity Conservation Project. The planning process of ICDP in Bhutan will be harmonised in order to have a common message to the different dzonkhags, geogs and communities.

2.2.1.13 Integrated Conservation and Development Program in Conservation Area

Phobjikha Integrated Conservation Development Program is a pilot ICDP in a conservation area. Phobjikha is not just the home for diverse plants and animals that include globally threatened species but also the livelihood base for about 5000 people living in about 500 households. The local people are subsistence farmers that have aspirations for economic development. This poses a tremendous challenge to biodiversity conservation and wise use of natural resources. Issues in the valley are related to current and potential threats to the alpine, temperate and wetland ecosystems of the valley. A number of threats to biodiversity conservation have been identified. Some of the current threats include the desire of the local people for materialistic development that could lead to encroachments and conversion of wetland to agricultural land; lack of knowledge and awareness on environmental conservation; increasing use of fuel wood that degrades the adjacent forests and watersheds, which serve as habitat for many animal and bird species; wildlife crop predation and damage which is viewed by the locals as undermining their subsistence livelihood; unplanned extraction of forest products that causes flash floods and soil erosion; growing tourism that provides negligible benefit to the local community and diversifying economic ventures of the community that have the potential for unsustainable use of biological resources. These factors pose tremendous threat to the ecosystems and related species in the valley that include the rare and endangered Black Necked Cranes and their wetland habitat. This will not only impoverish the local people in the long run but also greatly undermine the potential contribution of Phobjikha to global environmental conservation.

It is seen from this that ultimately, the goal of conserving and protecting the fragile wetland and its associated endangered species can be attained only if people see economic benefits emanating

from conservation activities. Therefore, efforts must be made to establish a clear link between conservation programme and the material well being of the people. Developed around the Black Necked Cranes as an indicator species, the Phobjikha ICDP aims to establish this link. The RSPN embarked on an Integrated Conservation and Development Programme (ICDP) in Phobjikha valley at the beginning of 1999. With various program components, this project aims to integrate economic development and conservation efforts to develop Phobjikha into a model for bio-diversity conservation area that serves the basis for the prosperity of its residents.

The project is also expected to deliver global environmental benefits, and enhance Bhutan's status as a "global hotspot" for Biodiversity conservation, through habitat conservation of the Black Necked Cranes, sustainable use of biological resources and use of renewable energy, which mitigates climatic change.

2.2.2. *In Situ Conservation and Sustainable Use of Wild Biodiversity Outside of Protected Areas*

2.2.2.1. Species conservation:

i. Tiger Conservation Program

The Department of Forestry Services is currently implementing the Tiger Conservation program through its network of territorial units located in tiger habitats. At the central level the NCD is the nodal agency for providing technical backstopping and co-ordination of field activities. WWF Bhutan Program provides the financial support for this national program.

The goals and objectives of the Program are

- *To carry out status surveys of tigers using appropriate scientific methodology to generate reliable data for program planning and formulation.*
- *Strengthen and expand the anti-poaching program to mitigate the killing of tigers and their prey species.*
- *Promote extension and public education to enlist public support and appreciation for tiger conservation.*
- *Enhance professional capacity of project implementation staff through training and workshops to enable effective implementation of tiger conservation programs.*

Activities till date:

Since its inception in 1995, one of the main activities has been to conduct tiger surveys in every Dzongkhag especially in Tiger reported areas. Until 1998, five nation wide surveys were conducted to estimate the tiger population in the country. The assessment results indicated that there is an estimated 115 to 150 tigers inhabiting areas that are connected to each other.

Another major component of the Program is the promotion of Education and awareness among the public. Annually activities such as Tiger Quiz Competition, Printing of Posters, Production of Audiocassettes, Delivering Tiger talks and Art and Essay Competitions have been organized. Such activities are aimed at creating awareness as well as in generating support for conservation.

Human Resources Development component is considered another major activity of the program. Until date 37 officials from territorial divisions and national parks have undergone regional training on tiger surveying methodologies and identification and interpretation of tiger signs at Nepal and

India. In country training through refresher courses have been conducted for all relevant territorial and park staff.

With regard to International Co-operation, Bhutan is actively co-operating with all the other 13 tiger range countries to ensure the survival of tigers and its habitat. This has also been possible due to the linking of the Tiger program and the anti-poaching program. Also, our representatives have attended meetings of the Global Tiger Forum, International Tiger Field Assessment Workshops, and the Year of the tiger conference.

From 1998, since there are adequately trained staff at the level of territorial divisions and protected areas, Tiger survey and monitoring has been decentralized to the respective Territorial Divisions and Protected Areas, with some support from The Tiger Conservation Project in terms of funds, equipment or technical support.

Apart from conducting surveys to assess the status of tigers, the condition of their habitat and the availability of prey species, research will be given more priority in the future so that management decisions can be taken accordingly. This will begin on a pilot basis and will be scaled up depending on the availability of resources such as field staff, technical knowledge and funds. Parks such as the Thrumshingla National Park have indicated and proposed for the establishment of an endowment fund to compensate for livestock depredation caused by Tigers.

Tigers have been reported from the five established protected areas Jigme Dorji National Park (JDNP), Jigme Singye Wangchuck National Park (JSWNP), Thrumshingla National Park (TNP), Royal Manas National Park (RMNP), and Bumdeling Wildlife Sanctuary (BWS). Moreover, breeding tigers have been found in areas between these protected areas. Therefore in order to ensure the future of the continuos distribution of the tigers as well as other wildlife, the Tiger Conservation Strategy adopted by the RGOB in 1998 called for the protection of corridors to link the protected areas.

ii. Anti-Poaching

Poaching of musk deer, bear and tiger and hunting and trapping of deer, pheasants and other wildlife are believed to occur in the BWS sanctuary (NCD, 2001b), and TNP (NCD, 2001). In JDNP poaching of medicinal plants is also quite high. Medicinal plants such as Fritillaria cirrhosa (Tsega), Cordyceps sinensis (Yartsa Guenboop) and Saussuria spp. (Ganglameth0), are the most commonly sought after species. In all protected areas, Regular patrols are being undertaken, especially in areas identified as particularly vulnerable and during the poaching and plant collection seasons. Park staff are assisted by risups (village forest guards).

Copies of reports from individual protected areas are submitted to the NCD where they are compiled by the anti-poaching unit, created to provide support to the PAs as and when needed. In addition to this the Anti-poaching unit also conducts awareness campaigns in areas prone to poaching.

Another means to combat the poaching problem has been the establishment of Park range offices and guard posts in selected areas, identification of new patrolling routes, awareness raising during PRAs and village meetings.

The shortage of staff is felt more acutely during the poaching season when small groups of anti-poaching teams have to cover wide areas and walk long distances even during the night. The lack of proper arms and ammunition also pose a risk to staff safety. Another difficulty is that the staffs posted in the Protected Areas are mostly young and inexperienced in handling such cases

The problem of poaching is complicated by the fact that the majority of poachers are from across the international borders of India and China, and as such there are no policies in place in dealing with such situations. Here, regular patrolling and enforcement of the Forestry Rules and Regulations seem to be only appropriate means to reducing the problem at the current moment.