

Sailaba and Khushkaba Farming Systems of Balochistan – Policy Support for Changing Land Use and to Avoid Infrastructure Damages Caused by Flash Floods

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1. Agriculture Sector of Balochistan

1.1. Contribution of Agriculture to GDP

Agriculture sector comprising of crops, livestock, fisheries and forestry sub-sectors is the dominant economic sector in the province and accounts for about 30% of the provincial GDP and employees around 65% of the work force fully or on part-time basis (Figure 1).

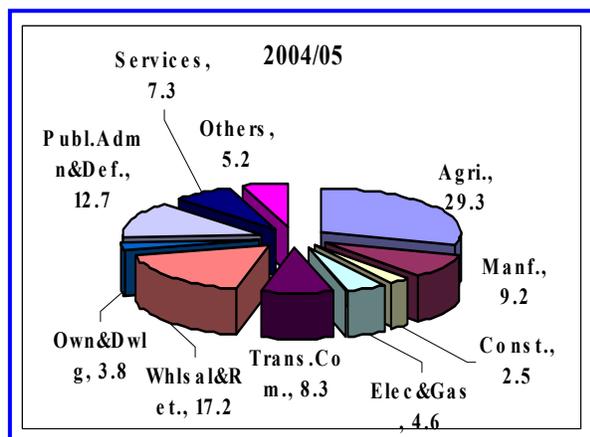


Figure 1. Sectoral contribution to GDP in percent

Out of the overall contribution of agriculture to the provincial GDP of around 30 % during 2004-05, share of crop sub-sector is 60.9%¹ (Table 1). The contributing sub-sectors are: major crops 24%; minor crops 36.5%; livestock 35.9%, fisheries 2.4% and forestry 0.70. In the absence of an industrial base in the province the major sources of livelihood are agriculture and livestock.

Livestock sub-sector generates sizeable employment for the rural population but the production systems are still of subsistence nature except some commercialization of the dairy and poultry sub-

sectors. Consequent to rapid urbanization and per capita income, the demand for livestock products is on the increase.

Table 1. Contribution of sub-sectors of agriculture to GDP during 1990-2005²

Year	Major Crops	Minor Crops	Live stock	Fisheries	Forestry
90-91	18.2	44.7	31.0	3.4	2.7
91-92	22.8	40.4	31.7	3.8	1.3
92-93	24.7	39.4	30.4	4.5	1.0
93-94	25.7	36.0	32.0	4.3	2.1
94-95	23.6	40.8	30.8	3.7	1.1
95-96	25.7	44.9	25.4	3.3	0.8
96-97	23.3	41.6	30.8	3.2	1.2
97-98	27.6	32.8	35.7	3.1	0.9
98-99	25.3	30.0	41.0	3.0	0.7
99-00	18.2	30.5	47.1	2.9	1.2
00-01	22.1	35.6	37.4	3.3	1.6
01-02	21.0	35.5	38.8	3.1	1.6
02-03	25.2	31.8	38.0	3.33	1.6
03-04	27.2	32.7	36.0	3.0	1.1
04-05	24.4	36.5	35.9	2.4	0.7

1.2. Agro-ecological Zones of Balochistan

Six agro-ecological zones are characterized for the province of Balochistan (Figure 2):

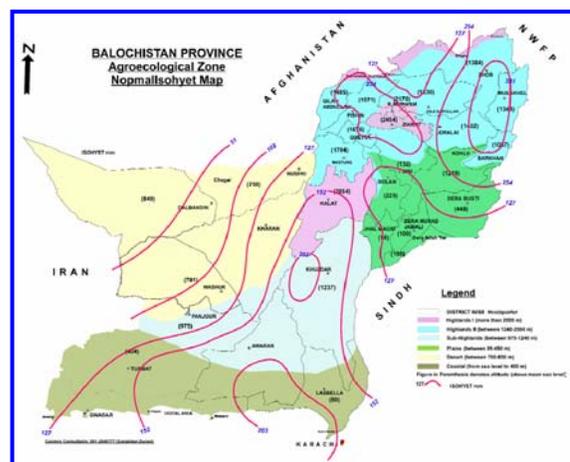


Figure 2. Agro-ecological zones of Balochistan

The agro-ecological zones are described as:

- **Highlands-I:** comprise districts Ziarat and Kallat having an altitude of > 2000 m above mean sea level.

¹ Average of past 15 years including the declining trend in the agricultural GDP due to prolonged drought during the past decade.

² World Bank Mission Estimates. 2006. Joint Mission of World Bank and Asian Development Bank on “Balochistan Economic Report”.

- **Highlands-II:** comprise districts Quetta, Killa Abdullah, Musa Khel, Barkhan, Qilla Saifullah, Pishin, Loralai, Zhob and Mastung having an altitude of 1200–2000m above mean sea level.
- **Sub-Highlands:** mainly include districts Khuzdar and Kohlu having an altitude of 900–1200m above mean sea level.
- **Deserts:** comprise districts Chagai, Dalbandin, Noshki, Panjgur, Awaran and Kharan having an altitude of 700–900m above mean sea level.
- **Plains:** comprise districts Jhal Magsi, Naseerabad, Jafarabad, Bolan, Sibi and Dera Bugti having an altitude of 100–400m above the mean sea level.
- **Coastal Zone:** comprises districts Gwadar, Turbat and Lasbella having climate of mild to warm in winter and very hot in summer.

1.3. Current Land Use

Geographical area of the province is 34.72 million ha. Out of this cultivated area is 1.93 million ha, representing only 5.6% of the geographical area, which is lowest compared to other provinces. The irrigated area of the province is 1.28 million ha, representing 66% of the cultivated area. This leaves around 0.65 million ha for *Sailaba* and *Khushkaba* farming. The culturable waste of 4.0 million ha is the potential area for further development of *Sailaba* and *Khushkaba* farming in the province (Table 2).

Table 2. Land use of Balochistan 2005-06

Land Use System	Area (million ha)
Geographical Area	34.72
Forest Area	1.36
Culturable Waste	4.0
Cultivated Area	1.93
Irrigated Area	1.28
Sailaba and Khushkaba	0.65

2. Sailaba and Khushkaba Farming

2.1. Definitions

Sailaba farming systems are entirely dependent on Spate irrigation. Non-perennial Spate irrigation is dependent on floodwater generated from the hill torrents, whereas perennial Spate irrigation is dependent on spring water generated from the groundwater resources (Figures 3 to 5).

Khushkaba farming systems are largely dependent on incident rainfall and localized runoff generated from adjacent slopes. Khushkaba systems are less reliable compared to Sailaba systems and are having

low cropping intensities. However, the current *Khushkaba* area is larger than *Sailaba*. If water harvesting techniques are employed, very large area can be developed for *Khushkaba* farming (Figure 6).



Figure 3. Non-perennial Spate Irrigation system in Barkhan, Balochistan



Figure 4. A well established non-perennial Spate Irrigation System in NWFP.



Figure 5. Regulation and control structure for non-perennial Spate irrigation system (PARC)



Figure 6. *Khushkaba* Farming System in Musa Khel district of Balochistan.

2.2. Land Use Systems

The perennial *Sailaba* (spring Rod-Kohi) area is around 89437 ha, which is about 32% of total *Sailaba* area in the province during 2000-01 (274318 ha). Around 40% of this area is owned by farmers having farm size of more than 10 ha (Tables 3 and 4).

The non-perennial *Sailaba* area is around 172,482 ha, representing 63% of the total *Sailaba* area. Around 49% of this area is owned by farmers having farm size of more than 10 ha (Tables 3 and 4).

The non-perennial *Sailaba* area under Tank Bandat is around 12,399 ha, representing 5% of the total *Sailaba* area. Around 54% of this area is owned by farmers having farm size of more than 10 ha (Tables 3 and 4).

Table 3. Distribution of *Sailaba* area in relation to Farm Size in Balochistan 2000-01.

Farm Size (hectares)	Area (ha)		
	Spring Rod-Kohi	Sailaba	Tank Bandat
<0.5	1374	37	82
0.50-1.0	3471	1397	242
1.0-2.0	6224	3072	575
2.0-3.0	8637	5356	1264
3.0-5.0	17922	24898	2075
5.0-10.0	15867	52956	1520
10.0-20.0	13045	32383	2550
20.0-40.0	11770	19582	790
40.0-60.0	3635	5891	130
>60.0	7491	26912	3174
Total	89437	172482	12399
>5.0	51808	137724	8164
>10.0	35941	84768	6644

The Year 2000-01 was a worst drought year and thus area reported under that year was extremely under-

reported. The potential *Sailaba* area in a normal year is thus higher than the reported data.

Table 4. Percent Distribution of *Sailaba* area in relation to Farm Size in Balochistan 2000-01.

Farm Size	Percent of Total Area under Each Category		
	Spring Rod-Kohi	Sailaba	Tank Bandat
<0.5	1.5	0.02	0.7
0.50-1.0	3.9	0.8	1.9
1.0-2.0	7.0	1.8	4.6
2.0-3.0	9.7	3.1	10.2
3.0-5.0	20.0	14.4	16.7
5.0-10.0	17.7	30.7	12.3
10.0-20.0	14.6	18.8	20.6
20.0-40.0	13.2	11.36	6.4
40.0-60.0	4.0	3.42	1.0
>60.0	8.4	15.6	25.6
Total	100	100	100
>5.0	57.9	79.8	65.9
>10.0	40.2	49.1	53.6

The *Khushkaba* area reported during 2000-01 was 342,074 ha. The potential *Khushkaba* area in a normal year is thus higher than the reported data (Table 5).

Around 63% area of *Khushkaba* farming system is owned by farmers having farm size of more than 10 ha. Thus landholdings of *Khushkaba* farmers are larger than the *Sailaba* farmers.

Table 5. Distribution of *Khushkaba* area in relation to Farm Size in Balochistan 2000-01.

Farm Size (hectares)	Khushkaba Area	
	(ha)	(%)
<0.5	658	0.2
0.50-1.0	3885	1.1
1.0-2.0	10160	3.0
2.0-3.0	17210	5.0
3.0-5.0	38398	11.2
5.0-10.0	57484	16.8
10.0-20.0	65581	19.2
20.0-40.0	52502	15.3
40.0-60.0	21026	6.2
>60.0	75169	22.0
Total	342074	100.0
>5.0	271762	79.5
>10.0	214278	62.7

The *Sailaba* and *Khushkaba* farming systems are traditional systems and mainly of subsistence nature due to uncertainty associated with the system. Livestock is an integral part of these systems. Crop production is primarily based on Spate irrigation for *Sailaba* and localized runoff and incident precipitation for *Khushkaba* systems. Thus spatial and temporal

variability in cropped area is high due to variability in precipitation, runoff and floodwater. Cropping intensity is usually low and around 70 and 30% under *Sailaba* and *Khushkaba* farming systems, respectively.

2.3. Land Use Systems and Agro-ecological Zones

The *Sailaba* area characterization indicated that largest area of 36% lies in Plains followed by Highlands-II (20%), Sub-highlands (18%), Deserts (11%) and Coastal (10%). The perennial *Sailaba* systems are largely located in Highlands and Sub-highlands (Table 6).

Table 6. *Sailaba* and *Khushkaba* area of Agro-ecological Zones and districts of Balochistan

Agro-ecological zones	Districts	Area (ha)	
		Sailaba	Khushkaba
Highlands I (>2000m)	Ziarat	671.4	115.7
	Kalat	10509.1	23129.8
	Total	11180.5	23245.5
Highlands II (1200-2000m)	Quetta	15.4	1530.9
	Killa Abdullah	38.1	22226.6
	Musa Khel	228.6	4160.9
	Barkhan	2495.3	9393.0
	Killa Saifullah	7047.1	9265.1
	Pishin	1901.6	12090.2
	Loralai	13250	39503.5
	Zhob	8378.5	5783.3
	Total	49337.4	121094.0
Sub Highlands (900-1200m)	Khuzdar	43192.1	34769.1
	Awaran	2289.3	2926.6
	Total	45481.4	37695.7
Deserts (700-900m)	Chagai	681.9	27322.2
	Dalbandin		
	Noshki		
	Panjgur	4398.4	5745.6
	Kharan	22447.9	18722.4
	Total	27528.2	51790.2
Plains (100-400m)	Sibi	20885.8	8577.6
	Kohlu	4318.7	9818.3
	Jhal Magsi	41707.2	13432.5
	Nasserabad	510.30	8842.2
	Total	90023.6	64785.8
Coastal (<400m)	Gawadar	44.5	380.8
	Turbat	5493.1	35470.9
	Lasbella	18791.6	7798.2
	Total	24329.2	43649.9

The *Khushkaba* area characterization indicated that highest area of 35% lies in Highlands-II followed by Plains (19%), Deserts (15%), Coastal (13%) and Sub-

highlands (11%). The *Khushkaba* systems are largely located in Highlands and Sub-highlands (Table 6).

2.4. Crops and Cropping Pattern

Crops cultivated under *Sailaba* and *Khushkaba* farming systems are categorized as: i) Rabi (winter season) crops; and b) Kharif (summer season) crops. Rabi crops include wheat, barley, rape and mustard, fodder, chickpea, vegetables, cumin and lentils, whereas Kharif crops include sorghum, maize, millets, beans (mong, mash and moth), fodders and melons. From 1985–2002, there was a decline in the share of Rabi and Kharif crops in the *Sailaba* and *Khushkaba* area compared to the total cultivated area of the province. However, the situation was worst during 2001-02 when the area of Rabi and Kharif crops under these systems was skewed the most and it can be contributed to the drought. The cropping patterns did not change over the last 20 years, however, chickpea and castor seed disappeared during this period.

The yields of crops under both the *Sailaba* and *Khushkaba* systems are function of availability of floodwater, runoff and precipitation. Thus yields are higher in a wet year from that of the dry year. Yields of crops under *Sailaba* systems are normally higher from that of the *Khushkaba* systems.

Cropping patterns of *Sailaba* farming systems in various ecological zones are:

- **Highlands-I:** Fallow-Wheat/Cumin/Barley
- **Highlands-II:** Beans/Sorghum-Wheat/Barley
- **Sub-Highlands:** Beans/Sorghum-Wheat /Barley
- **Plains:** Mashbeans-Wheat/Rapeseed
- **Coastal zone:** Sorghum-Wheat/Barley.

Cropping patterns of *Khushkaba* farming systems are:

- **Highlands-I:** Melons-Wheat/Cumin/Barley
- **Highlands-II:** Beans/Sorghum-Wheat/Barley
- **Sub-Highlands:** Sorghum/Mash beans–Wheat/Barley
- **Plains:** Mashbeans-Wheat/Rapeseed
- **Coastal Zone:** Mungbeans/Sorghum–Wheat/Rapeseed.

2.5. Livestock

Major livestock sources are buffaloes, cattle, sheep and goats and their population was 0.16, 1.34, 10.84

and 9.37 millions, respectively (Livestock Census 1996). Nutrition is a serious limiting factor for sustainable and economical livestock production. Feed sources are generally range biomass, crop residues, stubbles, orchard leaves and fallen fruits. Cultivated fodders, grains, oilseed cake and bran are fed particularly to lactating animals. Livestock production systems are nomadic, transhumant and sedentary. In 1996, total stockwater requirement of livestock in Balochistan was 136.33 million m³.

Maximum population of sheep and goats was present in a flock size of less than 20 animals in all zones except Sub-Highlands, where it was significantly higher in flock size of upto 100 animals. Majority of farmers were having joint flocks of sheep and goats. Farmers in most of the zones are having cattle of less than 5 heads. Seventy-five percent of the farmers were practicing sedentary production system under *Sailaba and Khushkaba* farming.

2.6. Water Management

More than 80% of farmers in *Sailaba and Khushkaba* farming systems practiced water harvesting, management and conservation throughout the province. Majority of the farmers are involved in the development and management of Spate irrigation and runoff farming systems. Over 90% farmers do not have the facility for supplemental irrigation in all the zones except in the Sub-highlands.

2.7. Plantations

Currently, farmers are not involved in plantations of fruit and forest plants. Fruit plants like almonds, pistachio, pomegranate and pear can be grown in Highlands and Sub-highlands, whereas ber, falsa and fig can be grown in deserts, plains and coastal areas. In addition, to fruit plants, plantations are most promising for producing bio-diesel, fuelwood and forages using plantations of acacia sp., prosopis sp., Jetrofa, Sukh Chain, Castor, etc. Plantations would also add sustainability in *Sailaba and Khushkaba* farming systems, as these plants can extract water from deeper depths and can survive in drought years and they are also tolerant to ponding of excess water during the flood periods. Therefore, these plantations can survive in the both the extreme conditions of floods and droughts and would reduce the chances of out-migration, especially during the drought periods.

2.8. Problems Restricting Changes in land Use

Problems and constraints restricting changes in land use patterns in *Sailaba and Khushkaba* farming systems are:

- in-sufficient and erratic rains
- lack of appropriate diversion structures
- un-improved water conveyance and application system not responding effectively to both the high- and low-flow regimes
- lack of effective water users' associations for resolving conflicts related to water distribution
- lack of documentation of water entitlements and regulations for equitable distribution of water in *Sailaba* Systems
- lack of conjunctive management of incident rainfall and runoff
- lack of land leveling equipment, water use technologies and precision planting machines
- lack of adequate stockwater facility
- inadequate research and development support in water and agriculture sectors
- shortage of trained human resources.

Since, risks involved in managing floodwater and runoff especially during the periods of droughts and floods are the primary factors restricting changes in land use patterns of Sailaba and Khushkaba farming systems, therefore, the top most priority has to be assigned for schemes related to water harnessing, management and conservation in Spate irrigation and runoff farming systems of Balochistan.

2.9. Livelihood Patterns

Maximum annual income was earned by farmers of Sub-highlands followed by Coastal zone, Highlands-I, Plains and Highlands-II. Major share of income earned by farmers was from crops in most of the zones except Highlands-II and Plains, where off-farm income was maximum. Income from livestock ranked 3rd and it was in the range of 10–20% of their total income. However, this income scenario reflects situation of post-drought, where livestock sources were adversely affected.

3. Promising Land Use Patterns

Promising land use patterns of *Sailaba* farming systems are:

- **Highlands-I:** Crops-Livestock-Plantations with cropping pattern of Melons-Wheat/Cumin/Barley; sheep in livestock; deciduous fruit plants; plantations for fuelwood and forages.
- **Highlands-II:** Crops-Livestock-Plantations with cropping pattern of Beans/Sorghum-Wheat/Barley; sheep in livestock; fruit plants like almonds, pistachio, fig, olive, etc.; plantations for fuelwood and forages.
- **Sub-Highlands:** Crops-Livestock-Plantations with cropping pattern of Beans/Sorghum-Wheat/Barley; fruit plants like almonds, wild grapes, olives, fig, and pomegranate; sheep and goat in Livestock; plantations for fuelwood and forages.
- **Plains:** Crops-Livestock-Plantations with cropping pattern of Mashbeans-Wheat/Rapeseed; goat in livestock, fruit plants like ber, fig, falsa, etc.; plantations for bio-diesel, fuelwood and forages.
- **Coastal Zone:** Crops-Livestock-Plantations with cropping pattern of Mungbeans/Sorghum-Wheat; goat in livestock; fruit plants like ber, fig, falsa, etc.; plantations for bio-diesel, fuelwood and forages.

Promising land use patterns of *Khushkaba* farming systems are:

- **Highlands-I:** Crops-Livestock-Plantations with cropping patterns of Melons-Wheat/Cumin/Barley; sheep in livestock, fruit plants; plantations for fuelwood and forages.
- **Highlands-II:** Crops-Livestock-Plantations with cropping pattern of Beans/Sorghum-Wheat/Barley; sheep in livestock; fruit plants like almonds, pistachio, fig, olive, etc.; plantations for fuelwood and forages.
- **Sub-Highlands:** – Crops-Livestock-Plantations with cropping patterns of Sorghum/Mash – Wheat/Barley; sheep and goat in livestock; fruit plants like almonds, figs, olives, wild grapes, pomegranate, etc.; plantations for fuelwood and forages.
- **Plains:** Crops-Livestock-Plantations with cropping pattern of Mashbeans-Wheat/Rapeseed; goat in livestock; fruit plants; plantations for bio-diesel, fuelwood and forages.
- **Coastal Zone:** Crops-Livestock-Plantations with cropping patterns Mungbeans/Sorghum–Wheat/Rapeseed; fruit plants like figs, etc.; plantations for bio-diesel, fuelwood and forages.

4. Implications for Changing Land Use Patterns

Changing land use patterns in *Sailaba* and *Khushkaba* farming systems is not only based on the scientific and technical reasons rather it is largely based on policy reforms, farmers' preferences, market demand and traditional norms of the rural society including the subsistence farming approach prevailing with the smallholders. The implications for changing land use patterns of *Sailaba* and *Khushkaba* farming systems of Balochistan are:

- **Policy Support:** implementation of policy issues and reforms already highlighted in the IWRM Policy of Balochistan, which was approved by the Cabinet on March 9th 2006;
- **Additional Policy Reforms:** additional policy reforms are needed for changing land use patterns;
- **Technological and Research Support;** support needed to develop technologies and processes to improve current land use and water productivity;
- **Development and Extension Support;** support needed to disseminate technologies and processes which improve land use and water productivity at the farm level;
- **Incentives;** incentives are needed to motivate farmers to have a shift from tubewell irrigated agriculture to *Sailaba* and *Khushkaba* farming.

4.1. Policy Support

Importance of *Sailaba* and *Khushkaba* farming systems can be realized from the fact that these systems contribute at least one-third of the total cultivated area of the province, even in a dry year. The current cultivable waste is around 4.0 million ha, which if developed for *Sailaba* and *Khushkaba* farming, can triple the current cultivated area of the province. Thus, there is a huge potential for further development of *Sailaba* and *Khushkaba* farming systems, which were neglected in the past.

Currently, there is not any development program financed by the federal or the provincial government for the development and management of *Sailaba* and *Khushkaba* farming systems in the province. The government is providing routine extension services coupled with provision of bulldozers and tractors for construction of bunds and rough leveling of land. Consequently, these systems have faced deterioration as two-third of the floodwater of *Sailaba* is still

unutilized, which is almost equal to the size of the storage of Tarbela dam.

The rains in the last week of June 2007 resulted in serious floods and damages to the infrastructure in the province - which was severely affected by drought and recently witnessed extreme floods after almost a decade of drought. The dams were almost at the maximum conservation level and excess water spilled over the small dams and the Mirani dam. The damages to the infrastructure (roads, buildings, irrigation structures, etc.), loss of human life and livestock, damages to agricultural lands and crops although still have to be assessed but these would be in the order of billions of rupees.

The IWRM Policy of Balochistan has already emphasized the development and management of Sailaba farming systems by developing network of Spate irrigation through sustainable diversion and spreading of floodwater. The situation of recent disaster in Balochistan reinforces the IWRM Policy for according high priority for Spate irrigation and runoff farming for Sailaba and Khushkaba systems.

The policy reforms suggested in the IWRM Policy Balochistan need immediate implementation prior to the introduction of any promising land use patterns in the *Sailaba* and *Khushkaba* systems. The policy reforms are reproduced as under:

Policy Reforms for Sailaba Systems

- **Ensure development of Spate Irrigation with active participation of water users to have improvements in existing systems rather than introducing traditional surface irrigation schemes.**
- **Encourage Water Users' Associations to implement small-scale Spate irrigation schemes instead of contractors. Contractors may be employed only for larger schemes, where Water Users' Associations are not having the desired capacity.**
- **Ensure development of multi-purpose small dams for storage of floodwater and diversion of stored water for Spate irrigation. Also encourage water users for the storage of excess water in wet years, so that they can use it for supplemental irrigation during the dry years.**

Policy Reform for Khushkaba Systems

- **Promote Khushkaba systems as an integral part of the basin plans and the rural communities should not be left due to the associated risks, because they also qualify on the front of poverty reduction.**

4.2. Additional Policy Reforms Needed

The additional policy reforms are needed to address two basic questions: a) further development of Spate irrigation for Sailaba farming and runoff management for Khushkaba systems must be addressed in the context of employment generation and groundwater recharge; b) supporting land use changes through introducing integrated land use systems (crops, livestock, fruit/forest plants, etc.). The additional policy reforms for Sailaba and Khushkaba systems are:

Additional Policy Reforms for Sailaba

- **Ensure sustainable development in Balochistan through managing floodwater which causes serious damages to the infrastructure.** The only available resource for future development in the province is the floodwater, which has to be harnessed for development of Spate irrigation and farming and to reduce the hazards infrastructure damages.
- **Adopt integrated land use approach while developing Sailaba and Khushkaba farming systems in the province.**
- **Formulate policy and strategy for the introduction of plantations in Sailaba and Khushkaba for production of oilseeds suitable for conversion to bio-diesel.** The National Renewable Energy Policy recently approved by the federal government assigned higher priority for bio-diesel through production of plants like Castor Oil, Jetrofa, etc. Implementation of this policy would also add sustainability to these farming systems especially during the drought periods, because these plants can extract water from deeper depths, whereas during the wet years the plantations would help to intercept the incident rainfall resulting in reducing the flood peaks.
- **Delineate high potential areas where reliability of floodwater is relatively higher and local farming community shall be motivated to introduce plantations for bio-diesel.** These plantations

would not only provide bio-diesel but at the same time would provide fuelwood, which is extremely short in the province.

- **Encourage the private sector to establish industry for production of bio-diesel and provide buy-back arrangement to the farming community.**
- **Encourage private sector to establish fattening and processing industry for sheep and goat to produce premium quality mutton and lamb in the province for local consumption and for export purposes.** Sailaba and Khushkaba farming community can provide 3-6 months old sheep and goats for fattening, which can be raised by the farmers on the rangelands at fairly low cost of production.

4.3. Research Support

The current research activities in the province are largely focused for canal and tubewell irrigated agriculture. AZRC is the federal institution dealing with research related to Khushkaba farming. They have recently started work on Sailaba farming systems at their integrated research sites in collaboration with ICARDA. Research support is needed for Sailaba and Khushkaba farming systems considering the ecological, climatic, water and topographic conditions prevailing in the province.

The policy reforms needed for research support are:

- **Focus research programmes of provincial and federal research institutions located in Balochistan in the operating systems of Sailaba and Khushkaba farming to address issues related to water harnessing, management and conservation and water productivity.**
- **Ensure that the crop breeding programmes must address the issues of drought tolerance by transferring character of deep rooting in the cultivars of promising crops**
- **Encourage mass propagation of drought tolerant true-to-type plants of almonds, pistachio, pomegranate, fig, olives and other species using techniques of tissue culture and vegetative propagation.** These plants are water efficient having very high water productivity.
- **Encourage private sector to take over the role of providing quality inputs to the farmers, whereas the public-sector provide the regulatory framework, quality control and technical backstopping.**

4.4. Development/Extension Support

The policy support needed for the development and extension is:

- **Encourage separation of extension cadre within the district governments to address issues of Sailaba and Khushkaba farming.**
- **Encourage private sector to provide quality inputs through a system of Agri Malls developed in the Punjab province.**
- **Encourage private sector to provide buy-back arrangement for the procurement of pulses and oilseeds, which are going to be the promising crops for Sailaba and Khushkaba farming systems.**

4.5. Incentives

Incentives are needed for the farming community and for the private sector to initiate sustainable development of Sailaba and Khushkaba farming systems:

- **Provide incentives to the private sector to facilitate the farming community for the development of Sailaba and Khushkaba farming systems through establishment of industry and buy-back arrangement to the farmers for bio-diesel plantations, pulses, oilseeds, almonds, pistachios, olives, etc.**
- **Introduce and fund public-sector programmes for the development of Spate irrigation for Sailaba and runoff farming for Khushkaba systems with storage of excess water for the drought periods and recharge to the groundwater.**
- **Encourage private sector to establish fattening and processing units for production of prime mutton for local consumption and for export purposes.**
- **Encourage Sailaba, Khushkaba and range farmers to provide 3-6 months old sheep and goats to the fattening industry through a buy-back arrangement.**
- **Provide policy incentives with an objective to support the poorest-of-the-poor living in the Sailaba and Khushkaba ecologies of the province.** These farming communities qualify from the standpoint of poverty reduction.

5. Way Forward

Assigning right priority to Sailaba and Khushkaba farming in Balochistan through effective policy reforms would lead towards generating employment, which is one of the basic issues faced by the provincial government. The management of floodwater and runoff would not only develop Spate irrigation and runoff farming systems but also save infrastructure, which is badly affected by the recent rains and floods in the province. The province has the capacity to provide pulses, edible oil and bio-diesel for the country, as there is a potential for development of additional 4 million ha in the province.

The way forward is the right policy for floodwater and runoff development and management and defocus the current policy of providing huge subsidy to agricultural tubewells (Rs. 8 billion per annum by the federal and provincial governments), which resulted in wasteful use of scarce groundwater resources in the province (only 4% of the total resource) and consuming around 81% of the energy resources by a fraction of the population.

Important thing to note is that energy resources are also scarce in the country and policy is needed to address the both as there is a strong nexus between the two. An American NGO “Alliance for Energy Saving” has invented a word “Watergy”, which addresses the issue of energy in water use. **Balochistan needs a policy which addresses “Watergy” in both agriculture and domestic sub-sectors of water use.**

The Policy Briefings relate to Series of Issues, which are being prepared and circulated to the policy and decision makers in the province of Balochistan and in other provinces of the Country with an objective to synthesize and disseminate the studies outputs under the TA-4560 (PAK) and to address new and emerging areas related to all sub-sectors of water use in Pakistan, in general, and in Balochistan, in specific.

The Policy Briefings are also based on the research work done by other national and international institutions with an objective to get benefit of the work done elsewhere.

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Reference: Ahmad, S. and A.G. Khan. 2007. Sailaba and Khushkaba Farming Systems of Balochistan – Policy Support for Changing Land Use and to Avoid Infrastructure Damages Caused by Flash Floods. Vol. (3), No. (10), TA-4560 (PAK), Quetta, Pakistan.

The topic to be addressed in the next Issue of Policy Briefings is “Water Productivity and Economic Efficiency of Tubewell Irrigated Farms in Balochistan – Issues and Policy Reforms”. The topic includes: a) Background; b) Characterizing the Tubewell Irrigated Farming System; c) Energy and Irrigation Efficiency; d) Water Productivity; e) Economic Efficiency; ;f) Study Conclusions; g) Issues; h) Policy Reforms; and i) Way Forward.