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# INTEGRATED PROTECTED AREA CO-MANAGEMENT (IPAC)

EXPOSURE VISIT TO NEPAL FOR  
GOVERNMENT OFFICIALS OF  
BANGLADESH  
23-29 May, 2009

**September 15 2009**

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**23-29 May, 2009**

*Organized By:* Centre for Integrated Rural Development for Asia and Pacific (CIRDAP)

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*Submitted to :*

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*Prepared by:*

**Dr. Ram Sharma, DCOP, IPAC**

*Submitted for :*

**International Resources Group (IRG)**

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WWF-USA, dTS, East-West Center

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Module Architects, IUB/JU



**International Resources Group**

1211 Connecticut Avenue, NW, Suite 700

Washington, DC 20036

202-289-0100 Fax 202-289-7601

[www.irgtld.com](http://www.irgtld.com)

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## INTRODUCTION

From 23-29 May 2009, the Integrated Protected Area Co-Management Project (IPAC) Project, organised an exposure visit of senior officials of Government of Bangladesh to Nepal to have first hand field experiences and gain insights on the co-management of wetland and forests Protected Areas (PAs) of Nepal. Centre for Integrated Rural Development for Asia and Pacific (CIRDAP), an inter-governmental organization, was assigned the task of conducting the field visit. The Centre has a vast experience of conducting such exposure visits through its network of link institutions in 14 CIRDAP Member Countries in Asia and the Pacific. The link institutions of Govt. of Nepal (Local Development Training Academy, Kathmandu) coordinated the program : The visiting team consisted of 11 Officials from the Government of Bangladesh (see Annexure for the list of participants).

IPAC has embarked upon the strategic goal of scaling-up natural resource co-management at the policy and operational level by achieving recognition, acceptance and integration of this approach by the GOB into its management tactics. The overall IPAC objective is to promote and institutionalize an integrated protected area co-management system for sustainable natural resources management and biodiversity conservation that results in responsible, equitable economic growth and good environmental governance. IPAC is building upon the successful co-management interventions launched under MACH and Nishorgo Support Project (NSP). Under IPAC, carefully crafted, integrated, activities are being implemented over significantly larger areas to: develop a protected area strategy that applies to ecologically and economically significant areas, build technical capacity within national and local level institutions for protected area co-management, and expand the geographic area of Bangladesh under co-management to ensure the long-term success of the models developed for freshwater and forest ecosystems. Institutionalization and successful implementation of IPAC will also address a series of short, medium and long term climate change mitigation and adaptation issues.

## PURPOSE OF THE EXPOSURE VISIT

The main objectives of the exposure visit to Nepal were:

- To study the practices of co-management of protected areas comprising forests and wetlands in Nepal.
- To understand the strategies and approaches of successful co-management projects and programmes relating to forests, wetlands and environment.
- To discuss with key officials, professionals and field functionaries working on the concept of co-management of PAs in order to get insights and explore plausible replication in Bangladesh
- Expose the Officials of Government of Bangladesh to the community forest management activities in Nepal and facilitate them for their direct interactions with the field staff and communities who are participating in such programmes.



## SUBJECTS OF THE VISIT PROGRAMME

The visiting team members after extensive field visits carried out detailed studies of Co-Management in selected Forest and Wetland Protected Areas of Nepal. The exposure visit included field visits to sites having successes and failure, and the participants carried out in-depth analysis, studied key factors behind each success/failure. The team members discussed with Nepalese officials and observed relevant issues such as tribal and hilly forest interface, roles and responsibilities of development committees, habitat improvement and management, man-wildlife conflicts, Micro/Working Plans, Wildlife Act implementation, Buffer Forestry Act implementation, etc.

In order to fulfil the purposes of this exposure visit programme, participants visited selected National Parks, Wildlife Sanctuaries, and Wetland Protected Areas. The team also met a number of community groups including women groups, Officers, staff of different Government Departments both at HQs and field level.

## SIZE AND DURATION

With the above-stated purposes, a group of eleven Officials from Bangladesh, accompanied by a coordinator from CIRDAP and an IPAC staff followed the itinerary detailed below and completed the visit within a period of seven days (**23-29 May, 2009**) that included departure and arrival. The team was received at Kathmandu on its arrival (Day 1) and was seen off Kathmandu on the last day (Day 7).

## ABOUT CIRDAP

CIRDAP is a regional, intergovernmental and autonomous institution aiming at alleviation of rural poverty in the region. The Centre has been implementing programmes and projects to assist national action and promote regional cooperation with focus on South-South Cooperation in its 14 member countries, namely: Afghanistan, Bangladesh, India, Indonesia, Iran, Lao PDR, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam.

The objectives of CIRDAP are: (a) to assist national action and promote regional co-operation relating to integrated rural development (IRD) and (b) to act as a servicing institution for its member countries with respect to IRD by providing them with technical support, by fostering exchange of ideas and experience, and by encouraging such collaborative activities as may benefit those states individually or collectively. Through its research, action research, pilot project, training and information dissemination activities, CIRDAP, in its efforts to assist the countries of the Region, has been pursuing activities that can create mechanisms for integration of human and institutional dimensions in rural development.

CIRDAP since 1998 has been regularly organizing exposure visits based on the needs of its member, non-member countries and the global partners. It is even facilitating

much bigger visits covering multi-countries exposure visits for senior officials from CIRDAP Member Countries (CMCs).

## ITINERARY

The following itinerary of the visit programme was followed during the exposure visit to Nepal :

Days	Activities
Day 1	<ul style="list-style-type: none"> <li>• Arrival at Kathmandu</li> <li>• Transfer to the hotel</li> <li>• Meeting with the Officials of Forest and Soil Conservation Department</li> <li>• Sightseeing</li> </ul>
Day 2	<ul style="list-style-type: none"> <li>• Meeting with the Officials of Department of Wildlife, Fisheries and Environment</li> <li>• Visit to the nearby project</li> <li>• Departure for Pokhara by air</li> <li>• Arrival at Pokhara</li> <li>• Transfer to the hotel</li> <li>• Evening sightseeing</li> </ul>
Day 3	<ul style="list-style-type: none"> <li>• Meeting with the Field Officials of Forest, Soil Conservation Departments and briefing on their projects/programmes</li> <li>• Visit to the national park</li> <li>• Visit to the Community managed park(s) and meeting with the community-forestry groups</li> <li>• Evening sightseeing</li> </ul>
Day 4	<ul style="list-style-type: none"> <li>• Meeting with the Officials of Wildlife department and briefing on their on-going and completed projects</li> <li>• Visit to the Wildlife Sanctuaries and interaction with the community/groups</li> <li>• Evening sightseeing</li> </ul>
Day 5	<ul style="list-style-type: none"> <li>• Meeting with the Officials of Fisheries and briefing on their on-going and completed projects</li> <li>• Visit to the lakes, rivers and ponds and briefing about the Co-Management of the projects</li> <li>• Interaction with the groups and Community</li> <li>• Evening sightseeing</li> </ul>
Day 6	<ul style="list-style-type: none"> <li>• Visit to the Community Managed Water-bodies and interaction with the group(s) on the co-Management aspects of these projects</li> <li>• Evening sightseeing</li> </ul>
Day 7	<ul style="list-style-type: none"> <li>• Meeting with the Officials of Environment Department and briefing on their projects</li> <li>• Visit to the selected projects/programmes of Environment Department</li> </ul>
	<ul style="list-style-type: none"> <li>• Return to Bangladesh</li> </ul>

## PRESENTATIONS

Detailed multi-media presentations prepared during and after the trip are presented in the following Sections:

# **SECTION I**

**BRIEFING ON STUDY VISIT OF THE GOB  
OFFICIALS TO NEPAL BY DR. RAM SHARMA,  
DCOP, IPAC**




## Briefing on Study Visit of the GoB Officials to Nepal



Integrated Protected Area Co-management (IPAC)  
June 2009, Dhaka




### Overview of the Presentation

- Context
- Objectives
- Organizers
- Itinerary
- Team Members
- Organizations Covered
- Highlights of the visit
- Observations and Learning
- Conclusions and Recommendations






### Context:

- Seeing is believing
- Nepal has long and rich experiences of community based development initiatives
- Nepal Community Forestry is world famous
- As in Bangladesh, water bodies in Nepal play an important role in the national economy
- Lessons learnt reviewed for their plausible replication in forest and fisheries sectors in Bangladesh






### Context:

- Nepal is a least developed country with agrarian economy
- The size of Nepal is almost equal to Bangladesh but with a population of nearly 3 crores
- Nepal has long and rich experiences of community based natural resources management initiatives
- Nepal Community Forestry and Protected Areas are world famous
- As Bangladesh, waterbodies including rivers, streams and lakes in Nepal play important role in the national economy
- Nearly 68% of the country's land mass is under forests that are mostly degraded
- Nearly 13% of land mass is plain (terai) and the remainder 87% are hills and mountains






### Objectives

- Observe and study the co-management practices/different approaches and strategies of successful projects/programmes for forests/wetlands
- Interact with the concerned institutions and decision-makers
- Interact with local stakeholders
- Field visits for experiential learning, first hand impacts and lessons from successes/failures






### Organizers:

- IPAC
- CIRDAP/Dhaka
- LDTA, Nepal







### Itinerary

- Day 1 : Arrival at Kathmandu
- Day 2 : FN - Presentations and interactions with the DG, DDG and other senior officials of Department of Forest Research & Survey, Department of Soil & Watershed Management - Presentations and interactions with senior officials of Department of Irrigation, and Department of Water Induced Disaster Prevention
- AN - Visit to Shivpuri National Park
- Day 3 : Departure for Pokhara






### Itinerary (continued)

- Day 4 : - Field visit to Surankote and interactions with VDC and Community Forest User Group and Community Fisheries Group - Meeting with DDC officials - Meeting with DC, Kaski District - Visit to Fisheries Research Institute - Visit to Rupa and Begnas lakes for community based activities and interacted with beneficiaries
- Day 5 : - Visit to DDCO and JICA supported Phewa Soil/Water Conservation Project - Meeting with DFO for discussions on community forestry activities - Meeting with Regional Director, Irrigation Department and visit to World Bank supported Irrigation Project to see community activities of Water Users Associations
- Day 6 : - Pokhara-Kathmandu
- Day 7 : Visit to ICIMOD, and back to Dhaka





### Team Members

**Mr. Joyanal Abedin Talukdar,**  
Team Leader & Joint Secretary

- Ms. Dilruba Yasmin, Deputy Chief
- Mr. Sheikh Sakil Uddin Ahmed, Senior Asstt. Chief
- Mr. Md. Huzur Ali, Senior Asstt. Chief
- Mr. Mainuddin Ahmed, Senior Asstt. Secretary
- Mr. Mozammel Haque Shah Chowdhury, DFO
- Mr. Shahidul Islam Bhuiya, SUFO

### Team Members (continued)

- Mr. Md. Rafiqul Islam, ACF
- Mr. Fanindra Chandra Sarkar, UFO
- Mrs. Afrin Akter, Program Coordinator
- Mr. Farid Ahmed, Programmer

### Organizations Visited

- Department of Forest Research and Survey
- Department of Soil and Watershed Management
- Department of Irrigation
- Department of Water Induced Disaster Prevention
- Forests Department
- Irrigation Department
- Fisheries Research Institute
- District Development Committee
- District Administrative Officer
- District Soil Conservation Office
- ICIMOD

### Highlights

- Nepal occupies about one-third of the total central Himalayas. Though this country occupies (147,181 sq. km) about 0.1 per cent of the world's land mass, it claims over 2.2 per cent of the total biological wealth of natural flowering plants. Nepal has life zones such as tropical, sub-tropical, warm temperate, cool temperate, sub-alpine, alpine, and arctic. For a successful implementation of the national policy, all the accessible forests in the life zones can be and are handed over as community forests.

### Forest

### Co-Management

### Forest Research and Survey

- Role of Forestry Research
- sustainable management of Nepalese forests
- Focus
- management of forests of the country and is based on participatory approach (called Community Forestry Programme, CFP). In CFP, forests are handed over to community/group of people called Community Forest User Group (FUG), who manages the forests and an autonomous institution.



Scientific forest management is comparatively a very new concept in Nepal. However, under the Community Forestry Programme, forests are being handed over to more than 14,000 FUGs for participatory management for about 3 decades. These are largely found focusing on protection

### Fisheries

### Fisheries

Fisheries Research Center, Pokhara

Lakes in Pokhara valley

**Biodiversity conservation and utilization**

- About 60% of total wetland area located at mid and far western development region

**Environment and fish diversity of wetland**

Displaced "kamaiya" belonging to Tharu community and woman of poor, dalit section of society involved in program

- Re-stocking program
- Habitat Improvement (Conservation)
- Domestication of river fish Gardi (*Labeo dero*)

**Research activities associated with**

- Cage culture
- Pond aquaculture
- Integrated fish farming
- Lake resources conservation and utilization through community participation (co-management)
- Disciplinary research on: breeding/genetics, nutrition, pathology, biodiversity

**Cages at Phewa**

**Open water fishery and people**

**lake conservation community program**

### Open Water Fisheries Managements

- Fish diversity conservation
- Stocking management
- Capture technology
- Marketing channelized


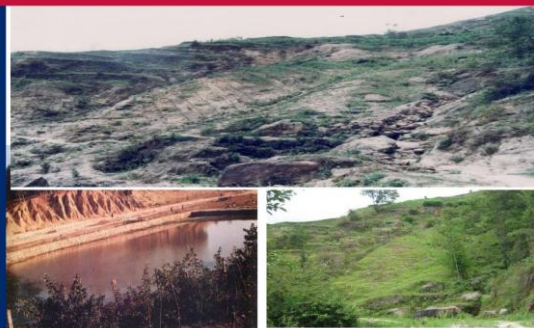





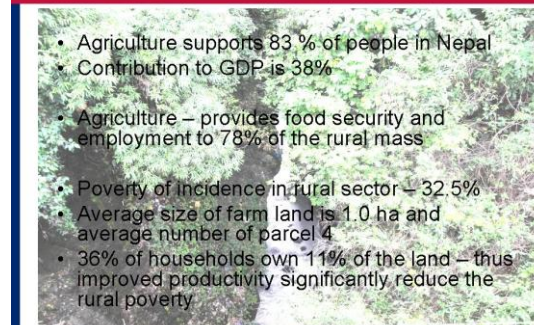
### Fish Catch Trend in Lakes

Year	Total catch (kg)	Fewa catch (kg)	Begnas catch (kg)	Rupa catch (kg)
1961	120	10	10	10
1965	125	15	15	15
1970	130	20	20	20
1975	135	25	25	25
1980	140	30	30	30
1985	145	35	35	35
1990	150	40	40	40
1995	155	45	45	45
2000	160	50	50	50
2004	165	55	55	55



<div>   </div> <p><b>Co-operative management of Rupa Lake (Participating farmers 670)</b></p>  	<div>   </div> <p><b>Fish Production Increased in Rupa Lake Monthly Rs. 300-400 Thousands Income</b></p> <ul style="list-style-type: none"> <li>» Conservation of degraded lake</li> <li>» Concept of local resource use and conservation for the benefit of local community</li> <li>» Traditional rights of fishers preserved</li> <li>» Women of the community prioritized</li> <li>» May be applicable to enhance the livelihood of deprived people living around ghols in southern parts</li> </ul>  
<div>   </div> <p><b>Participatory Research and Development Program</b></p>   	<div>   </div> <p><b>Scaling up of rice-fish farming and cage fish culture in far western development region</b></p>   
<div>   </div> <p><b>Participatory fishery management of high valued indigenous carp in Lakes of Pokhara valley</b></p>   <p><b>In-situ conservation and production performance of Sahar (<i>Tor putitora</i>) in different ecological regions</b></p>	<div>   </div> <p><b>It is estimated that Fisheries Center contributes to generate economic activities equivalent to nearly 80 million NRs in its command area</b></p> <ul style="list-style-type: none"> <li>- Cage aquaculture and recapture fishery shared over 75% of the total annual income of the Jalari fishers</li> <li>- Employment opportunity for &gt;1500 farmers in fisheries and allied activities in western mid hill</li> </ul> 
<div>   </div>  <p><b>Conservation pond and Conservation plantation for land productivity</b></p>	<div>   </div>  <p><b>Irrigation canal improvement for land productivity conservation and water management (multiple purpose)</b></p>



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<div>  </div> 	<div>  </div>  <ul style="list-style-type: none"> <li>• Agriculture supports 83 % of people in Nepal</li> <li>• Contribution to GDP is 38%</li> <li>• Agriculture – provides food security and employment to 78% of the rural mass</li> <li>• Poverty of incidence in rural sector – 32.5%</li> <li>• Average size of farm land is 1.0 ha and average number of parcel 4</li> <li>• 36% of households own 11% of the land – thus improved productivity significantly reduce the rural poverty</li> </ul>



Districts	Total cultivated area, ha	Irrigation Potential, ha
Terai	1,359,000.00	1,338,000.00
Hill	1,055,000.00	368,000.00
Mountain	227,000.00	60,000.00
<b>Total</b>	<b>2,641,000.00</b>	<b>1,766,000.00</b>

### History of Irrigation Development in Nepal

- There are evidences that irrigation systems existed in Nepal even before 2.5 millennium
- Some of the irrigation systems in Nepal have been functioning very well for 400 years
- (Raj kulo) Royal canals were constructed and operated by the state coffers, but maintenance were carried out by the farmers.
- These systems are also as old as 300 to 400 years.
- Several Community/ Jamindari irrigation systems were constructed during Ranas (1846 – 1950) in Terai (plains in Nepal).

The first modern irrigation system in Nepal was constructed in Nepal in 1928 having command area of 10,000 ha.

Systematic development of irrigation was initiated by establishing Department of Irrigation (then Department of Canal) in 1952 and particularly after the Planned Development since 1957.

### Types of Irrigation Systems on the basis of their Development

- Traditional farmer irrigation systems developed, owned and managed by communities.
- Traditional farmer irrigation systems supported by government;

### Government developed surface irrigation systems

- Government developed tube well irrigation schemes
- Individually owned and operated tube wells and pumps (mostly utilizing shallow aquifers, streams, ponds, and dug wells)

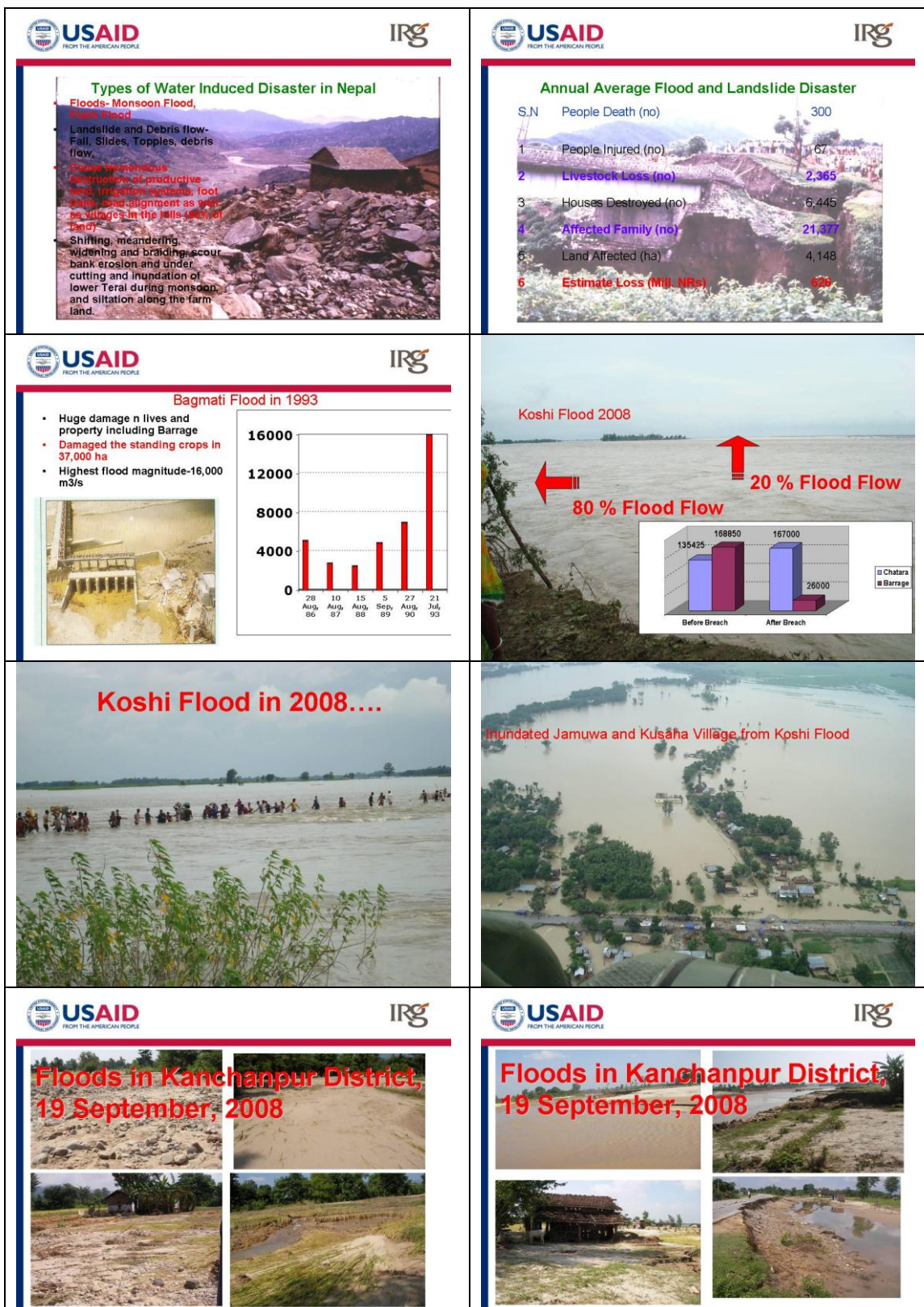
- Users' managed Irrigation System
- Traditional Irrigation System
- Turned over Irrigation System
- Government operated System
- Jointly managed System by Government and Users
- Jointly managed system by local Government and Users
- Private irrigation systems

### Disaster Prevention



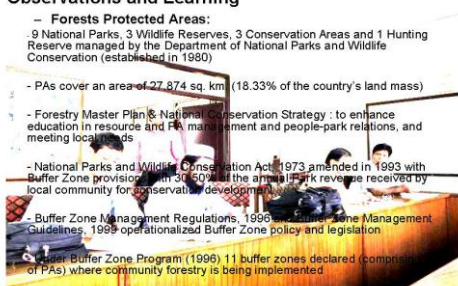


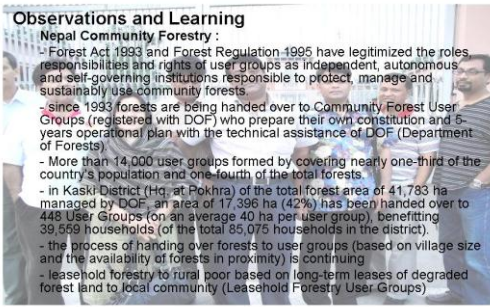





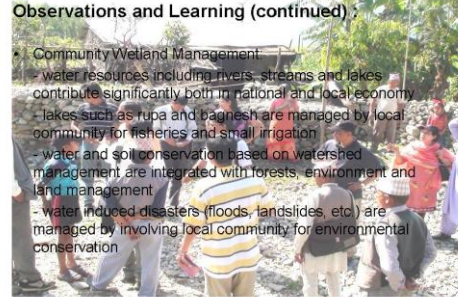

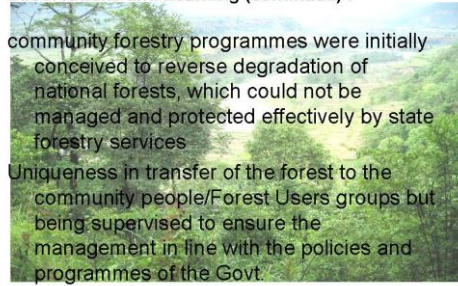









### Background

- Nepal possesses more than 6,000 rivers draining about 225 km<sup>3</sup> of water annually
- High temporal and spatial variation in runoff and rainfall
- High instantaneous flood due to high intensity rainfall up to 350 mm/day
- Average annual rainfall 1530 mm of which more than 82% occurred during June to September
- Steep mountain terrain and fragile geology
- Disasters result from various types of water induced disasters (floods, landslides, etc.)
- Unplanned development, deforestation and lack of land use plan cause further vulnerability
- The forest cover is declining and deforestation is continued due to high growth of population
- Resource constraints and lack of awareness are major obstacles in mitigation of water induced disasters







<div>   </div> <h3>Observations and Learning</h3> <ul style="list-style-type: none"> <li><b>Forests Protected Areas:</b> <ul style="list-style-type: none"> <li>9 National Parks, 3 Wildlife Reserves, 3 Conservation Areas and 1 Hunting Reserve managed by the Department of National Parks and Wildlife Conservation (established in 1980)</li> <li>PAs cover an area of 27,874 sq. km (18.33% of the country's land mass)</li> <li>Forestry Master Plan &amp; National Conservation Strategy : to enhance education in resource and FA management and people-park relations, and meeting local needs</li> <li>National Parks and Wildlife Conservation Act 1973 amended in 1993 with Buffer Zone provisions with 30-50% of the annual Park revenue received by local community for conservation development</li> <li>Buffer Zone Management Regulations, 1996 and Buffer Zone Management Guidelines, 1999 operationalized Buffer Zone policy and legislation</li> <li>Buffer Buffer Zone Program (1996) 11 buffer zones declared (comprised of PAs) where community forestry is being implemented</li> </ul> </li> </ul> 	<div>   </div> <h3>Observations and Learning</h3> <h4>Nepal Community Forestry :</h4> <ul style="list-style-type: none"> <li>Forest Act 1993 and Forest Regulation 1995 have legitimized the roles responsibilities and rights of user groups as independent, autonomous and self-governing institutions responsible to protect, manage and sustainably use community forests</li> <li>since 1993 forests are being handed over to Community Forest User Groups (registered with DOF) who prepare their own constitution and 5-years operational plan with the technical assistance of DOF (Department of Forests)</li> <li>More than 14,000 user groups formed by covering nearly one-third of the country's population and one-fourth of the total forests</li> <li>in Kaski District (Hq. at Pokhara) of the total forest area of 41,733 ha managed by DOF, an area of 17,396 ha (42%) has been handed over to 448 User Groups (on an average 40 ha per user group), benefitting 39,559 households (of the total 85,075 households in the district)</li> <li>the process of handing over forests to user groups (based on village size and the availability of forests in proximity) is continuing</li> <li>leasehold forestry to rural poor based on long-term leases of degraded forest land to local community (Leasehold Forestry User Groups)</li> </ul> 
<div>   </div> <h3>Observations and Learning (continued) :</h3> <ul style="list-style-type: none"> <li>user groups fix prices for harvested forest products and proceeds go to CF Fund managed by user groups</li> <li>Except in case of sal and khair forests, all harvested forest products as per operational plan are used by user groups either for their self-consumption or for sale</li> </ul> 	<div>   </div> <h3>Observations and Learning (continued) :</h3> <ul style="list-style-type: none"> <li><b>Community Wetland Management</b> <ul style="list-style-type: none"> <li>water resources including rivers, streams and lakes contribute significantly both in national and local economy</li> <li>lakes such as rupa and bagnesha are managed by local community for fisheries and small irrigation</li> <li>water and soil conservation based on watershed management are integrated with forests, environment and land management</li> <li>water induced disasters (floods, landslides, etc) are managed by involving local community for environmental conservation</li> </ul> </li> </ul> 
<div>   </div> <h3>Observations and Learning (continued) :</h3> <p>community forestry programmes were initially conceived to reverse degradation of national forests, which could not be managed and protected effectively by state forestry services</p> <p>Uniqueness in transfer of the forest to the community people/Forest Users groups but being supervised to ensure the management in line with the policies and programmes of the Govt.</p> 	<div>   </div> <h3>Observations and Learning (continued) :</h3> <ul style="list-style-type: none"> <li><b>Devolution or 'Co-management' = Government's grant communities use</b></li> <li><b>Outright Local Ownership of the Forest</b></li> <li><i>that when communities have "Security of tenure" they will invest more in the forest and have an incentive to manage it across generations</i></li> </ul> 
<div>   </div> <h3>Communities management Laws</h3> <ul style="list-style-type: none"> <li>Reforms of National Forestry legislation (ex: Forest Act)</li> <li>VDCs by-laws, Management plan</li> </ul> 	<div>   </div> <h3>What are success factors in Community rights in forests</h3> <ul style="list-style-type: none"> <li>Sovereignty: clear boundaries and</li> <li>effective defence system</li> <li>Governance: clear, self-enforcing rules</li> <li>Reflects local culture and legitimacy</li> <li>Link to markets</li> <li>Contribute to the livelihoods of local and indigenous communities and reducing poverty</li> <li>Woman and youth are also benefiting from the community forest concept</li> </ul> 



<div data-bbox="261 205 406 247">  <b>USAID</b>  <small>FROM THE AMERICAN PEOPLE</small> </div> <div data-bbox="711 205 763 247">  </div> <div data-bbox="475 277 558 306"> <h3>Issues</h3> </div> <div data-bbox="292 319 508 533"> <ul style="list-style-type: none"> <li>• Settlement in river banks and inside river boundary line pose high vulnerability</li> <li>• Cultivation in steep slopes</li> <li>• Global warming-glaciers retreat rapidly</li> <li>• Lack of flood forecasting system</li> <li>• Planning and preparedness for flood disaster requires to be strengthened</li> <li>• Community awareness is inadequate</li> </ul> </div> <div data-bbox="293 262 748 569">  </div>	<div data-bbox="837 205 982 247">  <b>USAID</b>  <small>FROM THE AMERICAN PEOPLE</small> </div> <div data-bbox="1291 205 1343 247">  </div> <div data-bbox="860 264 1245 312"> <h3>Lessons learnt for better management in Bangladesh</h3> </div> <div data-bbox="860 312 1094 529"> <ul style="list-style-type: none"> <li>• With diverse socio-economic-culture condition in Bangladesh, a tailor made management would provide one of the best options.</li> <li>• The capacity building programs such as the study visits arranged in India and Nepal should involve the technical needs, management and legal entity needs.</li> </ul> </div> <div data-bbox="859 262 1352 567">  </div>
<div data-bbox="261 615 406 657">  <b>USAID</b>  <small>FROM THE AMERICAN PEOPLE</small> </div> <div data-bbox="711 615 763 657">  </div> <div data-bbox="396 663 639 688"> <h3>Conclusion &amp; Recommendations</h3> </div> <div data-bbox="292 688 508 999"> <ul style="list-style-type: none"> <li>• Still special attention needs to be paid to ensure that governance systems are transparent, accountable and also include woman and youth and is effectively empowering local communities.</li> <li>• Ecological, economic, social and cultural values of protected areas need to be addressed simultaneously to ensure a sustained impact on poverty reduction – and also acknowledging that poverty is a multi-dimensional concept (the three pillars of sustainable development).</li> </ul> </div> <div data-bbox="293 682 748 989">  </div>	<div data-bbox="837 615 982 657">  <b>USAID</b>  <small>FROM THE AMERICAN PEOPLE</small> </div> <div data-bbox="1291 615 1343 657">  </div> <div data-bbox="860 682 1235 732"> <h3>Expanding Attention to Protected Areas</h3> </div> <div data-bbox="860 732 1076 861"> <ul style="list-style-type: none"> <li>• Protected Areas are means of mitigating environmental degradation &amp; preserving biodiversity.</li> </ul> </div> <div data-bbox="859 682 1318 974">  </div>
<div data-bbox="261 1024 406 1066">  <b>USAID</b>  <small>FROM THE AMERICAN PEOPLE</small> </div> <div data-bbox="711 1024 763 1066">  </div> <div data-bbox="415 1035 620 1071"> <h3>Light Moments</h3> </div> <div data-bbox="293 1085 756 1381">  </div>	<div data-bbox="837 1024 982 1066">  <b>USAID</b>  <small>FROM THE AMERICAN PEOPLE</small> </div> <div data-bbox="1291 1024 1343 1066">  </div> <div data-bbox="859 1085 1336 1381">  </div>
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## **SECTION 2**

**IRRIGATION DEVELOPMENT IN NEPAL BY  
MADHAV BELBASE, SENIOR DIVISIONAL  
ENGINEER, DEPARTMENT OF IRRIGATION**





## History of Irrigation Development in Nepal Contd..

- The first modern irrigation system in Nepal was constructed in Nepal in 1928 having command area of 10,000 ha.



- Systematic development of irrigation was initiated by establishing Department of Irrigation (then Department of Canal) in 1952 and particularly after the Planned Development since 1957.

## Types of Irrigation Systems on the basis of their Development



1. Traditional farmer irrigation systems developed, owned and managed by communities;

2. Traditional farmer irrigation systems supported by government;



## Types of Irrigation Systems on the basis of their Development

3. Government developed surface irrigation systems;



4. Government developed tube well irrigation schemes

5. Individually owned and operated tube wells and pumps (mostly utilizing shallow aquifers, streams, ponds, and dug wells)

## Types of Irrigation Systems on the basis of their Development

- Users' managed Irrigation System
- Traditional Irrigation System
- Turned over Irrigation System
- Government operated System
- Jointly managed System by Government and Users
- Jointly managed system by local Government and Users
- Private irrigation systems



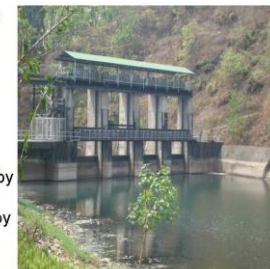
## Categorization of Irrigation System



- **Major Irrigation System**  
5000 ha in Terai and > 1000 ha in hills
- **Large Irrigation System**  
2000 ha and < 5000 ha in Terai and >500 ha and <1000 ha in hills
- **Medium Irrigation System**  
200 ha and < 2000 ha in Terai and >25 ha and <500 ha in hills
- **Small Irrigation System**  
200 ha in Terai and <25 ha in hills

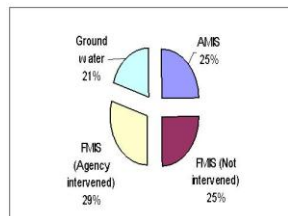
## Types of irrigation systems from management aspects

- Users' managed Irrigation System
- Traditional Irrigation System
- Turned over Irrigation System
- Government operated System
- Jointly managed System by Government and Users
- Jointly managed system by local Government and Users
- Private irrigation systems



## Irrigation Development: Present Status

Cultivated land: 2.6 M ha  
Irrigable land: 1.76 M ha  
Irrigation infrastructure developed on: 1.2 M ha



## How we manage the irrigation system in Nepal?

- Traditional systems and the systems rehabilitated by the government on the request of the users are managed by WUA
- In all the government constructed system – the canals irrigating 30 ha or less area is managed by WUA and remaining canals are managed jointly or on the request by the WUA blocks up to 500 ha can be handed over to them
- On the request of the WUA government managed medium irrigation systems can be turned over to the WUA




<p><b>How we manage the irrigation system in Nepal?</b> Contd..</p> <ul style="list-style-type: none"> <li>• New medium irrigation system – to be managed by WUA unless it is technically complex</li> <li>• Jointly or government managed system can be contracted out to a private party for its operation and management</li> <li>• In a jointly managed medium or large irrigation system, role of the government could transferred to local governing body</li> </ul>	<p><b>Plan and Policies</b></p> <ul style="list-style-type: none"> <li>• Periodic plans (now Interim – after 10<sup>th</sup> )</li> <li>• Irrigation Policy 2003</li> <li>• Water Resources Act 1992</li> <li>• Water Resources Regulation 1993</li> <li>• Irrigation Regulation 1996</li> <li>• Irrigation Master Plan 1992</li> <li>• Agriculture Perspective Plan 1995</li> <li>• National Water Resources Strategy 2002</li> <li>• National Water Plan 2005</li> <li>• Irrigation Development Vision 2005</li> <li>• Groundwater Development Vision 2006</li> </ul>
<p><b>Irrigation Sector Strategy - WRS</b></p> <ul style="list-style-type: none"> <li>• <b>First five years</b> – Emphasis on implementation and promotion of sustainable efficient irrigation systems.</li> <li>• <b>The following ten years</b> – Achieving reliable irrigation services and expansion of these services based on sustainability and creation of wealth</li> <li>• <b>By the end of 25 years</b> – Provide appropriate and efficient irrigation for the optimal use of irrigable land</li> </ul>	<p><b>Irrigation Sector Strategy – NWP</b></p> <ul style="list-style-type: none"> <li>• In concrete terms, the long-term vision of the sector is to: <ul style="list-style-type: none"> <li>– Year round irrigation in 67% of the total irrigated area;</li> <li>– Ninety seven percent of the potential irrigable area is served by irrigation</li> <li>– Irrigation efficiency increases to 50%</li> <li>– Irrigation service contribution collection increases to 75% of the O&amp;M cost.</li> </ul> </li> </ul>
<p><b>Strategies and Policies</b></p> <ul style="list-style-type: none"> <li>• Enhance productivity of existing public irrigation systems through management support and modernization</li> <li>• Empower water users association (WUA) legally for administrating ISF collection</li> <li>• Integrate irrigation development with other APP priority inputs such as rural roads, rural electrification, micro credit, agriculture extension and market support.</li> <li>• Increase involvement of users, local bodies, NGOs &amp; private sector in irrigation management through their capacity enhancement</li> </ul>	<p><b>Strategies and policies</b> Contd.</p> <ul style="list-style-type: none"> <li>• Develop new irrigation systems (Surface &amp; GW) having potential of year round irrigation</li> <li>• Conjunctive use of water</li> <li>• Initiate inter-basin transfer, storage and non - conventional projects to develop year round irrigation</li> <li>• Enhance capacity of irrigation professionals for quality services</li> <li>• Re-organize DOI towards meeting the long term institutional development vision.</li> </ul>
<p><b>Steps in Project Implementation of small, medium and large Irrigation System</b></p> <ul style="list-style-type: none"> <li>• Information dissemination</li> <li>• Farmers' request</li> <li>• Screening and Identification survey</li> <li>• Prioritization for feasibility study</li> <li>• Feasibility study</li> <li>• Appraisal and approval</li> </ul>	<p><b>Steps in Project Implementation of small, medium and large Irrigation System</b> Contd..</p> <ul style="list-style-type: none"> <li>• Detailed survey and design</li> <li>• Registration of WUA</li> <li>• Memorandum of agreement</li> <li>• Project implementation</li> <li>• Commissioning</li> <li>• Operation and maintenance</li> <li>• Establishment of PBME</li> </ul>

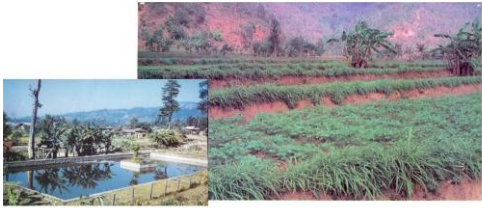




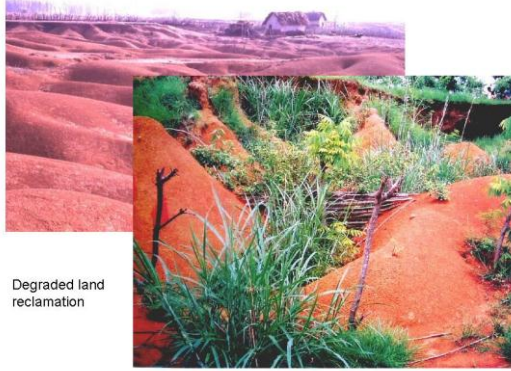
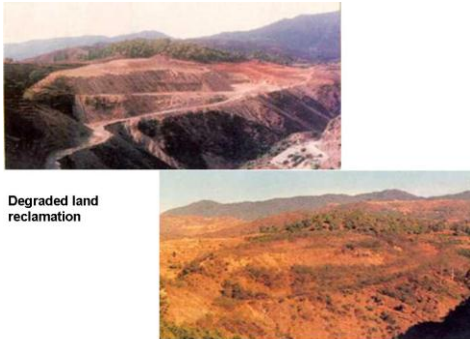

   <p style="text-align: center;"><b>IMPACTS OF TUBEWELLS</b></p>	    
  	   
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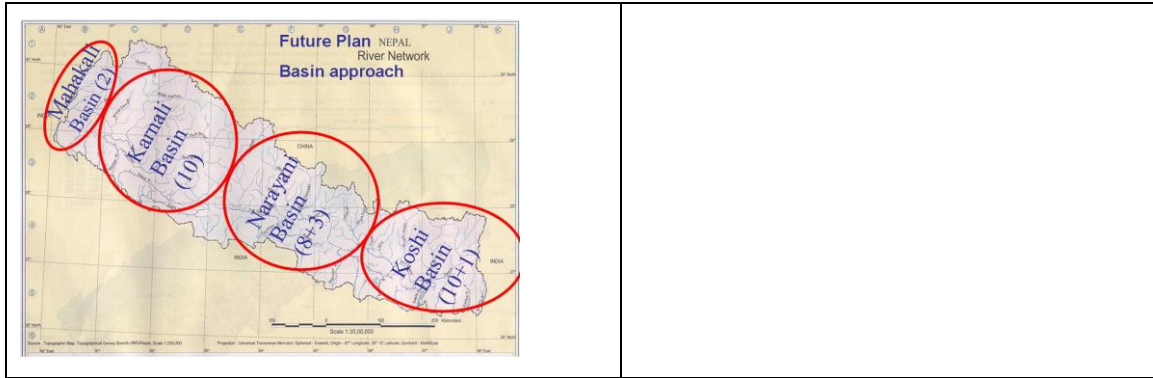
## **SECTION 3**

**DEPARTMENT OF SOIL CONSERVATION AND  
WATERSHED MANAGEMENT BY B.P. PUDASAINI**

<p style="text-align: center;"><b>Department of Soil Conservation and Watershed Management</b></p> <p style="text-align: center;">B.P. Pudasaini</p>	<p style="text-align: center;"><b>Background</b></p> <p>Established at 1974, Covered area: Offices at 56 Districts Service provide: 60 districts (Out of 75 districts)</p> <p>High Himal: 7 districts Mid hill: 37 Districts Churia and Terai: 12 districts</p>
<p style="text-align: center;"><b>Working approach</b></p> <ul style="list-style-type: none"> <li>Initially was at Hotspot approach, (Project basis),</li> <li>Latter shifted into Watershed Approach,</li> <li>Districts are divided into different sub watersheds and WM activities are implemented at prioritized watershed basis.</li> </ul>	 <p style="text-align: center;">Photo: Partial view of a watershed with forest, cultivated land</p>
<p style="text-align: center;"><b>Guiding principles of DSCWM</b></p> <ul style="list-style-type: none"> <li>Watershed scale,</li> <li>Integrated approach,</li> <li>Participatory approach,</li> <li>Based on Sub watershed management plan,</li> <li>Community will participate in WM Plan preparation, implementation.</li> </ul>	<p style="text-align: center;"><b>Log Frame</b></p> <ul style="list-style-type: none"> <li>Comprises 5 Component</li> <li>Component 1: Water and Sediment Yield</li> <li>Component 2: Land productivity Conservation</li> <li>Component 3: Protection of infrastructure against erosion</li> <li>Component 4: Institutional development</li> <li>Component 5: Programme management</li> </ul>
<p style="text-align: center;"><b>Major activities of DSCWM</b></p> <ul style="list-style-type: none"> <li>Land use planning</li> <li>Natural Hazard prevention: Gully control, Landslide control, landslide hazard mapping,</li> <li>Community soil Conservation,</li> <li>Infrastructure protection</li> <li>Land productivity Conservation</li> <li>Extension activities/awareness generation</li> <li>Group mobilization and empowerment</li> </ul>	<p style="text-align: center;"><b>WM Policy and Strategy</b></p> <ul style="list-style-type: none"> <li>Ensure proper land use,</li> <li>Integrated package,</li> <li>Ensure multiple use of land</li> <li>Establish linkage and coordination with other related stakeholders,</li> <li>Ensure peoples participation,</li> <li>Adopt minimum damage to Environment,</li> <li>Protect nationally important Watersheds like hydropower stations, roads lakes et.</li> </ul>



 <p>Conservation pond and Conservation plantation for land productivity</p>	 <p>irrigation canal improvement for land productivity conservation and water management (multiple purpose)</p>
	
	 <p>Degraded land reclamation</p>
 <p>Degraded land reclamation</p>	 <p>Before                      After</p> <p>Bioengineering stabilization of gully</p>

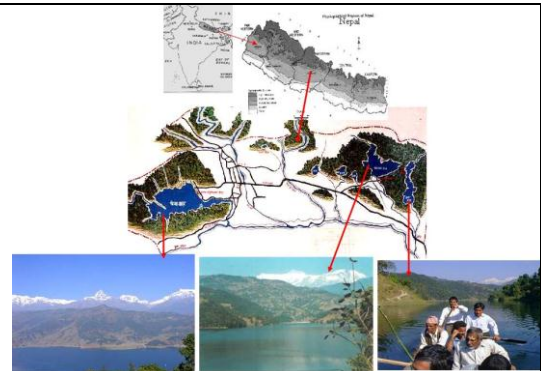




# **SECTION 4**

## **AN OVERVIEW OF FISHERIES RESEARCH CENTER, POKHARA**

## An Overview of Fisheries Research Center, Pokhara



Lakes in Pokhara valley

Established in 1962 as “Lake Development Center” with the aim to develop lake fisheries and technology generation to enhance livelihood through fisheries resources



### The Goal

Livelihood enhancement through sustainable fisheries and aquaculture technology generation/improvement for food, employment and income.



### Potential

- Fisheries development in highly untapped resources
- Fisheries development obvious
  - Food security
  - Livelihood opportunities
- Ecologically balanced use of land and water resources
- High priority accorded
  - Commercialization potential
  - Poverty alleviation

### Who are our clients ?



- Deprived community with no agricultural and business skill other than fishing, such as “Jalari”
- Deprived “Kamaiya”, “Tharu” and other poor community living near by water bodies

### Brief History of Fisheries Research Center, Pokhara

#### In 1972

- Few floating cage were introduced in lakes of Pokhara Valley by JOCV volunteers

#### In 1975

- “Integrated Fishery and Fish Culture Development Project (NEP/73/25)” was implemented under FAO/UNDP cooperation.

#### In 1991-98

- Natural Water Fisheries Development Project (NWFDP) JICA/HMG was implemented

### Research activities associated with

- Cage culture
- Pond aquaculture
- Integrated fish farming
- Lake resources conservation and utilization through community participation (co-management)
- Disciplinary research on: breeding/genetics, nutrition, pathology, biodiversity



Open water fishery and people



## Research and Development in Cage Fish Culture

- Pokhara valley, Kulekhani, wetlands of Terai
- High income with low input and source of food security
- Environmentally sound and friendly farming

### Pokhara Valley:

- Cage volume: 24,000 m<sup>3</sup>
- Production: 100 mt/year
- Productivity: 3-6 kg/ m<sup>3</sup>



## Cost, revenue, and returns of cage fish culture (cost in NRs)

	Per/ m <sup>3</sup>	per kg
<i>Variable cost</i>	31.04	8.65
<i>Fixed cost</i>	46.09	12.80
<i>Opportunity costs</i>	54.54	15.15
<b>Total costs</b>	131.67	36.60
Gross Revenues	270	75.00
<b>Returns</b>		
Operating profit	238.96	66.38
Net income	192.87	53.58
Net profit	138.33	38.40
Ratio of net profits to variable cost %	445.65	
Ratio of net profits to gross revenues %	51.23	

## Fry nursing technology in cage

- Cage size 50 m<sup>3</sup> (5 x 5 x 2)
- Cage mesh size 10 mm
- Stocking size = 1 g
- Stocking size 60 fry/m<sup>3</sup>
- Feeding = natural feed
- Growing period = 4 months (22-27 °C)
- Harvest size = 10 - 15 g
- Survival rate 55-70%

## Grass carp fish culture in cage

- Suitability: Aquatic weed infested water body
- Cage dimension: 5 x 5 x 2 m (50 m<sup>3</sup>)
- Initial stocking size: 50-100 g
- Stocking density: 10-12/m<sup>3</sup>
- Feeding: aquatic grass (ad libitum)
- Growing period: 10 months (at >22 °C)
- Production: 6-7 kg/m<sup>3</sup> (Phewa & Begnas lake)
- Production rate over conventional cage fish culture: 100-150%

## Aquaculture Technology Development of Indigenous Species, Sahar (*Tor putitora*)

- Domestication
- Breeding and nursing technology developed
- Survive and grow in wide range of agro-eco-region
- Open water stocking to mitigate development effect on its diversity



## Pond aquaculture of Sahar

- Culture system: monoculture and polyculture
- Stocking size: 5 g
- Density: 10000/ha (monoculture)
- Feed and feeding: 30% protein content feed @ 3% of bw/day
- Culture period: 2 yrs
- Average harvesting size: 300 g
- Productivity 2.5-3.0 mt/ha



## Comparative growth rate of Sahar among stocking size and age group

Attributes	Small size		Large size		One-year old sahar
	Pokhara	Tarahara	Pokhara	Tarahara	
Stocking mean weight, g	4.0	2.7	24.9	50.9	
Final mean weight, g	52.8	66.5	83.9	219.4	
Growing days	120	150	120	150	
Growth rate, g/day	0.40	0.42	0.49	1.12	



## Breeding Technology of Catfish

- Cross breeding among *Clarias batrachus* and *C. gariepinus*



Indigenous: *C. batrachus*



Exotic: *C. gariepinus*

Characteristics of hybrid catfish

- Customers preferred
- Survival higher than both spp
- Feed of agro-byproducts
- Medium growth rate

## Homestead cat fish farming technology focusing resource poor farmers

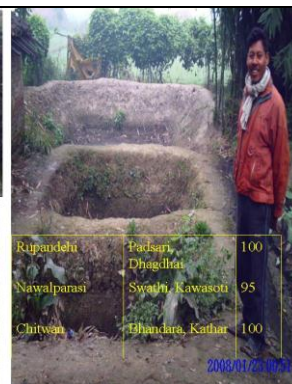
- Pit size: 1-5 m<sup>2</sup>
- Stocking size: 3-5 g
- Density: 40-50 fry/m<sup>2</sup>
- Feed and feeding: Agro-byproducts, snails etc
- Growing period: 5-6 months (22-30 °C)
- Harvest size 500-1000 g
- Survival rate 40-60%
- Production: 15-40 kg/m<sup>2</sup>

➔ Scaling up in Rupandehi, Nawalparasi, Chitwan  
➔ >300 farmer involved



## Household (HH) fish production and consumption

Location	Family size No.	Total Yield, kg	Fish consumption and sale		
			Kg/HH	Kg/head	Sold kg/HH
Nawalparasi					
Kawasoti	6.2	11.5 <sup>c</sup>	10.3 <sup>b</sup>	1.9 <sup>c</sup>	1.2
Swathi	5.7	19.9 <sup>b</sup>	12.4 <sup>cd</sup>	2.4 <sup>bc</sup>	7.5
Rupandehi					
Padsari	8.1	19.9 <sup>b</sup>	19.5 <sup>b</sup>	3.1 <sup>b</sup>	0.5
Dhagdhai	7.1	19.4 <sup>b</sup>	16.3 <sup>bc</sup>	2.5 <sup>bc</sup>	3.1
Chitwan					
Bhandara	6.2	37.4 <sup>a</sup>	37.4 <sup>a</sup>	7.2 <sup>a</sup>	0.0
Kathar	6.2	15.0 <sup>bc</sup>	15.0 <sup>bc</sup>	2.6 <sup>bc</sup>	4.2
Means of the location		21±11.8	18.7±12.0	3.3±1.7	



## Women participation



## Fish Harvest



## Homestead catfish yield



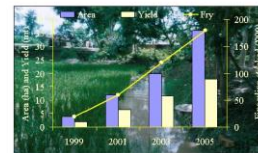
### Spawning study of *Pangasius*

- Suitable in Terai and mid-hill region
- Grows >1 kg in a year
- Maturity 2-3 yrs
- Potential for intensive aquaculture



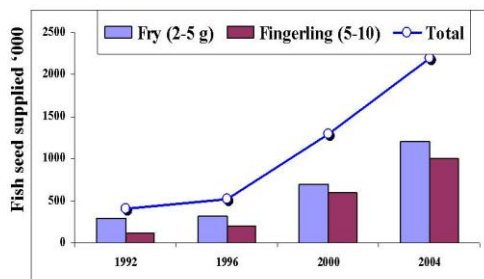
### Community based rice + fish farming technology development

- Fish yield: 365-514 kg/ha
- Increment in rice yield: 10-12%
- Economics: 43.4% ± 22.3 net income over rice culture
- Irrigated rice field (467000 ha) could be seen as potential for expansion



### Breeding and Genetics

- » Genetic diversity of native fish for inclusion in aquaculture
- » Quality seed supply to farmers



### Ornamental Fish



- Development and promotion of indigenous and exotic ornamental fish for entrepreneurs of Nepal

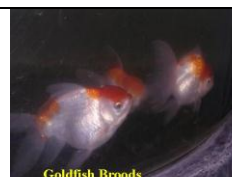
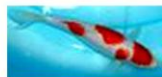
- Potential for import substitution of ornamental fish worth about 25 million rupees



- Breeding and nursing technology of exotic species developed for:

- Fancy carp (*Cyprinus carpio*)
- Guppy (*P. reticulata*)
- Sword tail
- Platy
- Molly
- Gold fish

- Breeding technology of some indigenous species under study (*Puntius*, *Barilius*, ...)



Goldfish Broods



Collection and domestication of native species



Goldfish fry



Kabre fish

### Feed composition for different fish

- » Supplementary pellet feed for carp and Sahar
- » Micro-feed for larval rearing of carps and Sahar
- » Low cost feed development: partial replacement of animal protein (15%) for Sahar

Feedstuff



Feed production



Prepared feed



### Biodiversity conservation and utilization

- About 60% of total wetland area located at mid and far western development region
- Environment and fish diversity of wetland
- Displaced "kamaiya belonging to Tharu community and woman of poor, dalit section of society involved in program
- Re-stocking program
- Habitat improvement (Conservation)

### Domestication of river fish Gardi (*Labeo dero*)

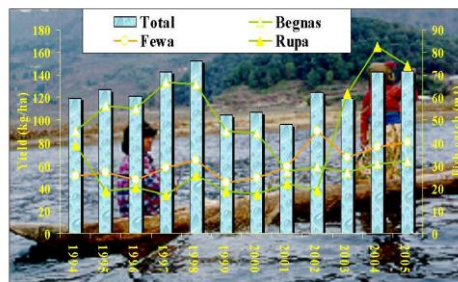


## Open Water Fisheries Management

- Fish diversity conservation
- Stocking management
- Capture technology
- Marketing channelized



## Fish Catch Trend in Lakes



## Co-operative management of Rupa Lake (Participating farmers 670)



### Conservation of degraded lake

- Concept of local resource use and conservation for the benefit of local community
- Traditional rights of fishers preserved
- Women of the community prioritized
- May be applicable to enhance the livelihood of deprived people living around ghols in southern parts

Fish Production Increased in Rupa Lake  
Monthly Rs. 300-400 Thousand Income



## Participatory research and development program



Scaling up of rice-fish farming and cage fish culture in far western development region



Participatory fishery management of high valued indigenous carp in Lakes of Pokhara valley



In-situ conservation and production performance of Sahar (*Tor putitora*) in different ecological regions

-It is estimated that Fisheries Center contributes to generate economic activities equivalent to nearly 80 million NRs in its command area




- Cage aquaculture and recapture fishery shared over 75% of the total annual income of the Jalari fishers

- Employment opportunity for >1500 farmers in fisheries and allied activities in western mid hill

Attributes	1980	2005
Family size	5	5.5
Education		
Literate	19.2	43.8
High school	2.3	7.2
University	0	2.0
Living standard		
Housing land (%HH)	38.1	66.6
Tin and concrete roof house	45.9	100
Access to potable water	5.2	78.5
Access to public health services	6.2	95.8
Use of energy (electricity, cooking gas)	1.7	54.6
Access to mass media	5.7	80.0
Use of automobile	0.0	9.2
fishery contribution to HH income (%)		75.0
Engel's coefficients		35.1


### Future Strategies Focus

- » Conservation and exploitation of native species in aquaculture
- » Simple & low cost aquaculture technological package for marginal farmers
- » Natural water fisheries resources management and utilization
- » Promotion of high value species (prawn, catfish) for warmwater and trout for cold water regions
- » Commercialization of aquaculture
- » Promotion agro-tourism through aquaculture and fisheries

### Our partners and stakeholders

- » All CBOs working in fisheries and aquaculture
- » Rupa Tal Restoration and fish farming Cooperative
- » Directorate of Fisheries Development
- » Agriculture Development Offices
- » Regional Agriculture Directorates
- » IAAS, Rampur
- » LI-BIRD, Pokhara
- » NARDF
- » FAO, UNDP, JICA
- » Office of the Pokhara Sub-metropolitan
- » LNCCL, Lekhnath Municipality



Thanks for your kind visit and we wish for your pleasant stay

## **SECTION 5**

**ROLE OF DEPARTMENT OF WATER INDUCED  
DISASTER PREVENTION IN DISASTER RISK  
REDUCTIONS BY C ACHARYA, ENGINEER,  
DWIDP**



<p style="text-align: center;"><b>Role of Department of Water Induced Disaster Prevention in Disaster Risk Reduction</b></p> <p style="text-align: right;"><b>S C Acharya, Engineer, DWIDP</b></p>	<p style="text-align: center;"><b>Outline of Presentation</b></p> <ul style="list-style-type: none"> <li>• <b>Background of Country</b></li> <li>• <b>Types of Water Induced Disaster in Nepal</b></li> <li>• <b>Average annual losses by Water Induced Disaster</b></li> <li>• <b>Management of Water Induced Disaster</b></li> <li>• <b>Role and activities of DWIDP</b></li> <li>• <b>Issues of Water Induced Disaster Management</b></li> </ul>
<p style="text-align: center;"><b>Background</b></p> <ul style="list-style-type: none"> <li>• Nepal posses more than 6,000 <b>rivers</b> draining about 225 BMC of water annually</li> <li>• High temporal and spatial variation in runoff and <b>rainfall</b></li> <li>• High instantaneous flood due to high intensity rainfall up to 350 mm/day</li> <li>• Average annual rainfall 1530 mm of which more than 82% occurred during June to September</li> <li>• Steep mountain terrain and fragile geology</li> <li>• Nepal often suffers from various types of Water induced disasters like floods, landslides, debris flow, GLOF etc</li> <li>• Unplanned development activities and lack of land use plan cause further <b>vulnerability</b></li> <li>• The forest cover is 38% but deforestation is continued due to high growth of population</li> <li>• Resource constraints and lack of awareness are major obstacles in mitigation of water induced disasters</li> </ul>	<p style="text-align: center;"><b>Types of Water Induced Disaster in Nepal</b></p> <ul style="list-style-type: none"> <li>• <b>Floods- Monsoon Flood, Flash Flood</b></li> <li>• <b>Landslide and Debris flow- Fall, Slides, Topples, debris flow,</b></li> <li>• <b>Cause tremendous destruction of productive land, irrigation systems, foot trails, road alignment as well as villages in the hills (83% of land)</b></li> <li>• Shifting, meandering, widening and braiding, scour bank erosion and under cutting and inundation of lower Terai during monsoon, and siltation along the farm land.</li> </ul>
	<p style="text-align: center;"><b>Rock failure, Siddhartha Highway</b></p> 
<p style="text-align: center;"><b>Debris flow 1993</b> e.g. Debris flow at Phedigaon, Palung</p> 	<p style="text-align: center;"><b>Bridge Failure, Seti River, Pokhara</b></p> 

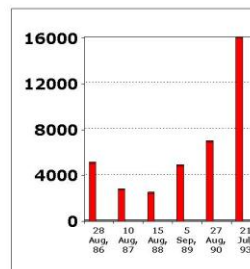


## Annual Average Flood and Landslide Disaster

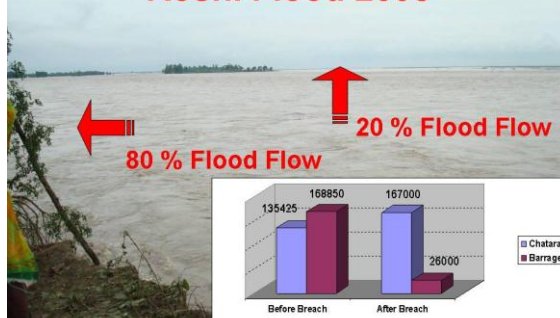
S.N	People Death (no)	300
1	People Injured (no)	67
2	Livestock Loss (no)	2,365
3	Houses Destroyed (no)	6,445
4	Affected Family (no)	21,377
5	Land Affected (ha)	4,148
6	Estimate Loss (Mill. NRs)	626

## Bagmati Flood in 1993

- Huge damage n lives and property including Barrage
- Damaged the standing crops in 37,000 ha
- Highest flood magnitude-16,000 m<sup>3</sup>/s



## Koshi Flood 2008



## Koshi Flood in 2008....



## Inundated Jamuwa and Kusaha Village from Koshi Flood



## Floods in Kanchanpur District, 19 September, 2008



## Floods in Kanchanpur District, 19 September, 2008



## Water Induced Disaster Management

- Policy, Rules and Regulations
  - Natural Disaster Relief Act -1982-amended 1992
  - Water Resources Strategy – 2002
  - National Water Plan- 2005
  - Water Induced Disaster Management Policy-2006
- Institutional Arrangements
  - Central Natural Disaster Relief Committee
  - District Natural Disaster Relief Committee
  - River Training Project under DOI in 1970
  - DPTC established in 1991
  - Department of Water Induced Disaster Prevention (DWIDP) established in 2000
  - River Training Division of DOI merged into DWIDP in 2002

## Establishment of DPTC

- DPTC was established in October 1991
- Aims to enhance institutional capability of GON through:
  - Technology development
  - Provision of training and
  - Establishment of data base

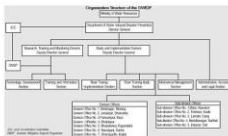


## Activities of DPTC..



## Department of Water Induced Disaster Prevention (DWIDP)

- DWIDP was established in 2000 to institutionalize the objectives of DPTC
- Responsible for managing and mitigating water induced disasters
- River Training Division of DOI transferred in 2002
- DWIDP has 7 Divisions, 5 Sub-divisions and 2 central Project Offices
- The DWIDP implements non-structural measures, which mainly, are awareness generating software, trainings, activation of inundation committee, warning/preparedness etc
- Structural measures are engineering structure like dike, spur, sabo dam, bio-engineering works, river



## Major Activities of DWIDP

- Settlement and agricultural land protection
- Infrastructure Protection
- Provision of emergency relief materials
- Trainings
- Public awareness
- Information Dissemination
- Hazard map preparation
- Research and study



## Physical Activities of DWIDP



## Infrastructure Protection Works

- Highway and roads- Kath-Nuwakot, Charali-Ilam, Kath-Naubise, Mugling-Narayanghat, Sindhuli Bardibas
- Hydropower- Marsyangdi HP,
- Irrigation Canals- SMIP
- Religious and cultural importance places- Manakamana temple, Devghat temple, Changunarayan temple,



## Major Works in MUNA Project



## Major Works in SIBA Project





## Provision of Emergency Relief Materials



Bamboo Shunt (Bamboo)

## Training and Seminars

- Roving Seminars- since 1993 ---50 nos in various districts
- General course training- 257 nos for junior technicians
- Advanced course training- 189 nos for senior technicians
- Intensive course-51 nos for senior levels



## Information Dissemination

- Data base management and publication
- Roving seminars
- IDRR day exhibitions
- DWIDP bulletin, Disaster Review
- School materials
- Higher study course materials



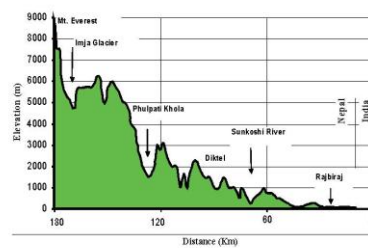
## Issues in Water Induced Disaster Management

- Settlement in river banks and inside river boundary line pose high vulnerability
- Cultivation in steep slopes
- Global warming-glaciers retreat rapidly
- Lack of flood forecasting system
- Planning and preparedness for flood disaster yet to strengthen
- Community awareness is not adequate

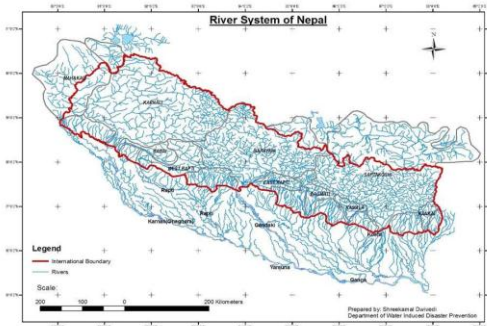
DWIDP would like to network and cooperation from all concerned.

Thank You

Variation of altitude with respect to distance



Photograph showing the vulnerability of Nepalese mountain





# **SECTION 6**

DEPARTMENT OF FOREST RESEARCH AND SURVEY (DFRS)

# Department of Forest Research and Survey (DFRS)

## Ministry of Forests and Soil Conservation Babarmahal

### (1) Role of Forestry Research

Forestry research has an important role to play in sustainable management of Nepalese forests. Forestry research is crucial in the context of a under developed country like Nepal where most of its people for its daily subsistence lifestyle directly relay on forestry.

The Forestry Sectoral Policy of the Government of Nepal's primary focus is towards the management of forests of the country and is based on **participatory approach** (called Community Forestry Programme, CFP). In CFP, forests are handed over to community/group of people called Community Forest User Group (FUG), who manages the forests and an autonomous institution.

Nepal occupies about one-third of the total central Himalayas. Though, this country occupies (147,181 sq. km) about 0.1 per cent of the world's land mass, it claims over 2.2 per cent of the total biological wealth of natural flowering plants. Nepal has life zones such as tropical, sub-tropical, warm temperate, cool-temperate, sub-alpine, alpine, and arctic. For a successful implementation of the national policy, all the accessible forests in the life zones can be and are handed over as community forests

**Scientific forest management is comparatively a very new concept in Nepal.** However, under the Community Forestry Programme, forests are being handed over to more than 14,000 FUGs for participatory management for about 3 decades. These are largely found focusing on protection. **There is a need to enhance the level of forest management by FUGs from protection to production.**

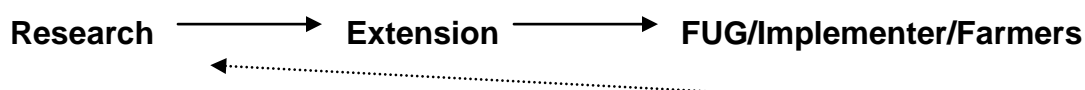
Effective initiation in forest management will require information regarding forest silviculture, growth and the harvesting dynamics of the forests. DFRS have been active on the line since little more than **4 decades**. However, due to limited focus on dissemination, application of these research results has been minimal. Forestry research therefore have a important role to play for a better livelihood of the people in the country.

## (2) History of Forestry Research

Forestry Research (FRD) of DFRS has a young history of research operations. DFRS is the only institution conducting forestry and silvicultural research (long and short term) for Government of Nepal. In the course of its association with research, institutions such as DFID, USAID, FINIDA and others have assisted the department in carrying out its role. Some of the major associating Donor and INGOs are listed below.

Donor institution	Year of its association
US-AID – Resources Survey	Starting 1963 (10 years) and 1980 (5 years - RCUP)
DIFID (ODA before) – FRP	Starting 1979 (for 17 years, till 1996) (CIDA, World Bank, ADB)
CFC	Starting July 2005 (3 years) - Ongoing
DANIDA - COMFORM	2007 (!)

## (3) Research Extension and Execution



Largely the extension approach is found to be one way as the system within the forestry sector is largely implementer led and research is not in priority. Thus **research is mostly left out in many instances**. However, the DFRS is making the best of its effort in improvising the **Research Extension Linkages**, by

**Going to or bringing in the FUG/Uesrs/Farmers/Managers in the research process.**

## (4) Research Conduction and Service Stations

The field research stations spread over various parts of the country specialises in different aspects of forest research. With its headquarters in Kathmandu, the field stations spread over different parts of the country is capable of assisting/carrying out its role of supporting the research survey activities in its stated boundaries, which is developmental region. These are mainly used to maintain, and manage forest research activities.

For a better representation of research carried and better look after, DFRS has its main stations spread over 10 sites (5 in Terai and 5 in the hills) of the country. In addition there are few satellite research sites in Chure/Bhavar (Adhabar), Nagarkot/Naldung (Valley), Charikot (?).



Field stations are at

Development Region	Field Stations	
	<u>Terai</u>	<u>Hills</u>
East:	Tarahara	Dhankuta
Centre: (HQs)	Hetauda	Kathmandu
West:	Butwol	Pokhara
Mid West:	Nepalgaunj	Surkhet
Far West:	Kailali	Dipayal

All the field stations have Residential and office facility, through which the researcher can comfortably stay and work in the field. The residential houses built are well furnished and have necessary equipment for few staff working in the area. These stations can accommodate up to 16 persons at a time, for necessary activity, which includes lodging and dining facility in a very good hygiene. In addition a fully furnished office space with a computer.

All the stations has a nursery, producing needed seedling and other planting materials for propagation research. Butwol Research Station (also field station), which is physiographically centrally located in the Terai has a well built green house, seed storage facility also.

## (5) Research Area and Service Delivery

### Research

The DFRS is presently operating in the field of forest research and survey, through two divisions. The survey division is very important as it is mandated to carry the National Forest Inventory to inform the national planners and policy makers in the forestry dynamics.

Important activities carried by DFRS are

Plantation Silviculture (Nursery and Establishment)	Forest Survey/Inventory
Tree Improvement	Cartography
Natural Forest and Management	Aerial Photography
Agro-forestry	Remote Sensing
Forest Product Utilisation	Biometrics Research
<i>Forest Research and Survey Information</i>	

### Services

DFRS has a strong and fully equipped **soil laboratory** and **survey service**. In addition to the one of the best and well equipped soil laboratory facility, FRD/DFRS has the “**Central Forestry Library**”. The library is the National Forestry Library of the country with a very good link with other national and international libraries and documentation centres. Specifically, its links with the British Universities is well maintained.

The library is situated in Kathmandu and has literature regarding forestry research, extension and implementation regarding Nepal and abroad. The library is equipped with modern retrieval system which makes, access to the information lot easier.

## Mode of Operations/Services (Organisational Chart)

His Majesty's Government of Nepal

Ministry of Forest and Soil Conservation

### Department of Forest Research and Survey (DFRS)

Forest Research Division

Forest Survey Division

#### (6) DFRS Staff (Human Resource)

DFRS is a institution mandated to carry out forest related research within the MFSC of GoN. Number and the academic background of the technical backup of FRD/DFRS and their efficiencies are as presented below.

All the sections as shown in organisational set up are supported by a senior forest research officer and assisted by other well-qualified researcher. Further, DFRS has the benefit of experienced staff who had been associated for long term researches (some more than 15 years in the field of forest research and extension). Some researcher have worked with implementing support projects (bilateral) supported by DFID, DANIDA, AUSAID, FINDA and others. The details are

The section heads of forest research division (FRD) and their specialisation

Director General –DFRS	GO I	MSC	Finland
Deputy Director General (Forestry Research)	GO I	PhD in Agro forestry	Austria
Natural Forest Management	GO II	MSc Forest Management	UK
Natural Forest Management	GO III	MSc Forest Management	Germany
Tree Improvement	GO II	MSc in Forest Management	UK
Tree Improvement	GO III	MSc Forest	Nepal
Plantation Silviculture	GO II	MSc General Forestry	UK
Plantation Silviculture	GO III	Post Graduate Forest Management	Japan
Biometrics	GO II	MSc Forest Management	Norway
Biometrics	GO III	MPhil Forestry	India
Socio-Economics Research	GO II	MSc Forest Management	Norway
Socio-Economics Research	GO III	BSc Forestry	Nepal
Soil Chemist	GO II	PhD in Essential Oil Extraction	France
Soil Chemist	GO III	MSc in Soil Science	UK
Agro forestry	GO II	MSc Agro-forestry	UK
Agro forestry	GO III	MSc Forestry	Austria
Information	GO III	MSC Forestry	Nepal

## Number of staff DFRS

### (A)

Management level	Status	Number of staff
Director General	GOI	1
Deputy Director General	GO I	2

### (B)

Forest Researchers (Technical)	Status	Number of staff
Senior Researchers (Section heads)	GO II	7
Research Officers	GO III	8
Technical support hands (Rangers, supporting both the divisions)	NGO I	25

### (C)

	Status	Number of staff
Other supporting Staff (supporting both divisions)		50
<b>Total</b>		<b>100</b>



## Organisational Chart

