

Draft

INTEGRATED SUSTAINABLE LAND MANAGEMENT POLICY OF PUNJAB

2018

Foreword

This Integrated Sustainable Land Management Policy (ISLMP) delivers the commitment of the Government of Punjab to respond to the land degradation issues, its major drivers and take measures that can arrest and reverse the land degradation process in the near and far future. The policy is fulfilling the government's commitment under various provincial policies and legislations, thematic strategic initiatives such as Punjab Conservation Strategy, and corresponds to the international calls through various instruments including the Sustainable Development Goals (SDGs) and the United Nations Framework Convention on Climate Change.

The province of Punjab, with its diverse geographic and natural resources, has been emblematic of land degradation. Its northern mountainous terrain under tertiary and sedimentary rock formations with thin soil cover results in landslides and erosive land movements, while the southern arid desert ecosystems are exposed to soil washing from sand dune movements. The central plains are subject to salinity, waterlogging and excessive use for agriculture, farming, urbanization and industrialization. In addition, exponential growth in human population has triggered maximization of productivity through unsustainable agricultural practices including in-appropriate use of nitrogen fertilizers, intensive management with no regard for maintaining soil fertility, unwise and wasteful flood irrigation leading to leaching out soil nutrients. The development sector has been mandated with time bound structural and non-structural initiatives, which in most cases have negative bearing on soil cover. This puts the whole province under land degradation pressure, which calls for integrated remedial measures. This policy, produced as a series of multi-stakeholder dialogue and discussion process, is designed to mainstream responses to reverting to land stabilization in conservation and development initiatives for a positive change to enrich soil fertility, conserve biodiversity, maintain ecosystem services, and enhance productive systems including agriculture, livestock, and life support systems.

Acknowledgements

The work on this policy document was jointly initiated and supervised by SLMP II on behalf of the Ministry of Climate Change [MoCC] Government of Pakistan in collaboration with the provincial governments, United Nations Development Program (UNDP), and Global Environment Facility. Let me truthfully mention that this work wouldn't have been accomplished without the high quality guidance and timely support of the Mr. Ishrat Ali, National Project Director, Mr. Hamid Khan Marwat, National Project Coordinator, Mr. Khalid Sultan Provincial Project Director SLMP P & D Punjab, Mr. Nadeem Shaukat, Policy Expert of SLMP and Mr. Umair Nazar Policy Associate for Sustainable Land Management Program. My team members Mr. Shaukat Ali, forest and biodiversity expert and Mr. Jam Khalid, Agriculture and Livestock expert were phenomenal in terms of providing sectoral input in the policy. They went much beyond and provided overall support in this policy formulation.

I would take this opportunity to express my gratitude to the UNDP and Global Environment Facility for funding and Provincial Planning and Development Departments for implementing SLMP-II in collaboration with the Ministry of Climate Change, Government of Pakistan. I appreciate the efforts of the provincial line agencies, SLMP Provincial Program Directors and Provincial Program Coordinators who took time out of their busy schedule and provided data and information as well as deeper insight on the SLM issues in their respective working premises. I would like to thank all the contributors from SLMP-II, and relevant stakeholders from Punjab for their invaluable inputs and contributions, as well as the team of consultants for the successful completion of the policy formulation process.

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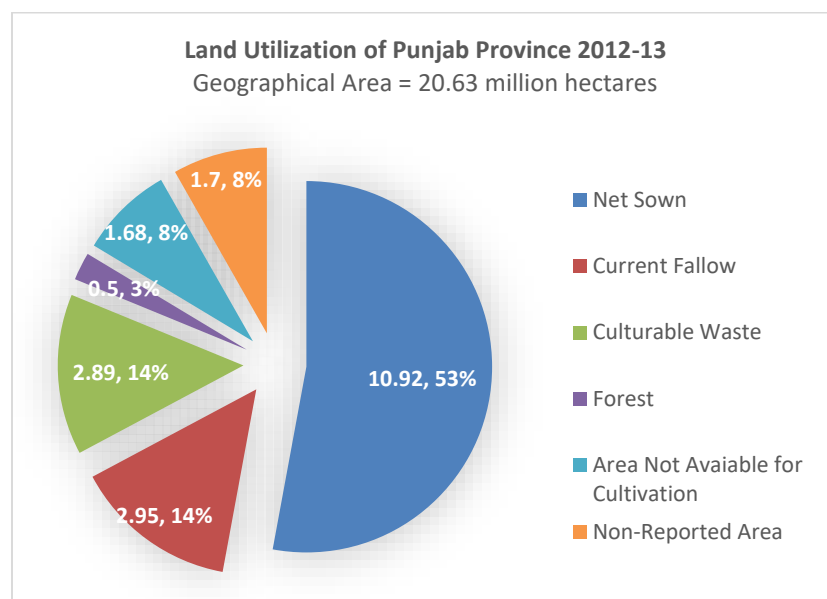
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1. INTRODUCTION

With 20.63 million hectares area, Punjab province is of critical importance to Pakistan for its provisional services of food, fiber and industrial goods to the entire country and is a lifeline of national economy. With 53% area under agriculture, the province serves as food basket for the country and surpluses for export. Rangeland is another major land use type covering about 27% of the province. Desert covers about 9% whereas open ground/current fallow account for a little more than 7% area. Waterlogged and saline lands cover some 0.6% of the area. A substantial area is fallow and cultivable waste which are already prone to degradation in general or is endangered to degradation.

Population growth rate in Punjab is 2.13 % which stands at 110 million in 2017 with 17 million households. Population of Lahore has swelled to 11.13 million from 5.14 million – showing a staggering increase of 116.3 per cent. Population density of Punjab is more than double as compared to national population density. This implies that a large proportion of peri-urban agriculture land has been brought under habitation.

Figure 1: Land use distribution in Punjab



Ref: Punjab Development Statistics 2015

2. THE CONTEXT OF LAND USE IN PUNJAB

The forest cover is limited, only about 4 percent. It is predominantly scrub forest (2%). Riverine and broad leaf forests cover only 0.7% each. The coniferous forests are mainly present in the northern mountainous area. Almost half of the area of the Punjab province is under agricultural land use Irrigated agriculture is predominant and is mainly in the area drained by the Indus River and its tributaries. Rangeland is another major land use type covering about 27% of the province. Desert covers about 9% whereas open ground/current fallow account for a little more than 7% area. It is mainly concentrated along the foothills of the western mountains where Rod Kohi agriculture is practiced in patches. Within the irrigated areas are pockets of waterlogged and saline lands which account for some 0.6% of the provincial area.

2.1 AGRICULTURE

Over the years the Punjab economy has been considerably diversified but the agriculture sector is still the largest sector of the provincial economy and the driving force for its growth and development. Besides its provisional services already mentioned, it caters for the employment of 45% of the people in the province and over 65% in rural areas. The farming community also contributes to growth by providing market for industrial products. This sector is therefore being given top priority by the Punjab Government.

The latest estimate of the share of this sector in the Provincial economy is over 24%, as compared to national average of 20% for the rest of the country. Clearly, in the presence of strong forward and backward linkages, the performance of the agricultural sector has a vital role to play in the growth process of the Province. Unfortunately, the emerging structural problem for Punjab is the loss of dynamism of agriculture. This sector grew at the rate of almost 4.5 % in the decade of the 90s, but since then it has managed a growth rate of only about 2%. The fundamental problem is the lack of buoyancy in the production of major crops. This is a reflection especially of the growing water constraint, diminishing returns to fertilizer use (especially urea) and increasing land degradation due to water logging and salinity.

THE SLOWDOWN IN GROWTH OF MAJOR CROPS IN PUNJAB

- Punjab accounts for 75% of the national value added in the major crops sector of agriculture.
- The agriculture economy of the province performed well in the decade of the 90s.it has flattered since then as shown below:

Trends in growth of agriculture products

(Annual growth rate

Crops	Share of National Output (%)	90s	1999 – 2000 to 2007 - 08	2007 – 08 to 2012 - 13
Wheat	7.7	6.6	-0.7	3.5
Rice	63	7.7	3.6	1.1
Sugarcane	67	1.7	5.1	1.3
Cotton	73	5.1	0.4	1.0

Source: PBS, Govt of Punjab, PDS

The approach adopted by the government is to increase productivity in both crops and livestock to ensure an adequate raw material supply and to combine this with increased value-added in downstream food processing. The main objectives of agricultural development are to ensure food security, improve the quality of agricultural commodities and achieve productivity of crops.

These objectives are driven by a longer-term strategic vision. The vision of the agriculture strategy is to raise productivity and profitability of the farming community; to enhance the living standards of rural masses; to protect the natural resource base by protecting land

and water and countering situations of short water supply or drought; and to ensure food security, especially for the rural and urban poor.

2.2 LIVESTOCK

Livestock in Punjab contributes to two third of the milk production in the country. Pakistan has an estimated livestock population of 125 million, as reported in 2006, a large portion of this population is in Punjab. It is also a large source of livelihood for 75% of the rural population (Planning and Development Department, 2015). Livestock department is a potential sector for growth, around three quarter of the provinces population is involved in the sector. Its growth rate is 4% more than agriculture and industries. While agriculture contributes 22% to GDP, 55% of that is due to livestock. Although its GDP growth has been increasing every year, the budget allocation has been reducing annually. Only 7% of total budget is given to livestock department. 85% of livestock farming is in Punjab and 64 mega industries depend on bi-products of animals such as gelatine, tannery, milk, meat. Livestock is critical for food security and ensuring food safety and quality of livestock can reduce health bills by 71%. In Punjab, livestock is used as farm help, dairy products, meat, manure, and for transportation. The main typed of livestock found in Punjab are cattle, buffalo, sheep, goats, poultry, camels, horses, mules, and donkeys (PGS, 2015).

2.3 RANGELANDS/ DESERTS

Rangelands in Punjab cover about 10% of the land while another 19% is either sparsely vegetated shrubby or bare land used for grazing. Farming and livestock rearing are complementary activities in the province. In the revenue records these lands are classified as "Wastelands".

Being the single biggest land use, patches of moist temperate and dry sub-tropical rangelands cover an area of about 1.5 million ha. The Thal desert covers an area of about 20,000 km² that comprises of dunes, slopes and foot of dunes and flats. D.G Khan Rangeland is spread over 0.5 million ha between Suleman range and Indus River with arid sub mountainous sub-tropical conditions. Cholistan is the largest range ecosystem comprising of 2.6 million ha falling in the districts of Bahawalpur, Bahawalnagar and Rahim Yar Khan. The area is mostly sandy having potential for grazing of livestock and a habitat for wildlife.

All rangeland areas are characterized by poverty with little livelihood alternatives. People have adopted rangeland dependent livestock that best fit with the vegetation type found in the area. The area is affected by severe to very severe desertification due to poor. Grazing pressure and poor grazing practices in the region has badly eroded most communal grazing areas. Wood extraction is undertaken extensively both for the domestic fuel market and for supply to urban centres.

2.4 FORESTS

Punjab has very low forest cover. Following is the statistics of forest areas as legally constituted and under the administrative control of provincial government or district governments (Punjab Development Statistics 2016)

Reserve Forests (Ha)						Chose Act/Other Forests	Protected Forests	
Area under provincial government	Area transferred to districts	Un-classed	Section 38/Resumeland	Guzar forest	Misc.	80	Province	Districts
319675	3114	112696	16015	68237	1553		211458	8198

The meager forests cover of about 3% mainly consisting of irrigated plantations, riverine forests, natural coniferous and scrub forests. The rest are linear plantation strips along roads, canals and railway lines as detailed below (Draft Provincial Land Use Planning Framework for Punjab UNDP/GEF):

Coniferous Forests	49,000 ha
Scrub Forests	316,000 ha
Range Lands	2,648,036 ha
Irrigated Plantations	150,060 ha
Riverain Forests	58,440 ha
Canalside Plantations	32,640 km
Roadside Plantations	11,680 km
Rail side Plantations	2,987 km
Linear Plantations	16,369 km

Forest resource is constrained by unfavorable climatic conditions, competing water allocation to irrigated plantations, low financial allocations, user rights in natural forests, human and livestock population pressure and low inundation in riverine forests. Economic survey indicates that direct contribution of forestry sector to GDP is meager 0.12%.

Irrigated plantations are threatened by drought and cutting of trees. To increase forest resources government has initiated leasing out forestland policy to private sector for afforestation and agro-forestry purposes through a company of the public sector. This is a challenging approach that needs dedicated efforts to make it a success for up-scaling.

Natural moist temperate and sub-tropical chir forests are both fragile and unique, in the overall topography of the province, however are extremely important for the ecological services that they provide through control of soil erosion, increased water flows, livelihood for local people, and habitat for wildlife.

2.5 BIODIVERSITY /PROTECTED AREAS

Biodiversity is cross-cutting to all kinds of land cover and natural resources and each has its peculiar characteristics. Agriculture, forests, protected areas, wastelands, wetlands,

rangelands, deserts have floral and faunal diversity of different species and scales. Even there is variation within the system where habitat types differ. Due to its diverse landscape, Punjab has outstanding biodiversity treasure spread over large areas or isolated pockets or sparsely available individual species.

Potohar and subtropical evergreen broadleaved forests have wild genetic resources of olive, almond and pistachio and there is a host of other floral and faunal species that deserve conservation against all odds. Plant species heterogeneity in Salt range is quite wide as reflecting the ecotones between sub-tropical dry forest, savannahs and wetlands. There are two national parks and a number of other protected areas in Punjab. Chinji National Park in Chakwal district covers an entire area of 15,061 acres. The National Park consists of the biome of deserts and xeric shrub lands and is featured to have sub-tropical vegetation with several rare plant species of extreme importance. The area is a huge habitat for threatened wildlife species of Urial. Lal Suhanra national park is one of the largest national parks in South Asia and is declared as Biosphere Reserve by UNESCO. The national park is spread over 162,568 acres and is notable for the diversity of its landscape, which includes areas of desert, forest and wetland.

2.6 WETLANDS

Punjab is abode to both permanent and ephemeral wetlands having intrinsic species biodiversity. There are three protected wetlands sites under the Ramsar Convention of 1971; Chashma Barrage in Mianwali, Taunsa Barrage in Muzaffargarh and Uchhali Complex in Khushab consisting of Uchhali, Khabbeki and Jahlar Lakes. There are 15 regular water bodies in the province spanning over 350,000 ha with splendid biodiversity of plants, birds, reptiles and mammals.

Wetlands provide sanctuary to variety of wildlife species, resident and migratory birds, habitat and spawning grounds for fish. They hold large quantity of rainstorm water to diminish flood damages, recharge aquifer, afford resilience in water scarce periods, provide habitat to large number of wildlife species. The wetlands are in service of mankind with considerable commercial potential that include aquatic products, foods, drinking water, irrigation, medicinal plants, fodder and other crops, timber production, recreation and tourism opportunities etc.

2.7 WATER SECTOR

Water being the most precious resource for life has no support of any centralized government sector to assess and manage all kinds of water resources at source in the province. Irrigation department, which is the main user of water resource, has some mandate to protect catchment areas. Punjab drinking water policy 2011 is limited to providing safe drinking water to consumer. The Pakistan Council of Research in Water Resources is a specialized agency that conduct research with issues regard to different to water resources but that also limited to quality and end use.

2.8. LAND RELATED SECTORAL POLICIES AND ACTS/RULES

Integrated Land Management is cross cutting to a number of sectors that utilize land resource for purposes that meet the sectoral objectives. A number of sectors already have obligations under their policy/law to control land degradation, assess/estimate water resources and plan for their rational use. Following is a brief of sectors and their land and water related laws.

S.No.	Name of sector	Policy/Act/rules	Relevant sections
1	Punjab Local Government and Community Development Department	Punjab Land use Classification, Reclassification and Re-development Rules 2009	Section 19 and 20: District government shall make Land use classification with maps using GIS technology Section 25 and 26: Plans for peri-urban areas will be prepared
2	Punjab Housing and town planning agency	The Punjab Housing and town planning agency ordinance of 2002	Section 4 (xv) of the act provides to "formulate provincial land use policy, plan and prepare regional development plans (inter-district spatial planning- Master plans) for an integrated, coordinated and systematic planning
3	Punjab forest department	Forest policy 1999 Forest Act 1927 Punjab Land Preservation (chos) Act, 1900	: "Enhance tree cover, improve tree and land tenure, proper land use planning, adopt Joint Forest Management (JFM), development of Agroforestry, habitat management, put complete ban on change of land use of forestry sector resources" Section 27 of forest act prohibits de-reservation of reserve forest Section 28 assigns any village community the rights of government over a reserve forest. Section 28-A may declare a wasteland as un-classed forest. Section 4 and 5 provides power to the government to regulate, restrict or prohibit clearing or breaking up land, cultivate, admit and herd livestock. Under section 5-A, government may direct the leveling, terracing, drainage and embanking of fields; control wind and water erosion, earthworks, streams training etc. Section 8 empowers the Provincial Government to take measures in the beds of chos
4	Wildlife & Parks department Punjab	Wetland policy 2012	The policy strategizes its objectives to develop wetlands through ADP, fund-sharing with NGO's, additional staff and necessary monitoring infrastructure, involvement of local communities, public education and awareness, research and training and enrollment of primary stakeholders such as: Irrigation, Fisheries,

			Forest, tourism departments, research institutes/universities, civil society organizations in wetland conservation, protection and sustainable management.
5	Cholistan Development Authority	Cholistan Development Authority Act 1976	Section 15 of the act is about undertaking any work relating to breaking up, cultivation, afforestation, plantation, leveling or reclaiming land for production of fruits, vegetables, fuel, fodder etc.
6	Irrigation Department	The Punjab Irrigation and Drainage Authority act 1997	Section 5 (11) maintain the storage reservoirs, hill torrent control including watershed management practices in catchment areas. 5 (12) To plan, design, construct and improve the storage reservoirs 5 (17) To undertake anti-erosion operations including conservation of forests and reforestation to restrict or prohibit the clearing or breaking up of land in the catchment areas of any rivers, hill torrents and other streams
7	Punjab Public Health engineering deptt:	Punjab drinking water policy 2012	The policy has no provision of assessment and management of water resources
8	Environmental Protection Agency	Environmental Protection Act	The act is overriding and has a number of provisions with regards to prevent land degradation, land use change
9	Agriculture Department	The Punjab Rice (Restrictions on Cultivation) Ordinance, 1959	The Act was to regulate the cultivation of rice in the Province of the Punjab. The preamble says that, in order to check the increase of water-logging, salinity, seepage and the resultant damage to land in the Province of the Punjab, it is expedient to regulate the cultivation of rice in the Province in the manner hereinafter appearing;
10		The Punjab Soil Reclamation Act, 1952 (XXI Of 1952)	it is expedient to make provision for the speedy reclamation and improvement of the areas damaged by Thur and Sem (for preventing further damage and for maximizing agricultural production].
11	Punjab Government	THE LAND IMPROVEMENT LOANS ACT, 1883 (Act XIX of 1883)	The Act was legislated for (a) the construction of wells, tanks and other works for the storage, supply or distribution of water for the purposes of agriculture, or for the use of men and cattle employed in agriculture;

			<p>(b) the preparation of land for irrigation;</p> <p>(c) the drainage, reclamation from rivers or other waters, or protection from floods or from erosion or other damage by water, of land used for agricultural purposes or waste-land which is culturable;</p> <p>(d) the reclamation, clearance, enclosure or permanent improvement of land for agricultural purposes;</p> <p>(e) the renewal or reconstruction of any of the foregoing works, or alterations therein or additions thereto; and</p>
12	Punjab Government	THE PUNJAB LAND PRESERVATION ACT, 1900 (Punjab Act II of 1900)	Notification of areas.— Whenever it appears to the Provincial Government that it is desirable to provide for the conservation of sub-soil water or the prevention of erosion in any area subject to erosion or likely to become liable to erosion, such Government may by notification make a direction accordingly].
13	Punjab Government	THE PUNJAB ALIENATION OF LAND ACT, 1900 (Act XIII of 1900)	An Act to amend the law relating to agricultural land in the Punjab WHEREAS it is expedient to amend the law relating to agricultural land in the Punjab;
14	Punjab Government	THE COLONIZATION OF GOVERNMENT LANDS (PUNJAB) ACT, 1912 (Act V of 1912)	<p>Explanation I— It includes among other things—</p> <p>(a) the construction of wells and other works for the storage or supply of water for agricultural purposes;</p> <p>(b) the construction of works for drainage and for protection against floods;</p> <p>(c) the planting of trees, the reclaiming, enclosing, levelling and terracing of land for agricultural purposes and other works of a like nature;</p> <p>(d) the erection of buildings required for the more convenient or profitable cultivation of a tenancy; and</p> <p>(e) the renewal or reconstruction of</p>

			<p>any of the foregoing works, or such alterations therein, or additions thereto, as are not of the nature of mere repairs and as durably increase their value;</p> <p>But it does not include such clearances, embankments, leveling, enclosures, temporary wells and water-channels as are made by tenants in the ordinary course of cultivation and without any special expenditure, or any other benefit accruing to land from the ordinary operations of husbandry;</p>
15	Punjab Government	Punjab Climate Change Policy (Internal Draft)	First draft is developed but Not circulated yet.
16	Planning & Development Department	Punjab Growth Strategy 2018 first draft	Land use management related focus I nthe strategy is Reforming Punjab’s Land Records Management and Information Systems

3. LAND DEGRADATION AND LAND USE CHANGE ISSUES

Punjab has many challenges due to huge population, depleting natural resources base and its vulnerability against climate related extreme events. Punjab must keep pace with modern world with rapid economic development involving huge infrastructure like highways, roads, housing, power and industry. Land is going to bear all these pressures. Punjab’s agrarian economy is heavily dependent on its natural resources because of its large population in rural areas and their economic dependence on primary natural resources that are generally utilized unsustainably.

Agriculture lands are faced with desertification problem due to unsustainable irrigation and agriculture practices. Water logging and salinity is caused due to the spreading network of irrigation system and over-irrigation practices. Rangelands are severally impacted due to wood cutting, over-grazing exacerbated by drought.

Similarly, water resources are exhausted with excessive groundwater withdrawal and overuse. Ground water resources are being rapidly depleted due to over draft of water and reduced recharge with rains. The excessive use of agro-chemicals and the introduction of invasive alien plant and animal species are also matters of serious concern. Underground water and wetlands are more vulnerable to heavy mining as recharge and refilling of reservoirs take longer time.

Over-exploitation of forests through cutting for timber, fuel wood or overgrazing of livestock have alarming impacts in the form of loss of humus layer, loss soil fertility, accelerated soil erosion, land sliding, ruining water sources, loss of biodiversity. Deforestation is cause directly when forest land is converted to other uses like agriculture,

pasturing or human settlements. Road infrastructure through forest lands cause opening of forests that indirectly incite illegal logging of the area and fragmentation of the forests.

In terms of area, rangelands and protected areas of all kinds in Punjab, occupy considerable part of Indus plains. Livelihood of millions of poor depends on rangelands that are, however, get degraded for several intertwined reasons. Human population growth and poverty are the major factors that trigger other drivers of rangeland and protected areas degradation. In the absence of alternate livelihood opportunities and sustainable planning, farmers tend to increase their livestock number that is shifted to the already overcrowded fixed-area rangelands. There is increase in livestock number in protected areas as well that cause ecological losses.

With increase in population and urbanization there is growing trend of establishing housing colonies out of agricultural land along major highways and roads. There is heavy investment in land hoarding for longer periods expecting high profits. This means that more and more productive land is brought under infrastructure in general and housing. Real state people, whether operating legally or illegally, are the drivers to hoard lands and transform them for housing and commercial purposes when market is created. Land owners are also tempted to sell their lands and a kind of "land use change and loss of agriculture production" sets in.

4. RATIONALE OF INTEGRATED SUSTAINABLE LAND MANAGEMENT

SLM is the use of land resources, including soils, water, animals and plants, for the production of goods and services to meet changing human needs, while simultaneously ensuring the long-term productive potential of these resources and the maintenance of their environmental functions. SLM combines technologies, policies and activities aimed at integrating socio-economic principles with environmental consideration.

Due to the competing thrust of diversity and intensity of land uses, the need of sustainable land management is conveniently ignored that leads to serious implications on the face of diminishing land and water resources. The turmoil arising out of power and gas shortages created socio-economic setbacks, but the consequences will be far more dire with further reduction of exploitable productive land. It has been estimated that world population will surge to 9.7 billion by 2050 and thus the aware nations have already pledged towards land degradation neutral development. They are on the other hand have proactively committed to sustainable land management under the framework of UN Convention on Combating Desertification and land degradation.

The absence of a land use policy in Punjab has resulted in haphazard land use practices. There are a number of governmental sectors that interact with matters related to land but the approach is narrow and short sighted confined to the achievement of sectoral objectives. There is not a single agency dedicated to oversee the cross-sectoral management practices to ensure that the integrity of land is maintained by all standards. These are very serious gaps that will even render disjoint sectoral efforts ineffective to combat land degradation under their specific use.

Sectoral planning is devoid of wide range of expertise as there is no culture of involvement of stakeholders in planning process. Land-use planning suffer from the absence of major players like farmers, herders and fishers who exploit forest, energy or mineral resources or who use land for settlements, industry, recreation or tourism. The lopsided plan so developed will hardly be implementable.

The concept of organized and integrated land use management is a complicated process, due to its inter-sectoral nature. Inefficient land use management leads to land degradation and disturbing real estate markets. Poor land management systems characterized by improper land records, weaker land tenure systems and absence of physical demarcations lead to the escalation in the number of disputes, litigations, evictions and armed conflicts.

There is an urgent need to stop and reverse the process of land degradation by sustainably managing soil, water, natural resources and biodiversity for food security and sustainable livelihood. In a broader sense it is environmental protection and rehabilitation that needs stocktaking by all segments of the society.

4.1. GOVERNMENT INITIATIVES TOWARDS SUSTAINABLE LAND MANAGEMENT

Government of Pakistan through all provinces is making a strategy for sustainable land management (SLM) which would be characterized by transparent allocation of land resources for development according to environmental suitability, ecological integrity, community needs and cultural integrity. This land use planning strategy would ensure that land use should be according to its quality and potential and to achieve objectives of sustainable agriculture, forestry, biodiversity, secure housing, sustainable tourism and conservation of cultural heritage.

The Ministry of Environment GoP undertook an inventory of land cover/land use and associated features in Pakistan through satellite imageries to collect and consolidate the digital data and utilize it effectively in environmental planning and management. Government of Punjab is desirous to ensure sustainable management of land-based resources and protect lands from degradation which will provide the basis of overall environmental management cross cutting objectives of food security, adequate housing and economic development.

4.2. POLICY AND INSTITUTIONAL GAPS

Conventionally the government departments work in isolation focusing on the achievement of their sectoral goals that sometimes conflict with one another and slow down the overall progress. To bring synergy and consistency in the working of several government departments and research and development institutions there need to be a focal organization to bring harmonization, coordination and a unified approach towards sustainable land management. All sectors that are involved in land-based activities focus on the achievement of their sectoral goals and give no or little attention to the primary resource of land and water. Sectoral policies usually have the following deficiencies:

4.2.1. Gaps in the existing policy framework related to land degradation

- Elements of overall land degradation either does not exist or has become redundant or not implemented
- The policy is not duly supported by legal and institutional framework of the sector
- Policy formulation initiative is taken without the formal need and aspiration of the concerned sector and actors
- Policy is framed without broader participation of stakeholders thus it is hardly in agreement with ground realities

- Political stakes are seldom taken into consideration that makes its implementation difficult.
- Policies once prepared are hardly reviewed for possible revision/adjustments/improvements
- Policies are not strategized and plans and projects are prepared without giving due consideration to the policy directives
- Sudden change in priorities at political level results in relegating all or some policy directives
- It is the entire land governance, (comprises of SLM and land administration) which have to be concomitantly addressed.
- Land and natural resource degradation issues have no priority at all to be debated in the media
- Lack of mechanism to highlight the issues through mass awareness programmes for general public

4.2.2. Institutional gaps

- At present there is no dedicated institutional home in the province with statutory mandate to ensure sustainable management of land with pragmatic strategies.
- Land and land based natural resources are never integrated into development policies, strategies and plans of the province that render resources irrelevant as for their role in providing goods and services
- Two or more departments working in shared space have no mechanism of developing rapport to achieve certain common objectives.
- Politically induced and quick turn-over of officials in government departments resulting in erosion of institutional memory.
- Land acquisition act takes too long and the process is cumbersome when land acquisition becomes unavoidable and quick.

4.2.3. Financial gaps

- Provincial desertification control funds, already agreed by the province, have not yet been established as no mechanism has been framed.
- The concept of private-public partnership has not been explored for capitalizing on outside resources by creating stakes for private sector but no tangible steps initiated.
- Thematic plans and projects are not well articulated to be presented to international conservation and development agencies/global mechanism for technical and financial support.
- Sustainably produced commodities have premium in certain markets which need to be explored (Forest stewardship Council, Cotton Initiative)

4.2.4. Capacity deficit

- There is acute lack of capacity in the sectors to appreciate land degradation phenomenon and its associated inter linkages which is essential for mainstreaming the issue in relevant sector
- Long-time Inertia in a sector does not encourage innovative and analytical approach
- Lack of inbuilt mechanism of in-service training in contemporary issues
- There is lack of formal experience of formulating integrated projects cross-cutting to a number of departments/sectors.

5. INTRODUCTION TO ISLMP FOR PUNJAB

Management of land and land-based resources is the prerogative of the provincial government and the environmental dimension associated with management of land resources was devolved to the provincial governments. Sustainable land management are evolved and improvised in the province through series of government led and donor sponsored initiatives, notwithstanding these practices needs concerted policy framework for upscaling and institutionalization. Keeping this need in view and through with a thorough consultative process the first ever ISLMP for the province is developed that aims at:

- Arresting degradation of land cover and land uses;
- Promoting sustainable land use of the available land cover;
- Linking various policies' measures to provide a common platform for address land use and land cover issues;
- Categorizing land use of Punjab for proper land use and land cover contributing to sustainable land use;

5.1 Vision and mission of the ISLMP PUNJAB

With its objectives as defined above, the ISLMP Punjab's mission is to bring Land Management to sustainable levels and pass the land and its resources for the benefit of the current generation and pass it on to the next generation in a better state. To achieve this mission, the ISLMP Punjab is guided by the vision to integrate sustainable land use with sectorial policies and develop a governance structure that ensures land management in the framework of sustainability.

Guiding principles of the policy

This ISLMP is based on a cohesive and integrated approach and nexus with national policies guidelines and country's obligations under international conventions particularly UN conventions on Climate Change (UNFCCC), biodiversity (CBD), desertification (UNCCD), targets of Sustainable Development Goals (target 15.3 in particular), national and provincial policies recommendations particularly the relevant policies and acts as mentioned in section 2.8 of this document. The various guiding principles for this policy are:

- Integrated rather than sectoral approach
- Subsidies and incentives
- Conserving and investing in replenishing the land resources (landforms, land-cover/land-uses, climate, ground and surface water, soils, etc.)

- Value added management of land products
- Gender issues and preserving the tenurial rights
- Socio-economic, politico institutional and bio-physical aspects in totality
- Compatibility of laws/acts to SLM

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- Categorizing land use of Punjab for proper land use and land cover contributing to sustainable land use;

KEY POLICY RECOMMENDATIONS

This policy document has made recommendations with an action plan to be implemented in the short and longer terms. These policy recommendations are framed in light of the synthesis of existing sectorial policies, gap analysis, issues paper, and various recommendations received during the consultation processes. The key policy recommendations are framed as:

5.2. Integration of the provincial sectorial policies for mainstreaming sustainable land management

Some sectors are directly implicating land management, conservation and land sustainability in their action plans. However, there are some that might have an impact on land resources, but may not be directly implicated. A few of the examples could be hospitals waste disposed-off improperly, municipalities with no plan for domestic waste management and therefore improper disposition, Housing sector with no plans to limit housing expansion on productive agricultural lands, and others. These needs to have sustainable land management mainstreamed into their operations. There is need for:

- i. Identification of various stakeholders who may have an indirect relevance to the land management, and their operations may be affecting land management adversely;
- ii. Identification of the role of such stakeholders and providing guidelines to incorporate sustainable land management into their operational plans;

5.3. Policy recommendations to address Land degradation issues emerging from various land uses and land covers in the province by sector

SECTORAL POLICY MEASURES

As provided in their policies, laws and by virtue of the nature of job various sectors perform, the following policy measures are suggested.

5.3.1. Agriculture

- i. Development of agriculture crop based zoning for suitable crops leading toward sustainable land management.
- ii. Promote use of gypsum to minimize the sodicity
- iii. Promote green manuring as soil amendment for improving soil health and water holding capacity as well as low pressure of weeds in irrigated crop production system.
- iv. Biological treatment of soil with plantation of salt /sodic tolerant plants
- v. Promotion of cropping system/rotation of rice crop with low delta crops,
- vi. To address the issue of waterlogging, promote the planting of high water demanding trees in areas prone to waterlogging.
- vii. Improve water recharge capacity of the area through:
 - a. Promoting block plantations particularly on steep terrain to arrest rapid-runoff;
 - b. Proportioning agricultural land to plantations and promoting linear plantations on agricultural lands
 - c. Promoting deep rooted plant species with salt tolerant properties
- viii. Provide technical and financial support to the local communities to promote drip and other water-efficient irrigation systems in the area.
- ix. Establish appropriate agricultural infrastructure with aims to promote and facilitate SLM with integration to sustainable agriculture and livestock production.
- x. Promote and adopt leveled terracing in steep and moderate slope areas
- xi. Promotion of zero tillage practices for minimal disturbance and reduced erosion. This may also include promoting tree and fruit plants production instead of artificial /seasonal crops to minimize the soil tillage disturbance and erosion in barani areas.
- xii. Promote and adopt boundary formation of agricultural land with shrubs, trees, stones to protect exposure of land to erosion.
- xiii. Conduct disasters risk assessment, adopt disaster risk mitigation strategy and management practices in disaster prone areas.
- xiv. Promotion of low Delta crops selection for agriculture production.
- xv. Re-defining cropping pattern with the use of rain water and precision irrigation technology adoption.
- xvi. Promote micro catchment conservation technologies enabling maximum land cover.
- xvii. Promotion of land leveling for minimizing the adverse effect of run-off to maximum water conservation.
- xviii. Strengthening agricultural extension activities in the area to educate people on rational use of chemicals in agriculture and livestock sectors, on irrigation efficiencies, and barani area agriculture practices.

- xix. Development of fruit valleys in Barani areas like olive, grapes, dates valleys with subsidy on provision of efficient irrigation system and technologies through establishing market network in water scarce areas of Barani Land and Deserts. Also promote on-farm composting in nutrient poor areas.
- xx. Capacity building at all level for Introduction and institutionalization of the sustainable land management best practices and technologies at local level.
- xxi. Establish sustainable land management demonstration model villages /farms for zero distance communication of rural innovations and new technologies knowledge and skill dissemination.
- xxii. Establish incentives for adaptation of new technologies with subsidized provision of soil and water conservation inputs, tools and machinery.
- xxiii. Awareness about issues with land fragmentation and promotion of consolidation of land.
- xxiv. Fixation of limited to minimum land holding capacity i.e. <5 acres.
- xxv. Promotion of deep ploughing technologies on levelled land for water conservation.
- xxvi. Improvement of cropping patterns against traditional cropping patterns addressing climate resilience and sustainable land use management.
- xxvii. Establish mass media campaign for sustainable land management best practices and technologies.
- xxviii. Promotion of multi cropping based agriculture on small holding farm following permaculture principles.
- xxix. Promotion of transformative agriculture on cultivable lands by promoting commercial forestry and land conservation practices.
- xxx. Capacity building of institutions, communities and individual farmers on financial, knowledge, inputs availability, credits and activation of allied development
- xxxi. Introduction of one window smallholder farmers-centered microfinance credits facility through strengthening micro finance system at rural level for provision of low interest loan with insurance schemes as financial support for adaptation of sustainable agriculture and land management actions.
- xxxii. Promotion and capacity building through technical facilitation for plantation of wind breaks in desert areas prone to wind erosion.
- xxxiii. Promotion of cultivation of ground cover crops like pulses through providing storage and market facility.
- xxxiv. Strengthening local extension and water management on farm services in Introduction of new technologies for crops and commodities with climate smart agriculture for sustainable land management
- xxxv. Introduction and promotion of climate resilient crops and practices along with strengthen weather alert system.
- xxxvi. Promotion of indigenous techniques or organic matter use in porous soils to improve water holding capacity

- xxxvii. Capacity building of local service providers for promotion of laser land leveling technology and services
- xxxviii. Promotion of local services for sustainable crop intensification and diversification through farmer led on farm research initiatives enabling participatory farmer led research and extension for Climate Smart Land management practices for crops, fruits, trees, livestock, forestry and fishery to promote sustainable land management actions.

5.3.2. Livestock

- i. Conservation, selection and promotion of natural high yielding local breed compatible to local fodder resources and conditions enabling efficient use of fodder and feed.
- ii. Improvement of natural fodder sources and development of lands areas around canals and rivers as grazing lands.
- iii. Promotion of silage and hay making technologies for improving fodder nutrient contents.
- iv. Promotion of rain water harvesting technologies with capacity building of local communities and institutions for development of drinking water Reservoirs for livestock in desert areas of Thal and Cholistan lands.
- v. Development of local semen collection and distribution centre for quality breed selection and production by local communities for large and small ruminants.
- vi. Development of processing facilities in local areas with improved marketing channels/supply chain and easy access to credit facility.
- vii. Conservation of acclimatized breed according to agricultural climatic conditions instead of exotic breed
- viii. Provision of soft-interest free loan on personal guarantee for livestock production in Barani, Thal, Cholistan and Marginal areas on priority.
- ix. Introduction of fodder diversity by grasses, shrubs, trees, herbs with introduction of climate smart plants species like Moringa having highly nutritious value as fodder with adoptability on marginal lands etc.
- x. Capacity building of supply chain (production of meat and milk) actors including Processing of livestock production and value addition.
- xi. Conservation of grasses and their fodder varieties by adopting local community led grazing resources management and use system.
- xii. Introduction of area-specific integrated agro-pastoral systems with comprehensive packages developed jointly by livestock, rangeland, agriculture, wildlife, water and marketing experts.
- xiii. Develop research on climate smart agriculture and livestock sector, exploring impacts of climate change and land degradation on productivity of the two sectors, and ways these can be addressed and reduced.
- xiv. Development of good infrastructure for marginal lands regulation

- xv. Conservation of local breed and their improvement for sustainable livestock management.
- xvi. Development of livestock value chain support packages for rural poultry birds and fishery with microfinance and subsidy support.
- xvii. Promote local high pedigree & drought resistant varieties of livestock and poultry;
- xviii. Improve productivity of livestock through genetic breeding so less livestock count is required for production of the same amount of milk/meat
- xix. Research on climate change impacts on poultry and livestock diseases, prevention, transmission, cure and facilitate transfer of technology to farmers.
- xx. Increase direct link of corporate sector and livestock farmers helping the latter to move up the value chain
- xxi. Diversify incomes in the livestock sector by treating them as saleable asset, animal by-products as fuel, recognize their role in poverty reduction, resilience building, and increasing food security;
- xxii. Develop and promote best management practices for sustainable land use management in livestock sector
- xxiii. Promote public-private partnership in livestock sector for research, training, sustainable land management, climate resilient shelters, transportation etc.
- xxiv. Arrange livestock management training programmes for farmers, including women, especially during disasters
- xxv. Research to further improve bio-gas technology and develop biogas related projects;
- xxvi. Devise and implement management plans (heat wave, floods, and droughts) and quality control plans (animal by products dairy, meat, and leather etc.).

5.3.3. Local Government and Community Development Department

The department has its representation at grass-roots level into the communities and therefore must spearhead the following roles:

- i. The LG & CD department will act as a catalyst and repository of latest satellite images for which the department shall strengthen its capacity and that of the district governments to meaningfully and productively implement the rules for which it is mandated
- ii. The department shall carryout land classification/zonation of all lands in the province and prepares land use maps on village basis using GIS technology.
- iii. The department shall procure old satellite imageries (as older as possible) compatible with the latest imageries, and detect district- wise temporal trend in desertification and land degradation, land use change of all lands in the province.
- iv. Agriculture lands and peri-urban lands shall be strictly protected from transforming to other uses

- v. Zones for human settlements, commercial areas and industries shall be carved out in areas keeping in view the projected demand for future and areas having resilience against foreseeable natural disasters
- vi. Forest lands, rangelands, wetlands, watershed areas and wastelands having biodiversity potential shall be declared environmentally sensitive areas and detail maps prepared in consultation with other relevant sectors for which the provision of Pakistan Environmental Protection Agency, as they relate to I.E.E and E.I.A, and other relevant actions, shall be invoked
- vii. The department shall periodically update images data it and share it with relevant departments/agencies for their respective uses.
- viii. The department shall coordinate through district governments by providing the required data for the preparation of village land use plans by the relevant sectors

5.3.4. Punjab housing and town planning agency

- i. The agency shall frame parameters for suitability of land for housing societies inter alia ascertaining that the land is not under agriculture forest, rangelands, wetlands, protected areas.
- ii. The agency shall develop viable legislation and land-use planning ensure that fertile land is prioritized for agricultural use and discourage conversion of this land for town planning, nonagricultural purposes, and deforestation.
- iii. In inevitable circumstances that land as stated above may be brought under human settlement with the approval of Provincial Assembly by making amendments in the act(s).
- iv. Land used for defense housing societies shall also be covered under the relevant rules and criteria to ascertain their suitability for housing purposes.
- v. Human settlements, industrial areas should be on higher grounds with efficient outflow of rainwater and disposal of effluent.
- vi. Department shall earmark housing zones in both urban and rural areas keeping in view future demand
- vii. In order to satisfy growing demands for housing, the agency shall provide generous incentives for houses of 5 marlas and less in urban areas and 10 marlas and less in rural areas.
- viii. Similar incentives shall be available for investing in condominium construction by the builder and also for residents

5.3.5. Forest Department Punjab

- i. There is need to revisit Punjab forest policy 1999 and forest act 1927 to include directives of National forest Policy 2015 and regulatory back up for sustainable management of rangelands ecosystem, wildlife habitats, biodiversity areas, wastelands, wetlands and contemporary challenges confronting the province and international obligations related to different international obligations etc.

- ii. The department shall liaise with concerned communities/land owners to declare wastelands, as indicated in the satellite imageries, as "un-classed forest" under section 28-A of forest act 1927 and prepare land use/action plans for their rehabilitation through the mechanism of joint forest management. As provided in forest policy and section 28 of forest act, village forests shall be constituted under the mechanism of joint forest management.
- iii. In view of impending scarce water availability, forest department shall look for alternate management practices, market based approach, choice of species, joint forest management etc.
- iv. Farmers shall be provided incentives and guidance to integrate forestry in their farming system, particularly in rain-fed areas, as this could be major initiative to increase forest cover in the province.
- v. Integrated Forest Resource Management Plans shall be prepared by a multidisciplinary team undertaking full scale inventory of all floral and faunal species using modern tools and techniques. Forests that qualify for carbon financing shall be managed under REDD+ programme. Management of guzara forests shall be managed by the forest owners/ users under the prescription of management plan and overviewed by a multidisciplinary monitoring team.
- vi. Commercial forestry shall be promoted in order to provide raw material to wood-based industry in the province. Sustainable forest management is one of the core parts of REDD+ which shall be adhered to get benefits from the programme.
- vii. The current modality of raising roadside and canal side plantation on public land shall be reviewed to involve the adjoining land owners/farmers in nursery raising, plantation, maintenance and protection under agreed conditions of payment and sharing income arising out of lopping, thinning and final harvesting.
- viii. Habitats of wildlife species in different ecosystems shall be restored and/or maintained in consultation with wildlife department with credible and scientific evidence
- ix. Forest department shall carry out intensive survey with modern technology and create database with regard to biodiversity resources in all ecosystems and up-date it periodically to track trend over time for remedial measures.
- x. Forest policy prohibits de-reservation of forests which should be supported by law particularly biodiversity areas should be protected against human interference of any kind. Any de-reservation for unavoidable reason shall be subject to the approval of provincial assembly.
- xi. The Chos act shall be revitalized through a crash capacity building programme of forest staff from grass roots level to managerial level and other stakeholders for its application to address contemporary land and land resource degradation issues through an integrated management plan.
- xii. The chos act shall be extended to larger areas after consultation with land owners/users and rules/ procedures/by laws shall be made under the act to facilitate its genuine implementation to save lands from degradation.

- xiii. Lands under the possession of armed forces shall be managed by forest department for plantation, pastures under certain terms and conditions to protect land form degradation and put it to gainful use.
- xiv. Sweeping legal, institutional and planning/decision making reforms shall be introduced at all levels to promote good forest governance.
- xv. To address energy problem of the forest and range-dependent communities, environment friendly (solar, wind, micro hydro-power) energy sources shall be explored and provided.

5.3.6. Biodiversity and Protected Areas management

Loss of habitat due to a number of environmental and ecological trespasses, there is every need to bring large tracts of suitable land under protected areas in order to protect land form degradation and to conserve biodiversity. The balance between protecting species and meeting human needs is very delicate that only sustainable management can take stock of. Given the diverse landscape of the Punjab there is enormous potential to spatially expanded existing protected areas by sensitizing the adjoining/land owner communities and offer them incentives that should be more than what is accrued from the current land use. This will be a huge step towards increasing protected area coverage to 17% as internationally agreed.

The following measures shall be taken.

- i. Biodiversity ecosystem/protected areas not falling in any forest category shall be declared as "environmentally sensitive areas" under relevant rules in consultation with all stakeholder under relevant law particularly Punjab Environmental Protection Act.
- ii. Guidance shall be obtained from draft National Biodiversity and Action Plan(2015) as for as it relates to Punjab with due collaboration of all stakeholders. This comprehensive document is enough to cover all dimensions of biodiversity/protected areas
- iii. Integrated Protected Area Management plans shall be prepared or updated by a multidisciplinary team according to the objectives of the area with due consideration to enhance the potential of land cover and biodiversity, recovery of species and conserve rain water. There must be elaborate planning for ecotourism of the area with the objectives of recreation and education.
- iv. Invasive plant species shall be managed as for as their role in protecting land from degradation is concerned but kept under check to contain their proliferation.
- v. Biodiversity/forest ecosystem service arrangements shall be integrated with other market-based approaches such as water markets from community managed rainwater harvesting reservoirs
- vi. Integrated plans shall include strategy, where feasible, with regard to linking contiguous areas falling across two or more districts as nature reserves/ protected areas covering a number of ecosystems/habitats that may also act as research and recreational areas and long term "land bank" for future use with public-private partnership.

- vii. The Salt range eco-region comprising of a number of reserve forests and wetland complex shall be managed as protected area with effective means and with the participation of resident communities giving them incentive like consolidation of scattered housings and providing better infrastructure and civic amenities.
- viii. Chinji National Park shall be extended as far as feasible after composite dialogue with local owners/user community and obtaining their prior informed consent by a multidisciplinary team having negotiation expertise to bring the surrounding large tract of lands under effective management. Communities will be involved in planning and management with explicit rights and benefits accruing out of the system.
- ix. Inter-provincial spread of protected areas shall be explored by extending Kala Chittareserve forest/ game reserve of Attock to Nizampur game reserve in Naushehra Khushab. Ecological corridor(s) shall be provided over the Indus River to link the two areas for nature and biodiversity conservation and provide recreational, educational and research facilities with B.O.T approach.
- x. Base on the satellite imageries and intrinsic potential, more protected areas shall be constituted in consultation of the owners' community to bring more area under formal management.

5.3.7. Wetland Ecosystem Management

The wetlands are faced with "slow death" as they vanish with a rate hardly noticeable with general observation over years. The lessons learnt from the Pakistan Wetlands Programme fits well within development goals by aiming to promote equitable sharing of natural resources, securing rights-of-access, especially for poor communities, diversifying livelihoods, improving the income earning potential of stakeholder communities and creating incentives for sustainable wetlands management. Scientific management can switch flood from bane to boon in properly selected areas for creating new wetlands.

- i. Detail maps of wetlands of the province shall be prepared based on the latest satellite imageries to be procured by the LG &CD department and identify primary stakeholders with their respective roles and responsibilities.
- ii. A joint comprehensive socio-economic, physical and biodiversity resource survey shall be undertaken of all wetland areas to establish a benchmark to help in planning and future assessment
- iii. A robust capacity building programme shall be conducted for all stakeholders
- iv. Joint management plans shall be prepared for all wetlands ecosystems focusing on the conservation of biodiversity and maintaining a minimum level of stored water or flowing water with adequate green peripheral area to protect the wetlands from all kinds of pollution. Natural waterways leading to the wetlands shall be kept in pristine condition with suitable interventions.
- v. Low cost environment friendly tourist and recreational facilities shall be developed

5.3.8. Cholistan Development Authority (CDA)

- i. The act of 1976 needs to be revisited as the circumstance have changed since then and should incorporate the contemporary requirements insofar they relate to combating land degradation and desertification. Similarly rules/by laws need to be

made under the act to translate/facilitate its application with close collaboration of stakeholders.

- ii. Possibility shall be explored to bring suitable tracts under protected area management
- iii. The integrated plans shall be prepared and implemented by undertaking measures as provided for each land use i.e. agriculture/horticulture, rangelands ecosystem, wildlife areas, forests, settlements, rain water harvesting reservoirs, infrastructure etc.
- iv. Rules shall be made to check human settlements and other activities detrimental to agricultural land and other natural resources
- v. Farmers and herders shall be provided incentives to help them out of poverty trap and successfully implement the plans.

5.3.9. Rangelands ecosystem management

- i. Punjab forest policy 1999 need to be revised along with Punjab Forest Act to provide due emphasis on rangeland ecosystem management as part of livelihood for millions of rangeland dependent people, ecological and environmental safeguards and fulfill international obligations,
- ii. A comprehensive GIS based map of all rangelands shall be prepared showing existing land cover by floral species and divided into blocks based on certain physical and social characteristics, vegetation types and carrying capacity
- iii. There shall be intimate coordination between forest department and livestock department while other sectors shall be called for where needed.
- iv. A detail survey of each rangeland ecosystem shall be carried out and based on the comprehensive data, integrated management plans shall be prepared in consultation with stakeholders keeping in view the unpredictable climatic conditions and other extraneous factors.
- v. Suitable areas within rangelands shall be planted with fodder tree species to provide feed to livestock in lean season. To produce planting stock of suitable species, women-operated tree nurseries shall be established.
- vi. Management plans shall have a separate chapter with regard to protection, propagation, collection, post-harvest treatment and marketing of plants of ethno-pharmaco-botanical values to sustain livelihood of herders and to conserve and develop biodiversity by establishing seed bank. The activities shall be undertaken by women community who will be entitled to returns.
- vii. Rangelands shall also be managed giving due consideration to local wildlife by regulating hunting and making conditions for natural breeding of the faunal species.
- viii. The user community shall have to organize inoperative/associations under certain mechanism with clear roles, responsibilities and rights to utilize the rangeland according to the prescription of the management plan.
- ix. Improve livestock feeding by increasing the quality and quantity of pastures and rangelands, providing nutritious and economic feedstock, safe drinking water, and livestock feed enrichment techniques

- x. Establish incentives to facilitate and promote production of ground cover grasses at community level for maximum land cover.
- xi. Minimize livestock impact on vegetation and crops in view of climate change and degraded land projected stresses with suitable grazing systems introduced in various grazing zones of the province;
- xii. Rangeland rehabilitation and improvement by reseeding with nutritious palatable varieties of native grasses, and fodder trees or bushes
- xiii. Private sector investment shall be encouraged to invest in the identification, collection, processing and marketing of various products, particularly medicinal plants, through collaboration with public sector and community organizations by investing in the whole chain of the enterprise development including the value addition of rangeland products.
- xiv. The government shall provide suitable incentive for marketing of fresh pure dairy products to have premium in the market after due verification, linked with private marketing sector to collect products from the point of origin etc.
- xv. Conversion of rangelands to other uses shall be strictly prohibited once mapped and declared as such. In case of exigency and emergent circumstances land use change shall be subject to approval by the Punjab Assembly with regard to amendment in act(s)

5.3.10. Agriculture and Irrigation Department

- i. The Agriculture department including Agriculture Extension, Adoptive Research and OFWM shall promote sustainable efficient irrigation tools and technology among the farmers with specialized trainings, subsidized technology packages and technical services through linkages development and establishment of public and private partnership.
- ii. The On Farm Water Management department shall encourage and incentivize the use of renewable energy and low carbon emitting technologies on farms and agricultural land especially renewable energy tube wells and biogas for slurry as nitrogen source and fertilization of land.
- iii. The department shall establish incentives to facilitate construction of small dams and reservoirs at farm level to strengthen water conservation for agriculture and livestock.
- iv. The department shall consider re-allocation and re-scheduling of irrigation water as per the the cropping system requirement and availability of quality of water.
- v. The department shall establish incentives for development, promotion and adoption of precision irrigation technologies especially drip irrigation and sprinkler irrigation with water harvesting techniques and tools.
- vi. Irrigation department shall identify through satellite imageries and ground truthing potential surface and ground water resources with reasonable assessment in coordination of PCRWR

- vii. The department shall construct community multi-purpose rainwater harvesting reservoirs as demanded by the community or any department/organization and carry out other works in the catchment areas in coordination with other partners.
- viii. The department shall assist other partners in prohibiting clearing or breaking up of any land in the catchment area of any stream as provided under section 17 of the act.
- ix. Irrigation department shall promote flooding of good quality canal irrigation water for leaching of salts for sodic soils management.
- x. The Department shall support in construction of dams for supply of good quality water in the greater canal network of the province especially in the irrigated plains
- xi. The department shall develop drains system in water logged areas for pumping of excess water to drain water
- xii. The department shall establish land use zones to prevent settlements expansion and encroachment to productive agricultural lands, and impose ban on demarcation and ban on conversion of land to other land uses;
- xiii. The department shall develop land holding mechanism to stabilize the increasing fragmentation and smallholding phenomena of land.

Annexure-1: List of ongoing and Completed projects on irrigation and agriculture in Punjab.

5.3.11. Environmental Protection Agency (EPA)

- i. EPA shall make rules under the act to check land use change and protect surface and underground water resources
- ii. It shall be mandatory to conduct full scale E.I.A for establishing housing colonies, societies, townships and commercial areas, industrial units with regard to land use under various section of the act.
- iii. EPA shall not issue N.O.C to any entity with regard to establishing housing colonies, societies irrespective of their size/level, on lands that are under agriculture, forests, rangelands, waterways or areas that have potential to be used for the mentioned purposes
- iv. Mineral exploration, road infrastructure shall be subject to full scale Environmental and Social Impact Assessment allowed on agriculture, forest, rangeland, protected areas and biodiversity areas shall be conducted where alternate arrangements are available irrespective of cost.
- v. Local government may invoke the provision of EP act and EIA where land use is taking place or suspected to take place for individual or family use.

6. MAINSTREAMING OF INTEGRATED SUSTAINABLE LAND MANAGEMENT

Policy by itself is of no avail until it draws legal support. Similarly there are a number of pre-requisites to effectively frame, implement and mainstream policy. A number of policies have doomed to failure as there was no enabling environment for their internalization. A number of steps have to be taken in logical sequence before launching a policy for its implementation else the resources spent on action plans will go down the drain.

The policy covers vast expanses of land, heterogeneous societies, diverse knowledge and experiences but having a common objective of sustainable land management. This policy document is geared towards addressing the social, economic, institutional and political drivers that are threatening integrity of land, human rights and to drive a transformation to rights-based, justice-oriented development that benefits both for people and the environment. Therefore the policy will have the following vital components when it comes to implementation.

6.1. Remote sensing/Satellite imageries

For viable land use planning it is imperative to collect credible current land use information. Remote sensing technology is the most efficient and best option on economic grounds as well. Recent advances in satellite monitoring have enabled a quantum leap in planning and of course supported by the people on the ground. Similarly land managers on ground no longer go arbitrarily to places, but instead know from the satellite imageries where to look for the sites of interest.

1. Using evidence based satellite images and appropriate technologies, zones for different land uses shall be defined on a given criteria for the whole province and for each district (as district government shall be the implementing organ of land utilization in most cases). Centralized database shall be maintained, updated shared by LG & CD department to avoid repetition of same work by other sectors.
2. Zones so identified for particular use or any use found most suitable for; shall be notified under relevant law to be used and managed as such and no use change allowed ordinarily.
3. Standard Operating Procedure framed for all sectors to honour the integrity of land and land-based resources in pursuit of their departmental goals.

6.2. Community participation

The role of concerned community is lynchpin for sustainable conservation and development. Since policy measures are targeted towards the welfare of the people, they can offer best options based on their local knowledge and their life-time experience. Organized community also stands high chance to muster the support of politicians which is of critical importance for the successful implementation of a policy. With continuous capacity building and interaction with different agencies, the community may gather enough strength and develop capacity to make implementation much easier and productive.

1. Local NGO need to be involved to organize the community in an all-inclusive fashion and that forum should be available to all sectors that may need the participation of the community.

2. Women have an immense role relating to natural resources, therefore, they shall have to be given due role in decision making which should be socially/ culturally acceptable.

6.3. Sectoral coordination

There are a number of government departments that utilize land, water and land-based resources in one way or the other but are more interested in increased production rather keeping the production base i.e. land intact and in healthy condition. Sometimes sectoral interests are conflicting with one another that put land users in state of confusion. This divergence creates an atmosphere in which the disharmony gap increases among sectors and the directed actions towards land and water conservations are lost.

1. As part of stakeholders' analysis, government departments and other informal organizations should be identified and their current and potential role established with respect to planning and management. This should be officially notified and made part of the integrated management plan.
2. In order to achieve the common objective of conserving and keeping the soil and land in healthy state, all the relevant sectors have to be educated and trained to bring behavioral change and inculcate the spirit of coordinated approach with respect to different land uses.
3. Collaboration of stakeholders for identification, planning, implementation and M&E of action plans shall be mandatory in appropriate manner.

6.4. Capacity building and mass awareness programs

This area is a woefully neglected as a targeted programme rendering a sector unaware of the potential dynamics that could bring a number of healthy social, economic and environmental outcomes and efficiency and effectiveness in achieving the goals. Continuous capacity building and awareness raising of all stakeholders through appropriate measures need to be internalized in all sectors as a permanent feature. Media owners have the social responsibility as corporate to air/print news, talk shows and features much more frequently to inform and motivate general public to wisely utilize the land and water resources they depend upon.

1. Provincial government should prepare strategy for print and electronic media to play its role as corporate social responsibility to adequately present programmes and features with respect to the importance of sustainable land uses and highlight the responsibility of general public to avoid land degradation and water misuse.
2. Relevant sectors should launch aggressive programmes to build the capacity of at all tiers from field workers to managers by capitalizing on the available approaches/techniques for mass awareness.
3. There shall be an elaborate interactive integrated capacity building programme highlighting all technical, socio-economical, legal & institutional, environmental dimensions of land degradation.

6.5. Research and training

Ongoing research unfolds hidden aspects that sometime bring paradigm shift in planning and management. So planning is also a dynamic process that responds to new findings and constantly improves. Planners and managers also need exploration of new areas through research. It is highly important that the exiting public sector research institutes/ organizations should be strengthened with regard to expertise and equipment to undertake complex research. Universities undertaking research studies must coordinate with relevant research institute and sector to make the findings more credible. University students will also get first hand training who will become the future researchers

1. Continuous tripartite research (sector, research institute, university) should be undertaken on the addressing the issues/ problems faced by the planners and managers on ground or identified by other stakeholders.
2. Research gaps shall be identified during implementation that may lead to successive research studies bringing more clarity to the advantage of planners and managers.
3. Demonstration plots should be established to display the results of the research more effectively and convincingly.
4. Result oriented multidisciplinary research shall be conducted to improve strategies, action plans, procedures and provide guidance to policy makers. Public sector capacity building

6.6. Institutional and legal framework

There need to be a dedicated provincial institution that will take cognizance of matters relating to land use change and land degradation issues. Oversight of the planning and management activities of all sectors, implementation of the harmonized directives of sectoral policy as well as this policy and relevant rules should be the responsibility of the umbrella institution. There shall be strict auditing with regard to the implementation of international conventions by the sectors and reporting. Possibility need to be explored for having a single composite legal framework to implement the directives of this as well as sectoral policies to avoid conflicting legal provisions and approaches.

1. Reforms shall be brought in Land Acquisition Act to make the process of land acquisition easier, less time consuming on one hand and devising a mechanism of incentivizing land owners and/or benefit sharing from the sustainable management of such land on the other hand.
2. Existing sectoral policies and laws shall be reviewed with respect to their efficacy towards sustainable land management and adjustments made accordingly by removing anomalies.

6.7. Monitoring

Absence of monitoring is another weak area that puts the sectors/systems in state of inertia as there is no formal and regular reporting mechanism with regard to implementation of policy and plans. Periodic internal monitoring should be an ongoing process to keep track of the achievements of goals within a given time frame. An exhaustive check list with key indicators needs to be framed by a multidisciplinary team to enable sector to obtain up-to-date information with respect to the interventions aimed at the health and effectiveness of land cover resources, water, soil and land in general.

1. An integrated check list should be prepared with verifiable indicators and applied in order to collect information on the performance of policy, rules, strategies and programmes.
2. Monitoring should be carried out by multi-disciplinary team periodically and results reported to the umbrella institution that may commission an independent monitoring for further verification.

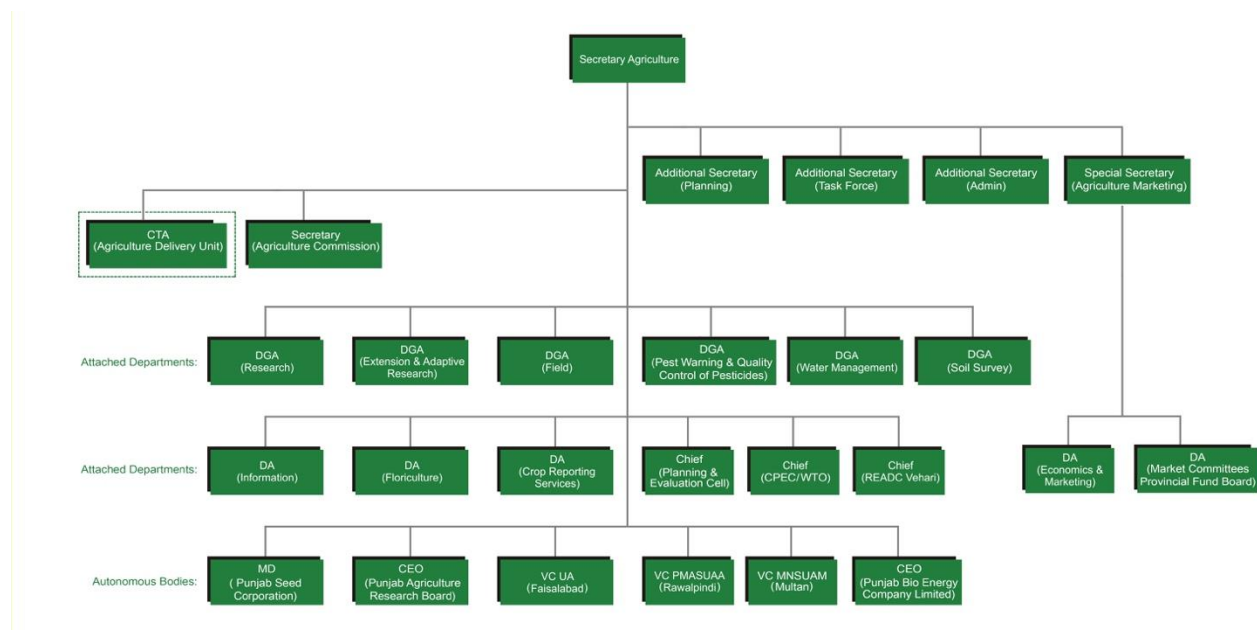
7. IMPLEMENTATION, MONITORING AND EVALUATION STRATEGY

The document is a "land guide" falling across a number of sectors and thus faced with as many hurdles but conversely could get multiple support if integrated approach is applied. Geographic scope of the policy is the entire province covering areas with diverse ecosystems and varied land uses. The policy has therefore to be implemented on district scale where climatic and land use characteristics are more homogenous.

7.1. Institutional mechanism

There are a number of government departments that somehow deal with land-based resources the way they are mandated. There is no institutional home in the government that could coordinate the efforts of all sectors relating to sustainable management of land and water.

In Punjab, the Agriculture department headed by Secretary Agriculture consist of 6 sub-departments like Agriculture Extension, Agriculture Research, Adoptive Research, Pest Warning & Quality Control of Pesticides, On Farm Water Management and Soil Survey are headed by Director Generals., Irrigation Fig. Administrative structure of Agriculture Department of Punjab province.



Livestock department of Punjab Province comprises two directorates of generals i) Livestock Extension and ii) Livestock Research headed by Secretary Livestock and Dairy Development Board.

Forest, Wildlife and Fishery Department headed by Secretary has different management setups headed by Director Generals while Forest Department has Chief Conservative Forest under the command of Secretary Forest, Wildlife and Fishery.

7.2. Financial

Financial allocations are sector-based that meet only the sectoral goals. Depending upon the scale of interventions, budgetary allocations need to be made accordingly to a given sector. Thematic allocations, for example, allocation for land conservation, biodiversity and natural resource conservation, water conservation have to be integrated into overall development planning.

7.3. Desertification Control/Land Management Authority

Provincial government is committed to establish an independent Desertification Control Cell to prudently address the challenges associated with dwindling land and water resources. There is also recommendation to create Desertification Control Authority with larger mandate. There is no second opinion that the cell/ authority shall be strong enough and have vast powers within a framework of land management to make the sectors to comply with their policies/rules.

Local Government and Community Development department has strong mandate to make land use classification and preparing plans for peri-urban areas by using GIS technology. Moreover it has district level representation through local governments. The department shall take a lead role and maintain a data base. GIS labs established by line departments/organizations must coordinate with the authority before issuing sectoral reports. This will also obviate anomaly in reporting different figures that are cause of confusion and make planning lop-sided.

7.4. The Steering Committee

Desertification Control Steering/ Coordination Committee (DCSC) has already been notified which is to be headed by Chairman P&DD to integrate initiatives for sustainable land management spread over a number of sectors and entire land mass of the province. Following shall be the composition of DCSC.

Chairman, P&D Board	(Chairman)
Secretary, LG&CD Department	(Member)
Secretary, Irrigation & Power Department	(Member)
Secretary Housing department	(Member)
Secretary Finance department	(Member)
Secretary Agriculture and Livestock department	(Member)
Secretary, Forest, Wildlife and Fisheries Department	(Member)
Senior Member Board of Revenue	(Member)
DG Environmental Protection Agency	(Member)
DG/Chief Desertification Control	(Member)
P&D Department	(Secretary)

Terms of References of the Committee:

The committee shall meet biannually:

- To ascertain that relevant sectors have robust policy directives and legal cover to address land and water issues in integrated fashion

- To oversee that policy directives and legal orders are implemented by respective sectors according to some agreed framework of ISLM and to issue directives on the monitoring reports
- To provide overall strategic guidelines for harmonizing working of concerned sectors and make decisions accordingly
- To ascertain that work plans are prepared and approved according to the policy/rules and ensure budget allocation for each activity
- To act as a catalyst for the overall coordination of Public & Private stakeholders, implementing partners, district government, NGOs, etc.
- To arrange local and multi donor and global financial resources, overview building capacity of the sectoral actors and support general awareness programme
- To confirm that action plans are according to the policy and address international agreements
- To critically examine rebate/ incentives/ subsidies and other strategies offered by a sector to ensure that it does not run oblique to the objectives of other sector and does not lead to land degradation and water depletion.
- To make case for placing the ISLM on the agenda of Provincial Assembly for constituting a standing committee on the subject to create political stakes on a very important life issue
- To assess the robustness of the sectoral policies and legal instruments before sending them to the approval forum
- To incorporate/integrate ISLM in the overall development planning and poverty reduction strategy of the province
- To evaluate Payment for Environmental Services(PES) mechanism for incorporation in ISLM strategy where relevant
- To analyze and address trans-boundary issues and approve interprovincial reserve/ protected areas plans/projects
- To co-opt other sectors/ organization and seek investment opportunities by the private sector and issue directives as deem fit for carrying out the objectives of this policy

7.5. Secretariat of the steering committee

The steering committee shall be assisted by a full time secretariat that will coordinate the disjoint efforts of different sectors towards the common goal of ISLM. It shall prepare working paper according to the ToR of SCDC. The secretariat shall comprise of the representatives of different sectors as identified by the SCDC and notified for a suitable period.

7.6. Legal coverage

Some of the sectors have policies but devoid of legal support. In some cases acts exist but in the absence of rules, procedures and bye-laws, the acts cannot be effectively applied. In some instances there is lack of implementation and enforcement mechanism. This are serious shortcomings and render any policy toothless. It is therefore imperative to

reconcile existing sectoral laws to accommodate the principles of ISLM or consider separate enactment for implementation of this policy with directed rules and procedures.

7.7. Review of the ISLM Policy

The policy shall come under review each time the DCSC meets and shall issue such orders for adjustment or revision. Each sector shall also review the effectiveness of its own policy/laws and suggest improvement for approval by the DCSC.

Annexure -1: List of ongoing and completed projects by Agriculture and

Irrigation departments in Punjab.

Key initiatives by Punjab Government addressing Sustainable land Management directly or indirectly.

Ongoing Projects

1- Punjab Government to lease 99,077 acres of land for afforestation and rangeland management

Pakistan witnessing one of the highest rates of deforestation, it was imperative to promote commercial forestry, so that the nationwide wood-based demand could be met sustainably and pressure on natural forests is reduced.' Keeping in view the situation, under the umbrella of Punjab Forest Act and Public Private Partnership (PPP) Act 2014. 'A total of 99,077 acres of land in the form of 187 forest lots of various sizes in Bahawalpur, Rahim Yar Khan, Rajanpur, Muzaffargarh and D.G. Khan are being offered to the investors for 15 years on lease, so that commercial forestry and range management activities can be done. The government has set 15% reserve price of the total produce for afforestation and Rs. 2000 for rangelands and the investor offering the highest bid to the government will secure the bid' told Awais Khan.

http://spfc.org.pk/press_releases/news-31-07-17.php

2- Punjab Irrigated-Agriculture Productivity Improvement Project

The Punjab Irrigated Agriculture Productivity Improvement Project (PIPIP) has been designed to maximize productivity of available water by adopting a complete On Farm Water Management (OFWM) technological package for minimizing water losses at various levels of tertiary conveyance network and improving its application efficiency at the farm level. The PIPIP foresees an integrated development approach, envisages upgrading/developing unimproved and partially improved watercourses/irrigation schemes, promotion of high efficiency water conserving technologies like sprinkler/drip irrigation systems, LASER land leveling, capacity building of all stakeholders, and undertaking action research for acquisition, indigenization and pilot testing of improved water management interventions to suit the local conditions. The project has been sponsored by Government of the Punjab and World Bank through Agriculture Department and is to be implemented in six (06) years (2011-12 to 2016-17) throughout Punjab.

3- Rainwater Management in Cotton Fields to Minimize Impacts of Climate Change (Pilot Project)

The key development objective of the project is to safeguard the cotton crop from negative impacts of excessive rainfalls vis-à-vis climate change to optimize its productivity.

4- Punjab Irrigated-Agriculture Productivity Improvement Project - Revised (PIPIP-Revised)

The overall project development objective (PDO) is to improve water productivity i.e. producing more crop per drop. It will be achieved through increasing delivery efficiency, adopting improved irrigation practices, promoting crop diversification, and effective application of non-water inputs. The PDO would contribute to increased agricultural production, more employment opportunities in rural areas,

higher incomes from the farming, better living standards of the farmers, and improved environment.

Key Components

- a. Installation of drip and sprinkler irrigation systems on **120,000** acres
- b. Provision of **5,000** LASER units to farmers/service providers
- c. Improvement of **6,100** unimproved canal area watercourses
- d. Completion of **4,000** partially improved watercourses
- e. Rehabilitation of **3,400** irrigation schemes outside canal commands
- f. Adoption and Promotion of Modern Irrigation Technologies, Training, Capacity Building, Processing, Marketing and Value Chain Development

5- Promotion of High Value Agriculture through Provision of Climate Smart Technology Package

Promotion of High Value Agriculture through Provision of Climate Smart Technology Package" under Chief Minister's Kissan Package envisages provision of Solar System for water supply at 20,000 Acres of land with mandatory condition of High Efficiency Irrigation System and installation of Solar System on 3,000 acres where Tunnel will be installed along with High Efficiency Irrigation System

6- Optimizing Watercourse Conveyance Efficiency Through Enhancing Lining Length

ADP funded project "Optimizing Watercourse Conveyance Efficiency through Enhancing Lining Length" envisages extension in lining length of 3,000 watercourses upto 50 percent. Its key objective is to enhance conveyance efficiency which in turn would result in saving of water and improvement in water productivity at the farm level.

7- Provision of LASER Land Levellers to Farmers/Service Providers on Subsidized Cost

Government is providing LASER Land Levelling units to the farmers/service providers on subsidized rates through short listed Firms on turn key basis. The main goal of the project is to maximize productivity of irrigation water at the farm level i.e. producing more crop per drop through optimal use of water and non-water inputs.

8- Punjab - Land Records Management and Information Systems

The objective of the Punjab Land Records Management and Information Systems Project is to create a secure, reliable, efficient, accountable and equitable system of management of land records. Such a system is expected to increase title security and reduce transaction costs.

Completed Projects by Punjab government

The first "On Farm Water Management Project" was launched during October 1976 as a five-year pilot program with assistance of United States Assistance for International

Development (USAID). On Farm Water Management has completed 47 projects. Major objectives of these projects were to increase overall irrigation efficiency through increasing delivery efficiency, adopting improved irrigation practices, promoting crop diversification, improve land utilization, increase more land under cultivation, effective application of non-water inputs, improvement of community watercourses, precision land leveling of farmers' fields, and adoption of advanced irrigation agronomic techniques. The detail of these projects is described below:

1. Up-Gradation of Water Management Training Institute
2. Water Management Spatial Database System
3. Greater Thal Canal Command Area Development Project Phase-I
4. Punjab Irrigated-Agriculture Productivity Improvement Project (PIPIP) (Pilot Phase)
5. Pilot Testing of Solar Water Pumps
6. Pilot Project for Promotion of Cotton Cultivation in Thal Region with Drip Irrigation
7. Water Conservation and Productivity Enhancement through High Efficiency (Pressurized) Irrigation Systems (The Punjab Component)
8. National Project to Stimulate the Adaptation of Permanent Raised Bed for Maize, Wheat & Cotton Wheat Farming System in Pakistan. (Punjab Component)
9. National Program for Improvement of Watercourses in Pakistan (The Punjab Component)
10. Strengthening of LASER Land Leveling Services in Punjab
11. Watercourse Improvement (District Government)
12. Accelerated Improvement of Watercourses
13. OFWM Component of Crop Maximization Program
14. Barani Village Development Program Rawalpindi Division (BVDP)
15. Improvement of Turbine Tube well and Kaha Sultan Watercourses in Dera Ghazi Khan and Rajanpur Districts
16. D.G. Khan Rural Development Program (DGKRDP)
17. Drought Emergency Recovery Program (DERA)
18. Khushal Pakistan Program (PUNJABP)
19. OFWM Component of Chashma Right Bank Project (CRBCIP) (ADB Assisted)
20. OFWM Component of Bahawalpur Rural Development Project (BRDP) (ADB Assisted)
21. OFWM Component of National Drainage Program (NDP) (IDA/OECF/ADB Assisted)
22. OFWM Component of Punjab Private Sector Groundwater Development Project (IDA/ World Bank Assisted)
23. Third Punjab OFWM Project D.G. Khan & Bahawalpur (ADB Assisted)
24. Fordwah Eastern Sadiqia South Drainage Project

25. OFWM-III (Japan Assisted)
26. OFWM Second SCARP Transition Project Sheikupura (World Bank Assisted)
27. Second Barani Area Development Project Rawalpindi (ADB Assisted)
28. Strengthening of Training Program under OFWM Project (World Bank Assisted)
29. OFWM-III Project (World Bank Assisted)
30. OFWM Private Tube well Development Project D.G. Khan (World Bank Assisted)
31. Second OFWM Project DG Khan (ADB Assisted)
32. Command Area Development, FatehPur Lift Irrigation Scheme, District Khushab
33. OFWM SCARP Khushab Project(ADB Assisted)
34. Construction of Watercourses in PirowaliNankana Sahib, District Sheikhpura
35. Provision of Laser Land Leveling Equipment Entire Punjab
36. OFWM Gujranwala Project (ADB Assisted)
37. Command Water Management Project (OFWM Component U.S. AID/ IDA Assisted)
38. Demonstration and Training in Water Lifting Devices
39. SCARP Transition Pilot Project, Khan KaDogran (IDA Assisted)
40. OFWM-IV Drainage Project (World Bank Assisted)
41. Thal OFWM Project (ADB Assisted)
42. OFWM-II (World Bank Assisted)
43. OFWM-I (World Bank Assisted)
44. Watercourse Improvement in Sheikhpura (U.K. Grant)
45. OFWM, Bahawalpur & R.Y. Khan (Local Funded)
46. OFWM Scrap-VI Project R.Y. Khan (IDA Assisted)
47. Pilot OFWM (USAID Assisted)