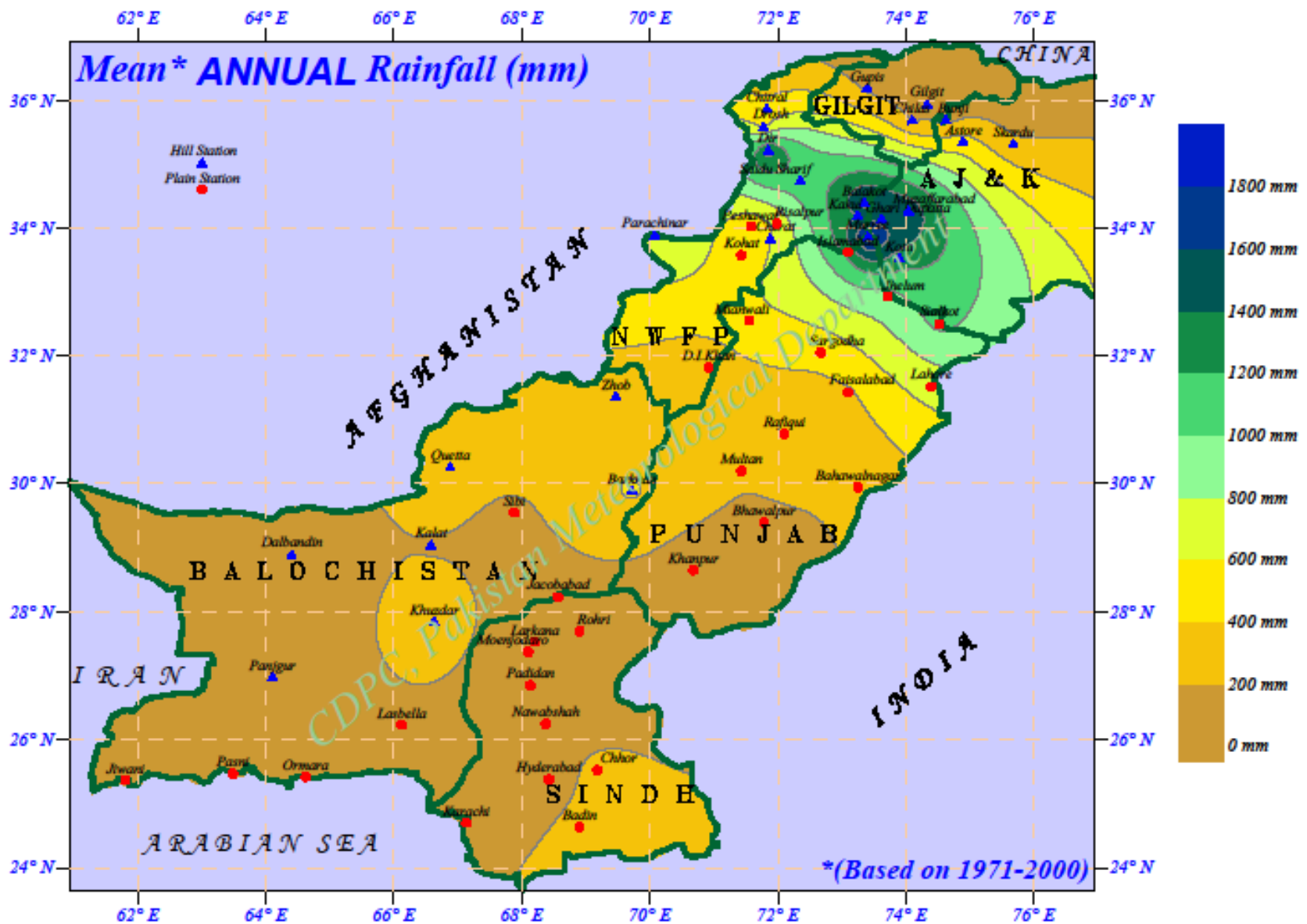


Management of Scarce Water Resources for Rehabilitation of Degraded Lands in Arid & Semi-arid Regions of Southern Pakistan

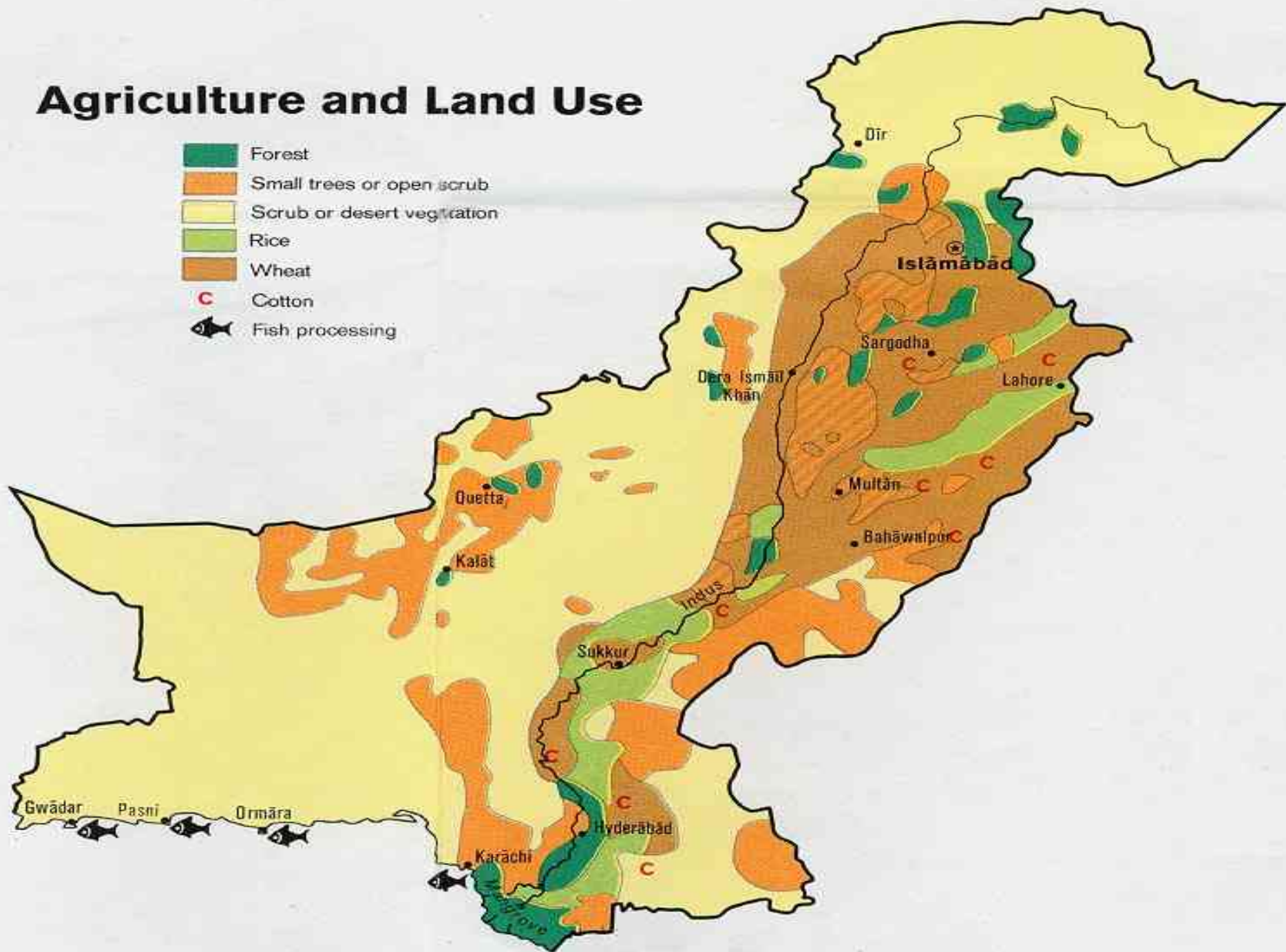
**3rd WORKSHOP ON WATER & ADAPTATION TO CLIMATE CHANGE
“Making Adaptation Work”
Geneva, Switzerland (April 25-26 2012)**

Sahibzada Irfanullah Khan
Sustainable Land Management Project (SLMP)
Project Funded by GEF-UNDP-Gov. of Pakistan



Agriculture and Land Use

- Forest
- Small trees or open scrub
- Scrub or desert vegetation
- Rice
- Wheat
- C Cotton
- Fish processing



The Study Area

Land-uses

agriculture (19%), rangelands (79%), Forest (2%)

The Problem

- Abandoning of rainfed agriculture due to low productivity.
- The increasing reliance on livestock, causing heavy pressure on natural vegetation
- Reduced regenerating capacity of vegetation due to harsh climate and repeated grazing
- Depletion of ground cover and Desertification
- Undermines the livelihood base



Rehabilitation of drylands

OBJECTIVES

- Demonstrate dryland rehabilitation methodologies that are economically viable, socially acceptable and ecologically suitable.
- Engage research institutions, govt. departments and civil society organizations in mutually facilitating planning and implementation model.
- Deviating the focus from single sector development to an integrated adaptation approach involving feed-food-energy-water sectors
- Generate easy-to-use and easy-to-access knowledge and solutions for local and national policy makers to address the needs of adaptation to climate change

Methodologies and Outputs

PROCESSES

Gentle Slopes
Hillside Ditches

Sand Dune Stabilization
Saccharum spontaneum
application

Moderate Slopes
Conservation Contour
Trenches

Steep Slopes
Eyebrow pits

Plain Area
Roaded Catchments

ACTORS

Research institutions
Pakistan Forest Institute
Peshawar University of
Agriculture

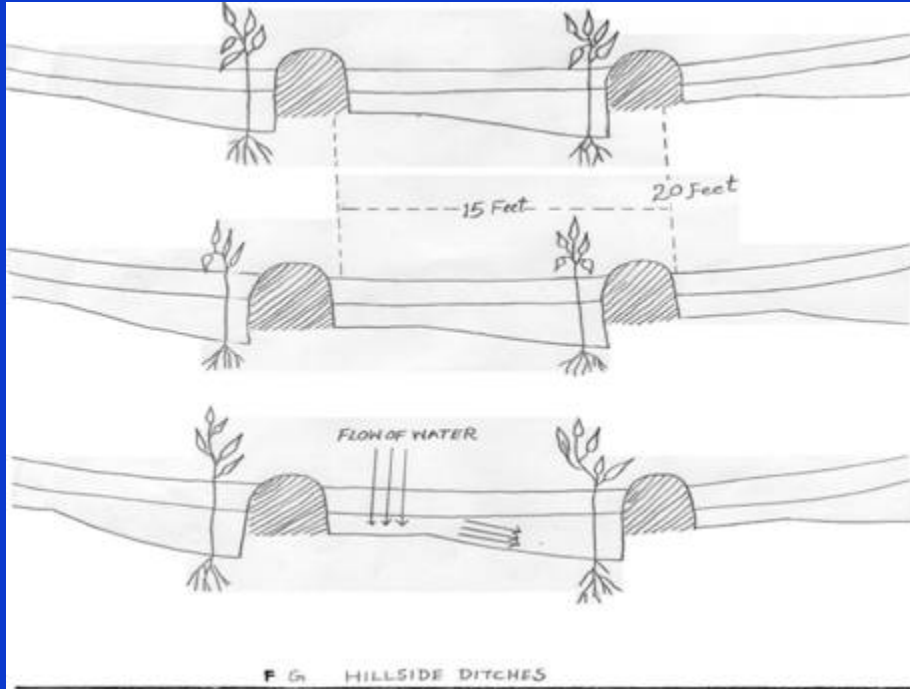
Govt departments
District Forest Departmt.
Deptt of Rangeland Mgt.
Agriculture Department

Civil Society
Community based
organizations of 12
villages
Local NGO

OUTPUTS

Field demonstrations
Technology
development
Capacity building
Case studies
Field guides
Workshop reports
Documentary

Drylands (Silvopastures)



Drylands (Silvopastures)



Drylands (Silvopastures)

Efficiency in growth

S#	Parameter	Species	Data recorded (6 years)	Control
1	Average diameter	<i>Acacia albida</i>	20 centimeters	8 cm
		<i>Acacia nilotica</i>	15 centimeters	6.5 cm
2	Average height	<i>Acacia albida</i>	6 meters	2.8 m
		<i>Acacia nilotica</i>	5 meters	2.1m
3	Av. no. of trees surviving / ha.	Overall	218 numbers	14 no.
4	Av vegetation soil cover	Overall	45 %	12.5%

Drylands (Silvopastures)

Soil improvement



S#	Parameters	Control plot	Treated plot
1	Organic mater (%)	0.65	1.01
2	Total nitrogen (%)	0.13	0.20
3	Phosphorus (mg / kg)	3.05	3.14
4	Potassium (mg / kg)	155.13	114.1
5	Electric conductivity (d S/m)	0.10	0.13
6	Lime content (%)	6.96	6.75
7	pH (1:5)	8.29	8.38

Drylands (Silvopastures)

Hillside Ditches



Economics Aspects

Rehabilitation on 1 ha. of land costs Rs. 4,900 (US\$ 82) on the whole, where as cost of departmental afforestation on same area is more than Rs. 19,800 (>US\$ 330).

Drylands (Sand dunes)



Cost/Benefit	Kanola (Rs.)	Gram (Rs.)	Saccharum (Rs)
Annual Cost	6,052	9,139	-
Annual Income	14,795	53,097	44,100
Net profit (Rs.)	8,743	43,958	44,100
Net profit (US\$)	146	732	735

Challenges

- High dependency on lands, yet very little capacity to invest
- Increasing probability of droughts, uncertainty about climate patterns
- Absence of safety nets, access to micro-credits or financial institutions
- Limited awareness about and access to new technologies
- Harsh climatic conditions hampering productive ventures
- Due to increasing livestock and free grazing, land cover further decreases rapidly
- In-appropriate allocation and management of development funds leads to deprivation of needy people.

Coping Strategies

- Enhanced research and Knowledge / information dissemination centers
- Demonstration and up-scaling of low cost, easy to implement land based technologies
- Access to micro-credit schemes, soft loans, crop insurance schemes and alternate livelihood resources
- Justified, closely monitored schemes in the sectors of forest, range, agriculture to benefit the needy farmers
- Encourage private sector to invest in land and livestock under properly monitored environmental standards.
- Ecosystem interventions based on all-inclusive approach for community, planned and implemented at basin/watershed level.