Government of Pakistan

PAK-SCMS BULLETIN

PAKISTAN: SATELLITE BASED CROP MONITORING SYSTEM

SUPARCO

Volume II, Issue 8 1-August-2012

Prelude:

SUPARCO, the National Space Agency of Pakistan, has developed algorithms, techniques and procedures for fast track release of reliable and reproducible information on agriculture. FAO, UN is contributing in improvement of this bulletin through provision of technical advice. The other organizations collaborating in this endeavor are:

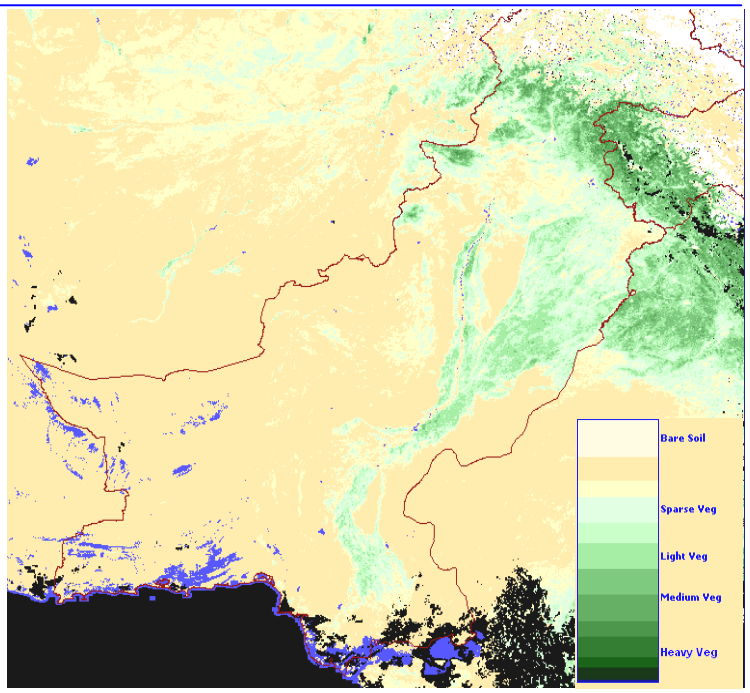
- Pakistan Meteorological Department (PMD)
- Provincial Crop Reporting Services (CRS)
- National Fertilizer Development Center (NFDC) and
- Indus River System Authority (IRSA).

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Crop Situation: July, 2012

The satellite vegetation (VGT) images of Pakistan for July 2012 exhibit a rising trend in NDVI values after touching the baseline during mid May to mid June in the aftermath of harvest of wheat, spring maize, sunflower and tobacco crops. This phenomenon is indicative of the emerging growth of Kharif crops as sugarcane, cotton, fodders, vegetables, rice, maize and others. The sugarcane crop is at an advanced stage of growth. Most of the cotton sowing was completed between February to end June. The area under cotton crop worked by medium resolution satellite data is estimated at 3.3 million ha. The early sown cotton crop is at boll opening / picking stage. Some ginning factories have already become operational. The cotton crop is generally free of any major attack of insects, pests or diseases especially the curl virus at this stage.



Normalized Difference Vegetation Index (NDVI) 31st July, 2012

The Cot look A Index price of cotton was 83.45 cents per lb on 30th July 2012. The cotton price last year on this date was 115.30 cents per lb. The New York Cotton future Market price on this date for contract of October 2012 was 70.73 Cents per lb and for December contracts was 71.45 cents per lb. The prices on corresponding date last year were 102.81 cents per lb and 102.57 cents per lb respectively.

The domestic phutti (seed cotton) prices during July 2010 were around Rs. 3500-4000 per 40 kg. These prices fell to a level of Rs 2000 to Rs 2500 per 40 kg during June 2011. During current year the price of seed cotton in Sindh was Rs 2600-2625 per 40 kg. In Punjab, the rates were at Rs 2700-2750. Prices continued to decline on the cotton market as phutti arrivals fostered. The prices are likely to fall further during September-October when bulk supplies trade in the market.

The sowing of coarse rice was almost completed in Punjab and is still ongoing in Sindh as water supply is constrained. The sowing of basmati rice is ongoing in Punjab. The sowing of maize crop started in June in KP, AJK, GB and in July in Punjab and has been mostly completed.

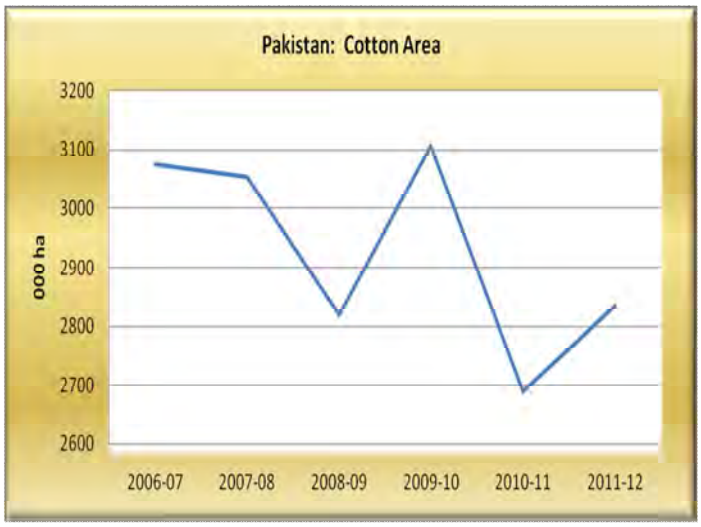
The situation of fertilizer manufacturing is constrained by short supply of gas. The fertilizer supply situation was generally normal and better than last year. The irrigation water supplies as per information from IRSA were generally short during April to July period during 2012 compared to corresponding period of last year. The shortfall in surface water supplies was 20 percent in Punjab, 15 percent in Sindh and 8 percent in Baluchistan. The situation in KP was normal. This situation is exacerbated by breaches in canals in Sindh. Three of them have been reported so far during the Kharif season. A virtually drought like monsoon situation prevailed up to end July with scanty rainfall. The satellite images over Pakistan for last decadal of July 2012, therefore display a comparatively impoverished vegetation situation almost all over Pakistan as compared to the last year.

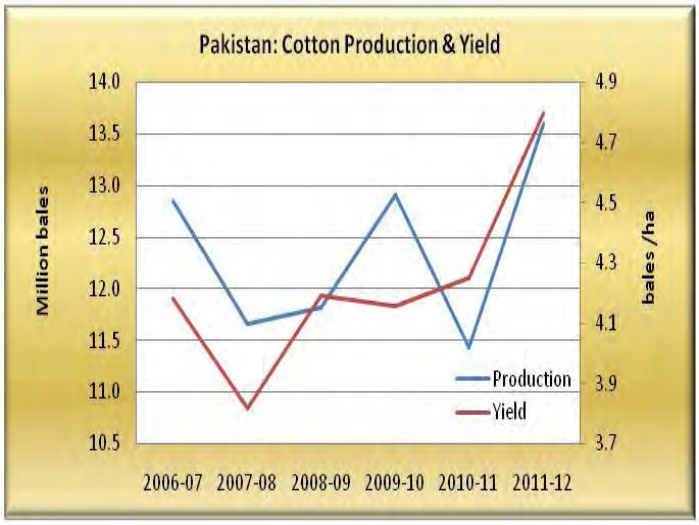
Kharif Crops 2012-13

The perceptible features of Kharif season 2012 include (a) a cold regime extending into early Kharif season (b) slow down in glacier melts, reducing surface water supplies in the Indus River basin (c) delayed harvest of wheat crop affecting sowing of cotton and other crops and (d) nearly drought like situation of monsoon season up to end July.

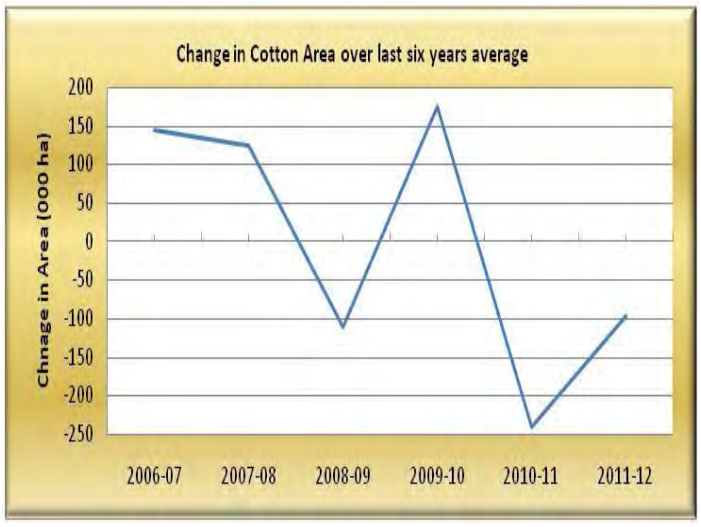
Cotton Crop

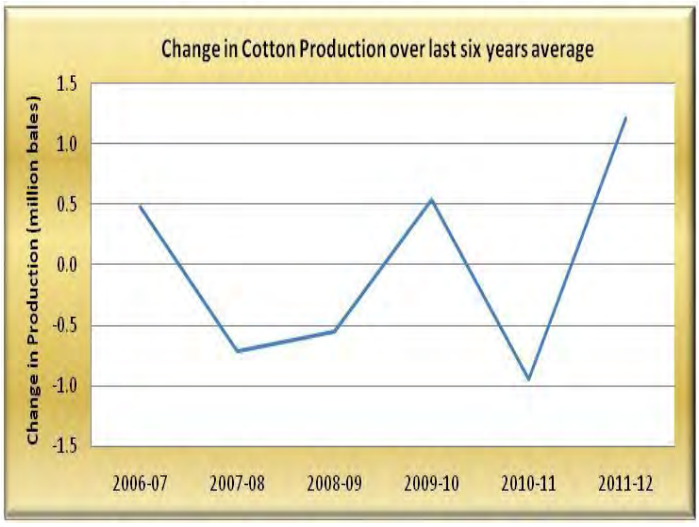
The cotton area has shown variability over years depending upon (a) fluctuations in prices of seed cotton (b) intensity of pests and diseases especially cotton leaf curl virus and (c) situation of floods and rains. The statistics of cotton crop during the years 2006-07 to 2010-11 is presented in the attached graphs.





The average area under the crop, during the above period was 2.9 million ha, yield at 718 kg/ha and the production was 12.4 million bales. The deviations from the average during this period ranged between ± 0.2 million ha, yield ±96 kg/ha and production ± 1.2 million bales. The graphic presentation of these variations is as follows.





During the current Kharif season, the early sowing of cotton crop started in February both in Punjab and Sindh. The constraint in sowing of cotton was low levels of surface irrigation water supplies. The sowing of the crop has been completed and the cotton is estimated at 3.19 million hectare, using MODIS 250 m resolution satellite data. The area under cotton is undersized than the sown area of the last year. The reasons for this in addition to rundown supplies of surface irrigation water include (a) low returns from the crop as prices of phutti during 2011-12 dropped to about one half from last year (b) the likely probability of flood risk in Sindh (c) shy framers in the presence of a monsoon forecast at 15 percent plus over the norm (d) Some substitution of cotton area by sugarcane crop in Sindh.

In Punjab, the Cotton Leaf Curl Virus (CLCuV) for over long periods of time remained a major threat to cotton crop in Punjab. The areas around Chichawatni, Burewala, Vehari, Khanewal, Lodhran, Multan, Muzaffargarh and Bahawalpur have remained highly vulnerable to the disease for over two decades. Punjab has lost cotton crop of about 1 to 2 million bales annually. During last two decades, at an average annual loss of 1.5 million bales and at current factor price of Rs. 2500 per 40 kg, the value of the loss works to be at about Rs. 955 billion.

During current year, the crop is generally in good condition and is normally free from pest attack above threshold level. The studies carried out by the Pest Scouting and warning department Punjab indicate an insect level as follows:

Month/Year	week	White Fly	Jassid	Boll worms			Army worm	Cotton Leaf Curl Virus
				Spotted	Pink	American		
July 2012	I st	12.52	3.2	0	0	0	0.44	6.6
July 2011	I st	12.87	3.6	0	0	0	3.04	5.52

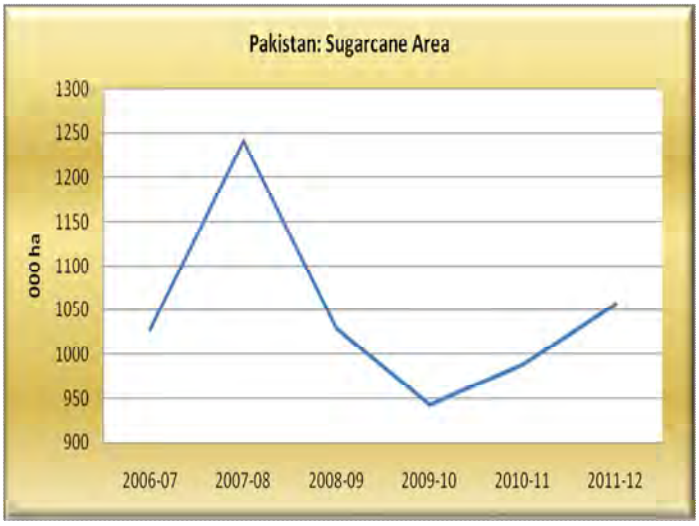
Source: Directorate General of Pest Warning & Quality Control of Pesticides Punjab, Lahore.

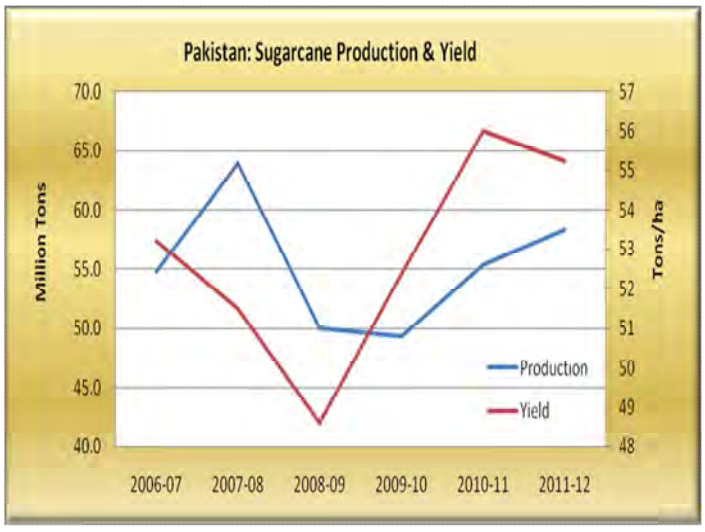
The prospects of crop seems to be bright despite a decrease in area. The gross crop statistics based on hyper temporal, SPOT VGT data are as follows:

Province	Area	Yield	Production million bales	Production million bales
	000 ha	Kg/ha	Bales of 170 KG	Bales of 150 KG
Punjab	2390.5	711	10.0	11.3
Sindh	801.6	845	4.0	4.5
Total	**3192.1**	**904**	**14.0**	**15.8**

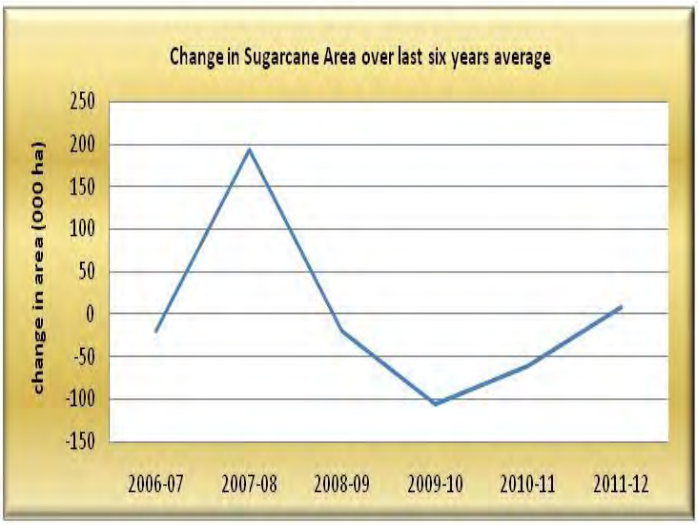
Sugarcane Crop

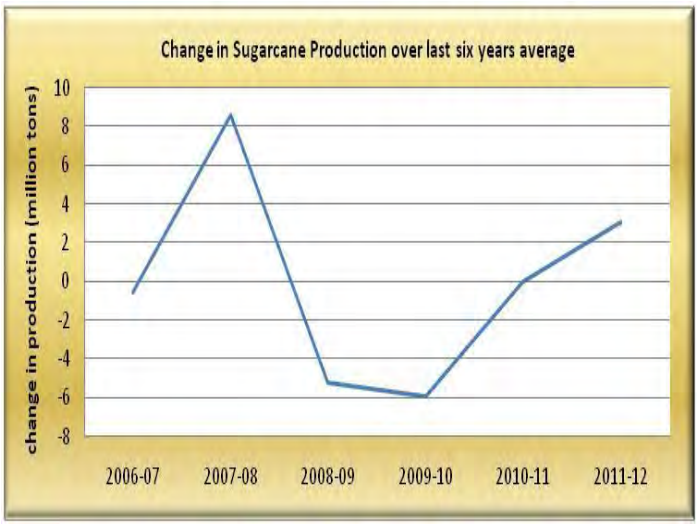
The sugarcane area has shown variability over years depending upon (a) fluctuations in prices of cane (b) irrigation water availability and (c) situation of floods and rains. The statistics of sugarcane crop during the years 2006-07 to 2010-11 is presented in the attached graph.





The average area under the crop during the above period was 1.05 million ha, yield at 53 tons/ha and production was 55.3 million tons. The deviations from this area during the above time lines ranged between ±0.2 million ha, yield ±4 tons /ha and production ±8.6 million tons. The graphic presentation of these variations is as follows:



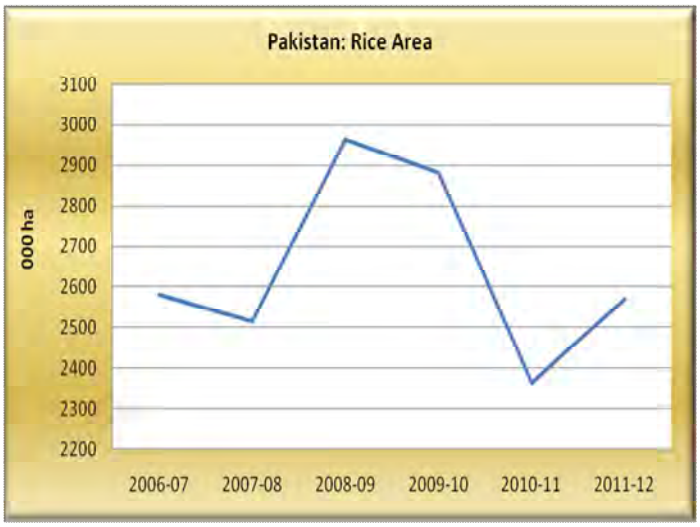


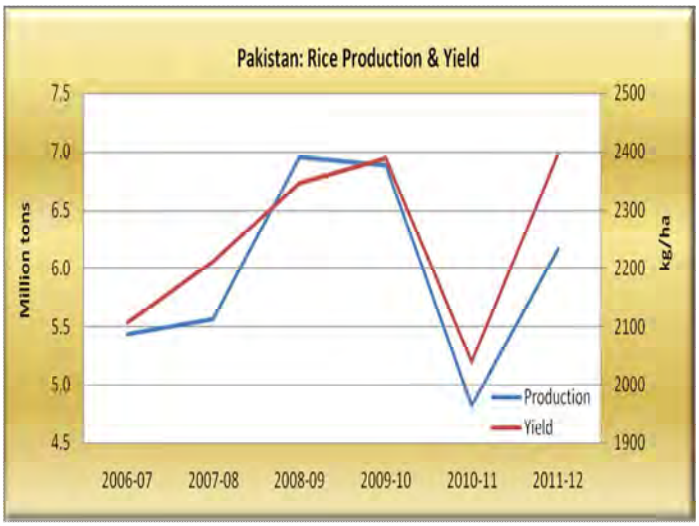
Sugarcane crop is at a highly advanced stage of growth. Fertilization, irrigation and crop protection are the important farm operations and are being carried out by farmers. Important pests and diseases include Gurdaspur borer, red rot, whip smut and others. The Gurdaspur borer (Acigona steniella) is a serious pest attacking sugarcane crop. This insect attacks the central shoot of the plant and causes colossal loss to the crop. The red rot disease is caused by infection of the fungus Glomerella tucumanensis. Diverse type of environment as excessive soil moisture, drought and low temperature are favorable for this disease. The level of sugar drops with this disease. The whip smut disease is caused by the smut fungus, ustilago scitaminea. The terminal leaf of the plant turns into a whip. Wind and insects play a role in transmission of the disease.

According to Sugarcane Factory Ordinance 1950, the crushing of sugarcane is scheduled to start on October 1st each other. Virtually, none of the sugar mills complies with this provision of the legislation. Most of the sugar mills start in November. The production of sugar during 2011-12 was 4.123 million tons. The domestic requirement of sugar during the consumption year 2013-14 for a population of 185 million at 25 kg per head works at 4.625 million tons.

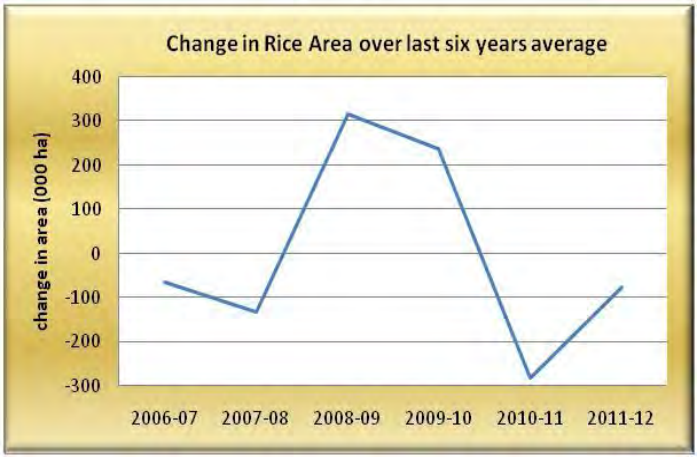
Rice Crop

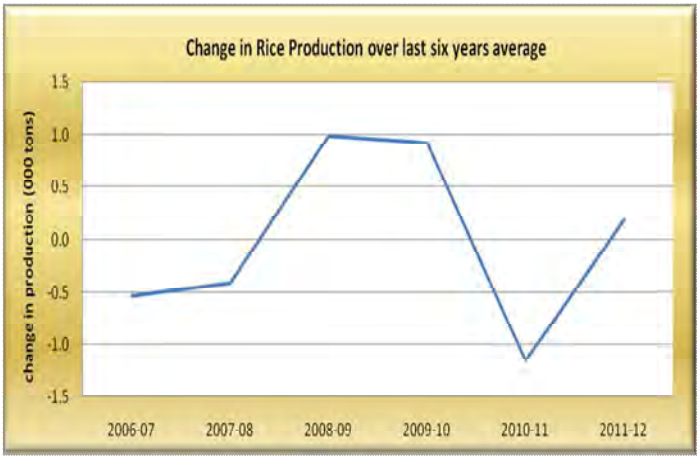
The area under rice crop shown variability over years depending upon (a) fluctuations in prices of the commodity in national /international market (b) irrigation water availability and (c) situation of floods and rains. The statistics of rice crop during the years 2006-07 to 2010-11 is presented in the attached graph.





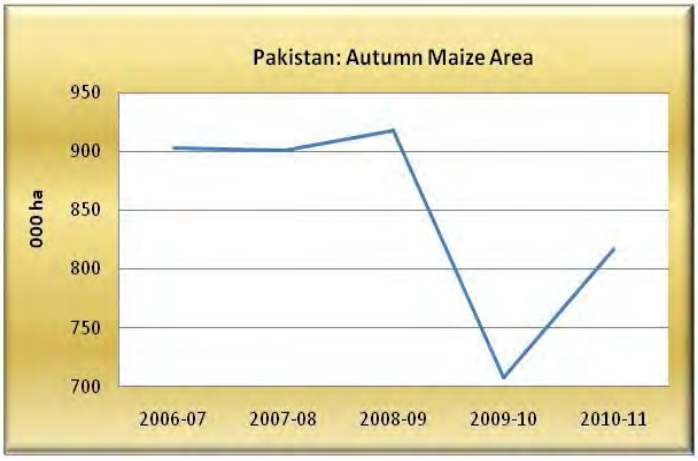
The average area under the crop during the above period was 2.6 million ha, yield at 2248 kg/ha and production was 6.0 million tons. The deviations from this average behavior is area ±0.3 million ha, yield ±210 kg/ha and production ±1.1 million tons. The yearly variation of rice area, yield and production is as follows.

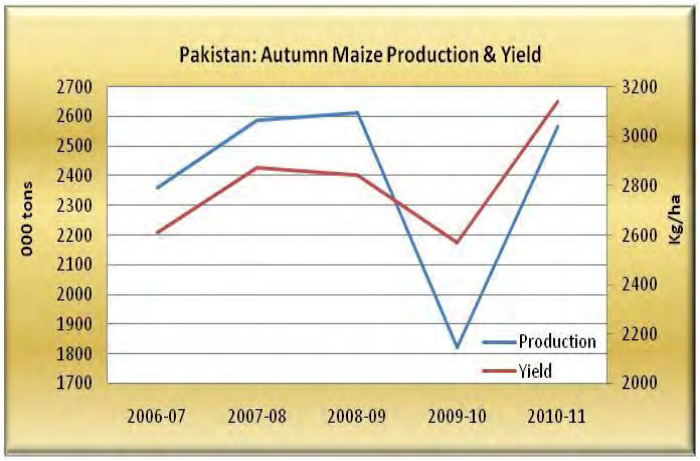




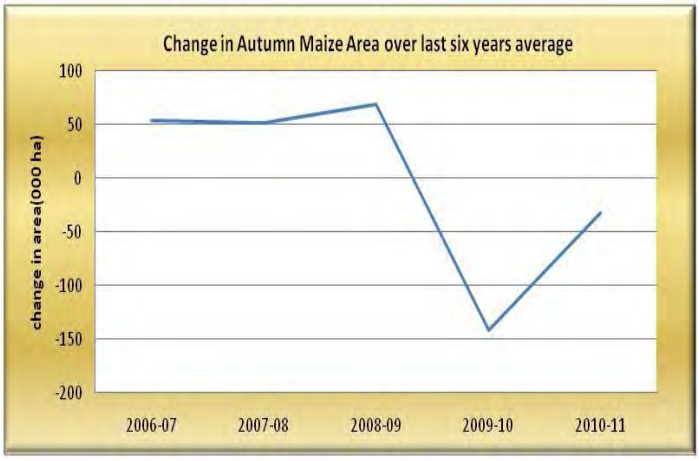
The sowing of IRRI rice was generally completed in July. However the sowing of basmati rice in Kallar tract of Punjab continues and will be completed by mid August. The rice crop is mainly infested by rice stem borer and it results in infertile spikes, reducing crop yield. Farmers generally manage this issue. Another problem in rice is of zinc deficiency. The problem is accentuated by supply of substandard, facsimile, and spurious zinc fertilizers available in the market. Provincial governments need to embark upon this issue.

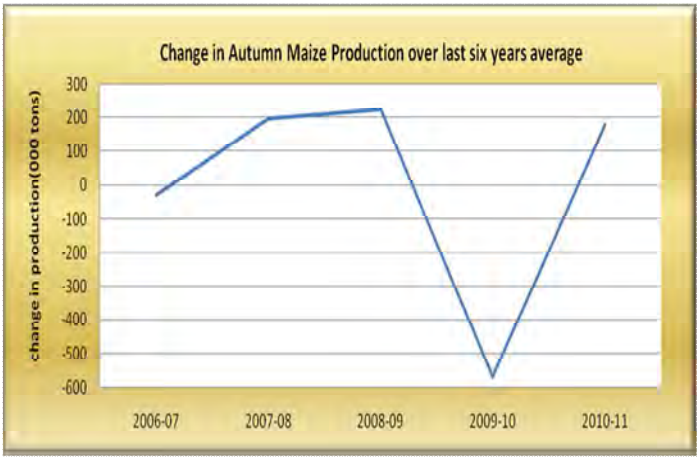
Maize The statistics of maize crop during the years 2006-07 to 2010-11 is presented in the attached graph.





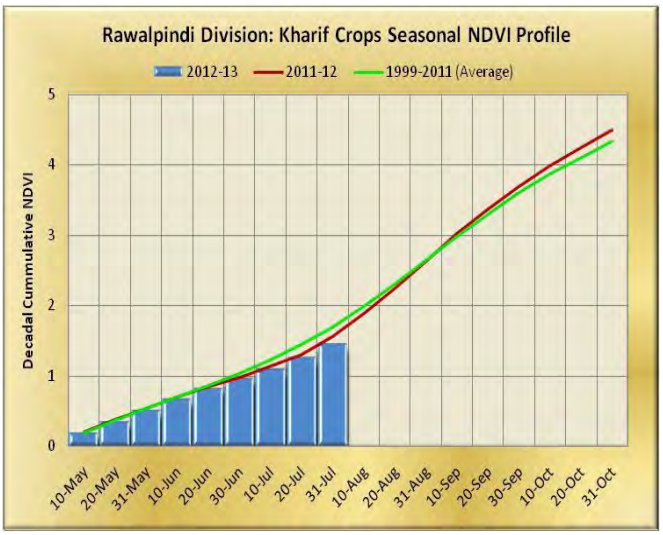
The average area under the crop during the above period was 849.4 thousand ha, yield at 2812 kg/ha and production was 2.4 million tons. The deviations from this average behavior was area ±140 thousand ha, yield ±300 kg/ha and production ±0.5 million tons. The yearly variation of maize area, yield and production was as follows.

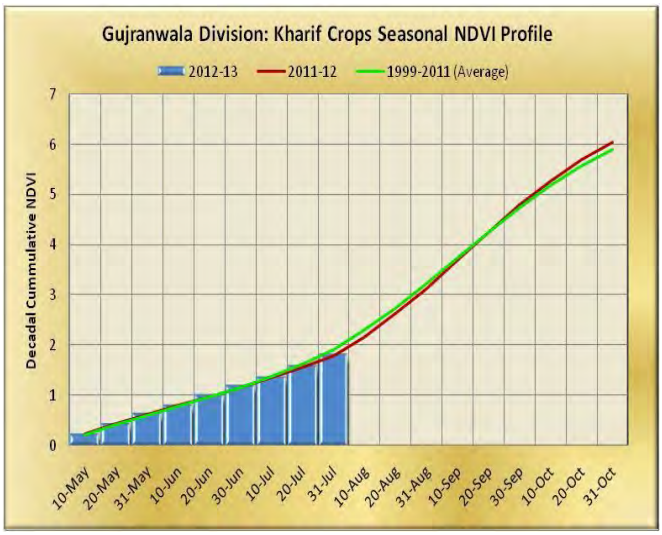


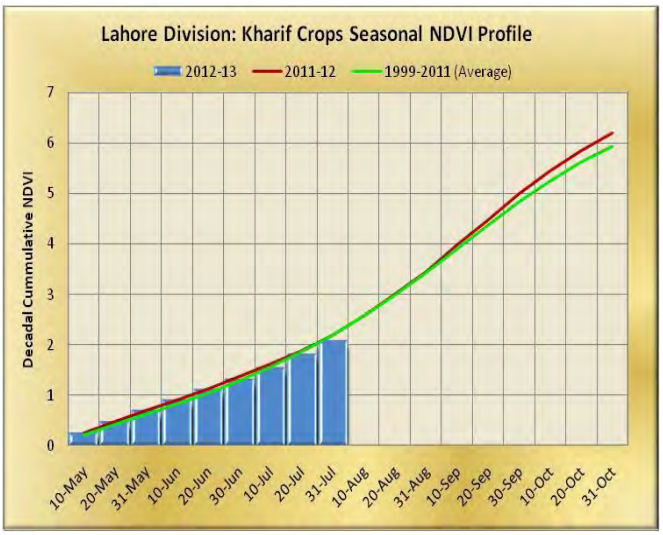


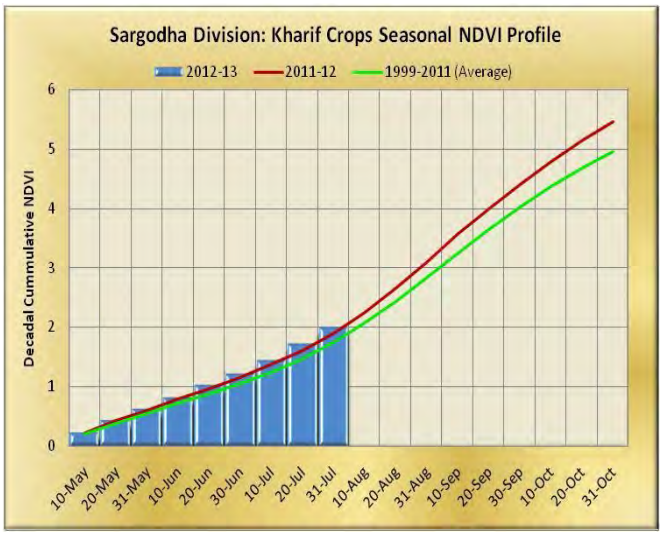
Normalized Difference Vegetation Index (NDVI): Crop Biomass Accumulation Profile at Divisional Level

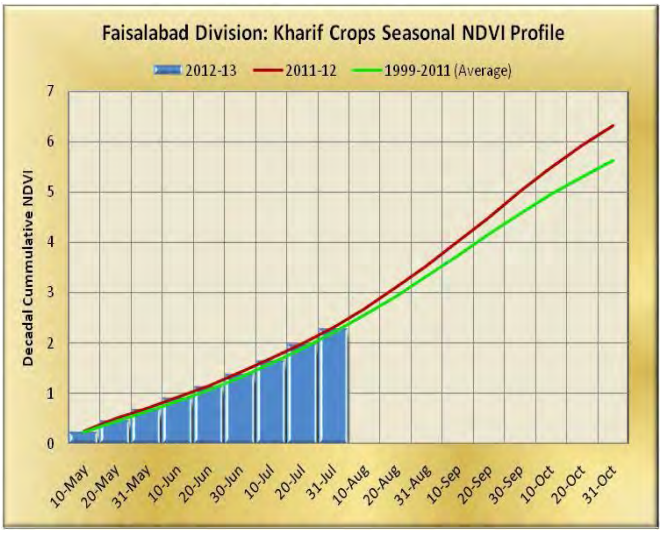
SUPARCO is acquiring MODIS 250 m resolution data on daily basis and SPOT VGT data on 10 daily basis to assess crop growth. SPOT-5 high resolution data are being acquired during each cropping season to assess land surface changes in image classification. The graphs depicting temporal changes for various regions are as follows:

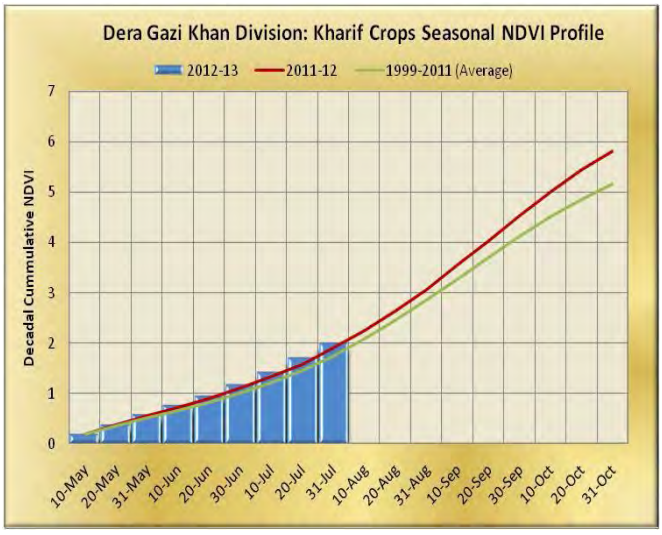




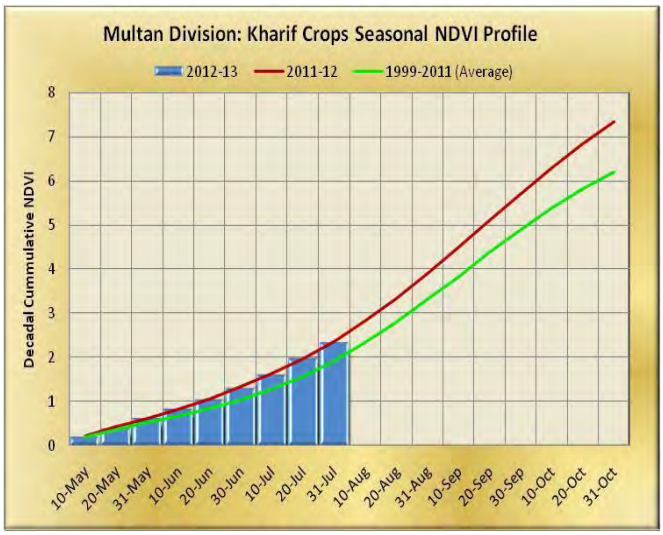


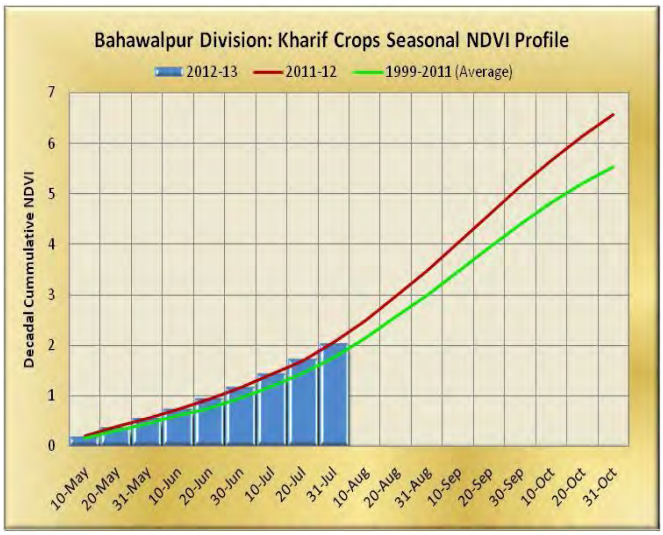


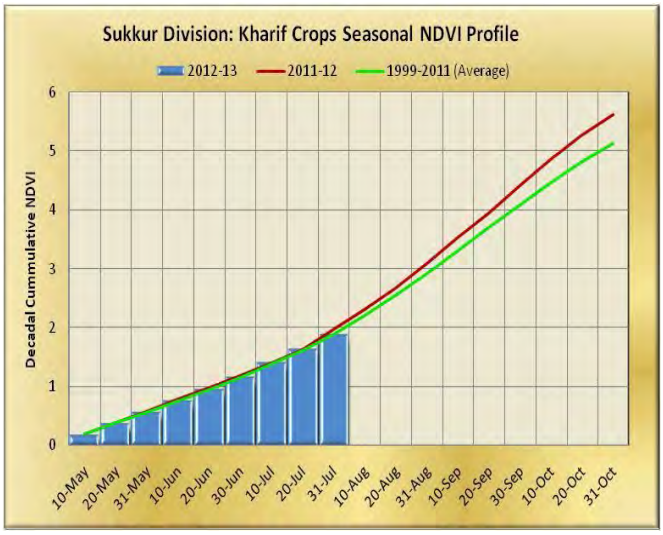


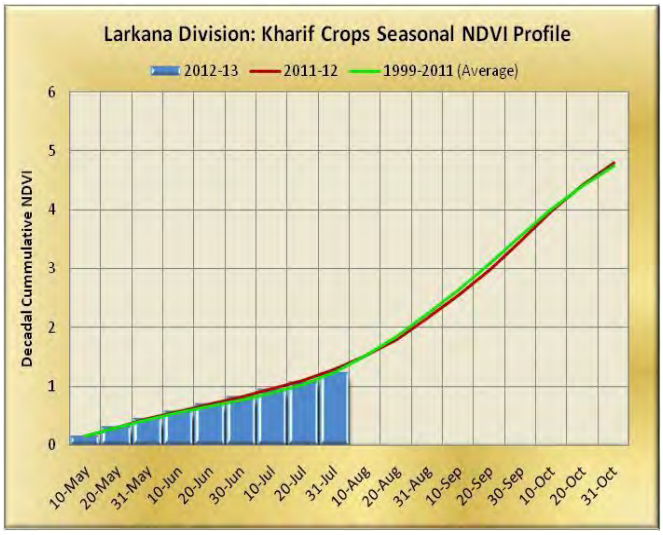


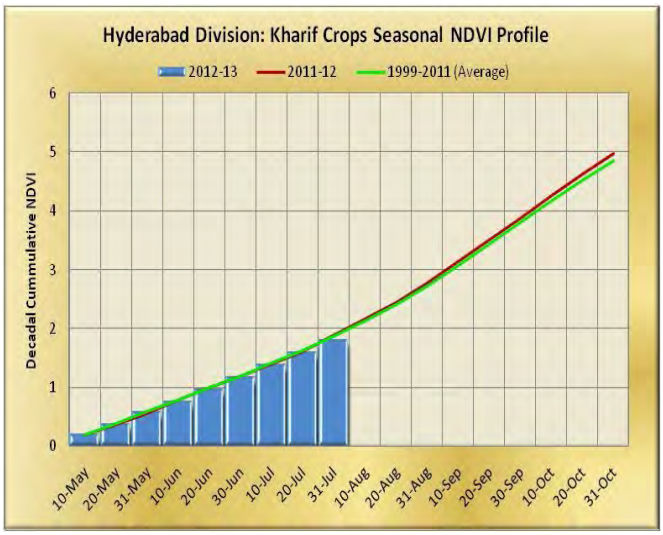
Normalized Difference Vegetation Index (NDVI): Crop Biomass Accumulation Profile at Divisional Level

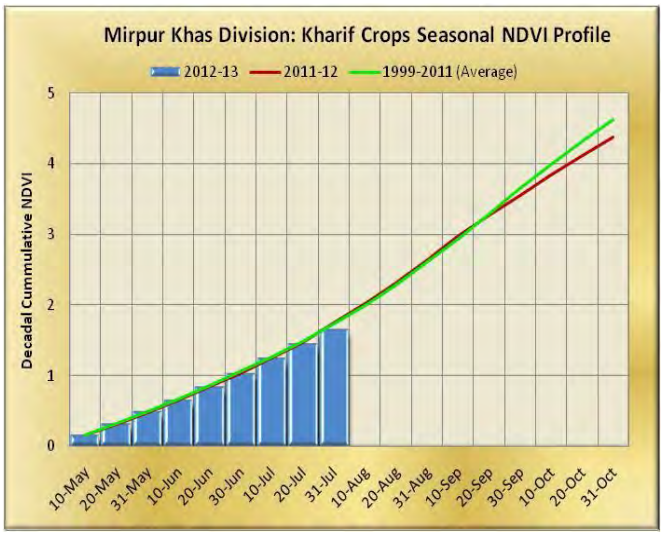




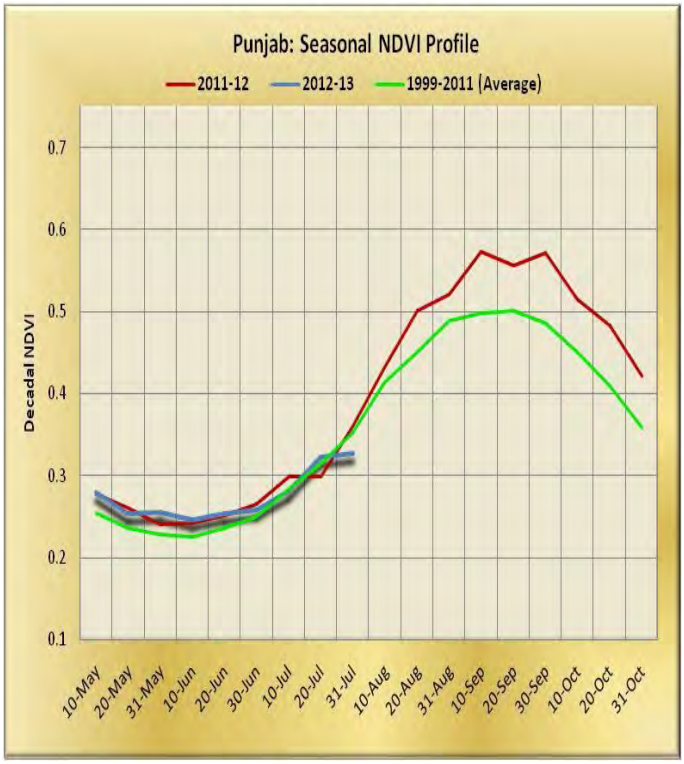




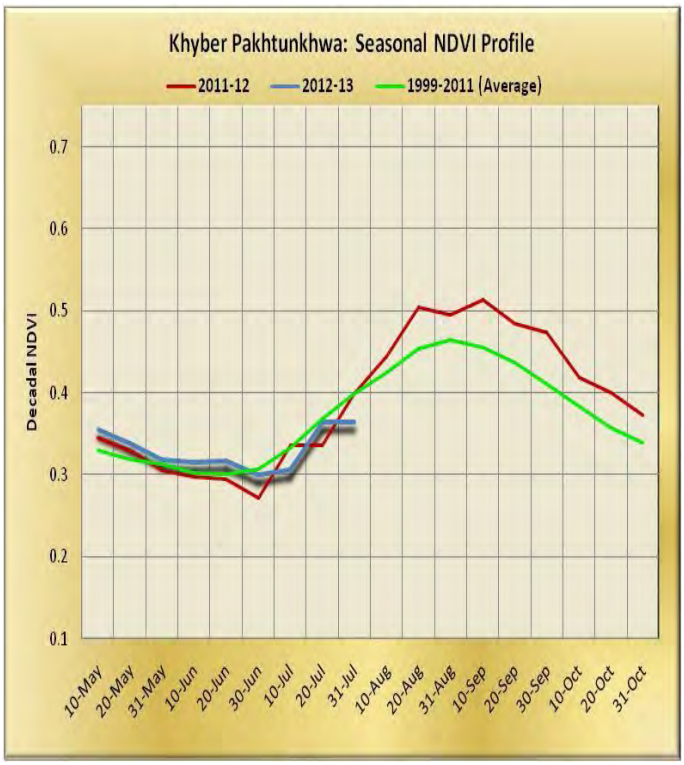


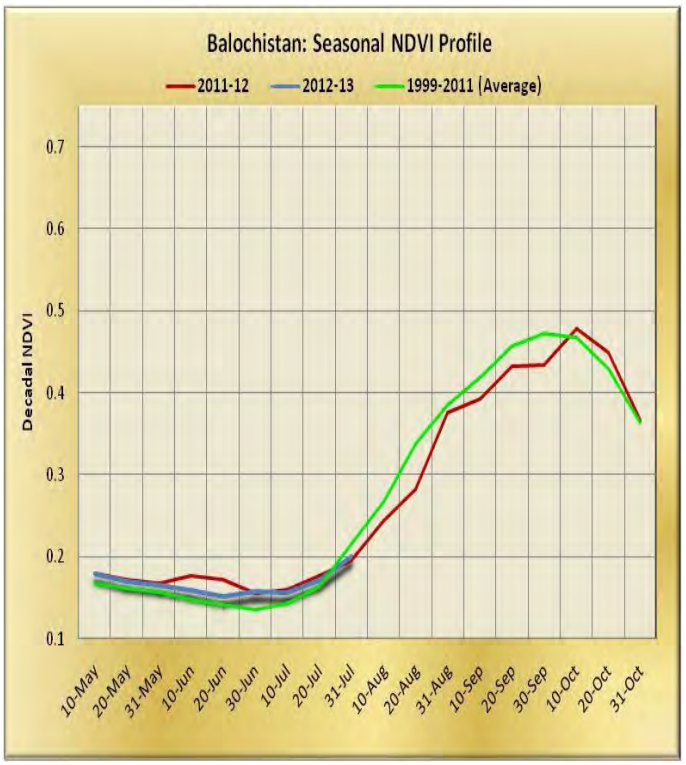


Normalized Difference Vegetation Index (NDVI): Crop Growth Profile at Provincial level

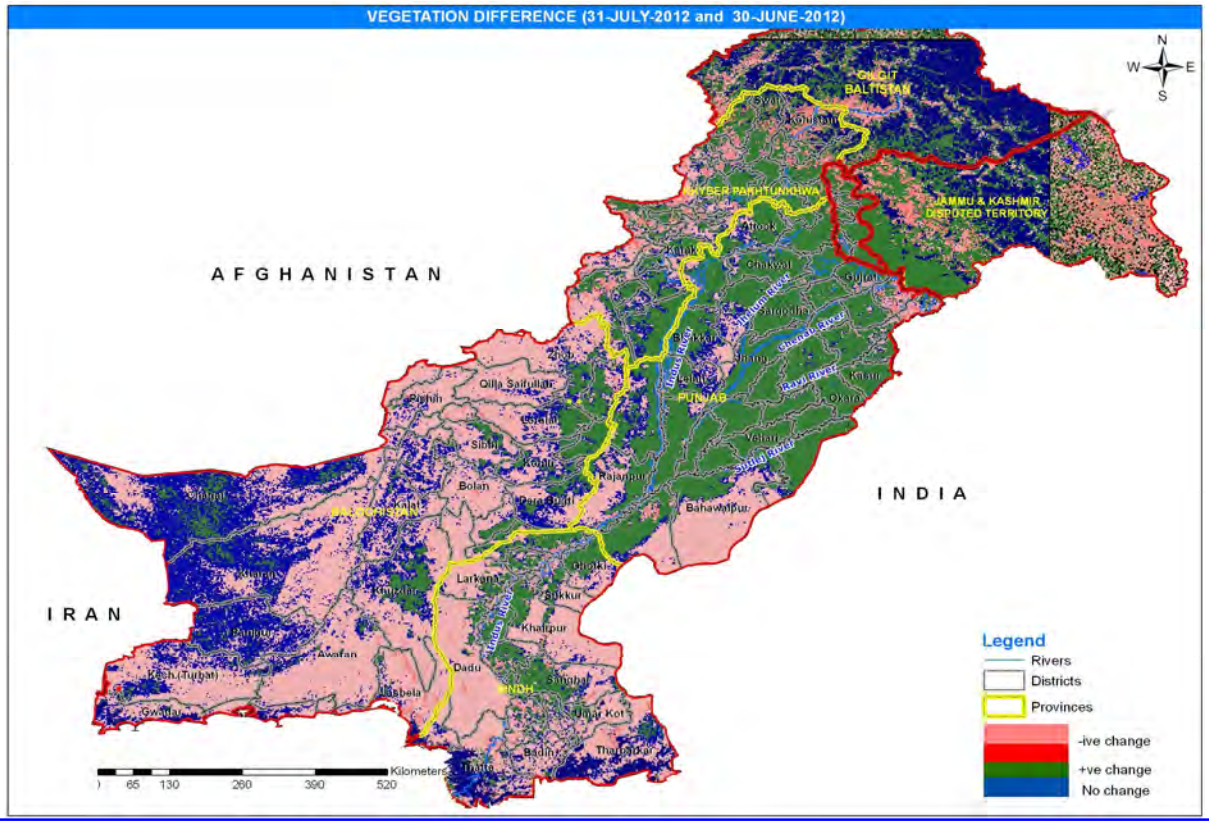




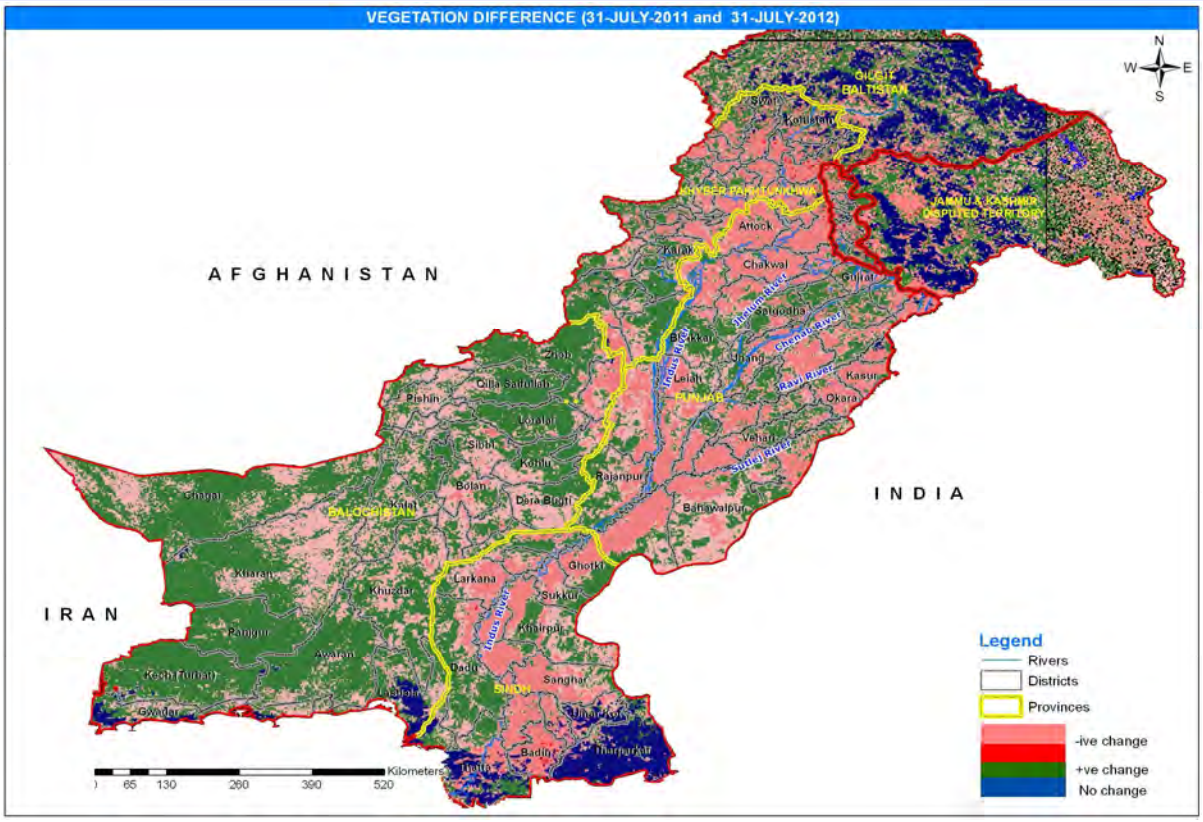




Vegetation Change in July, 2012

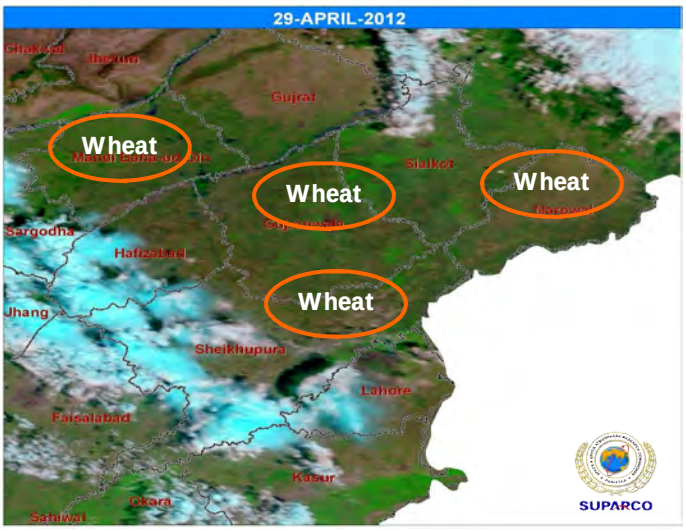


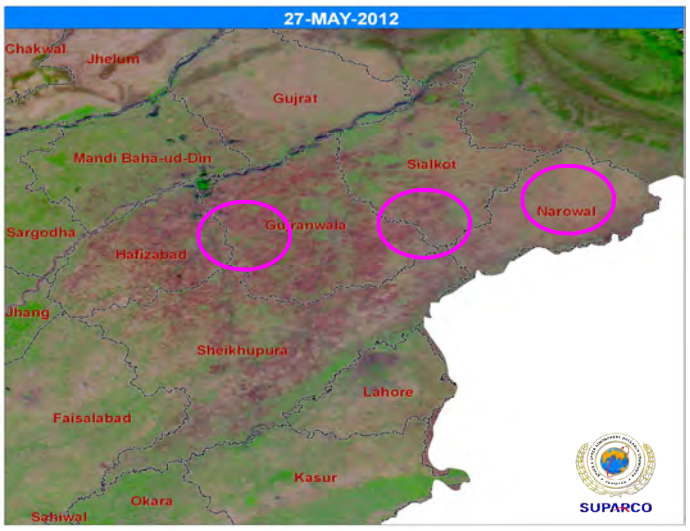
Vegetation Change 2012 vs. 2011 during July

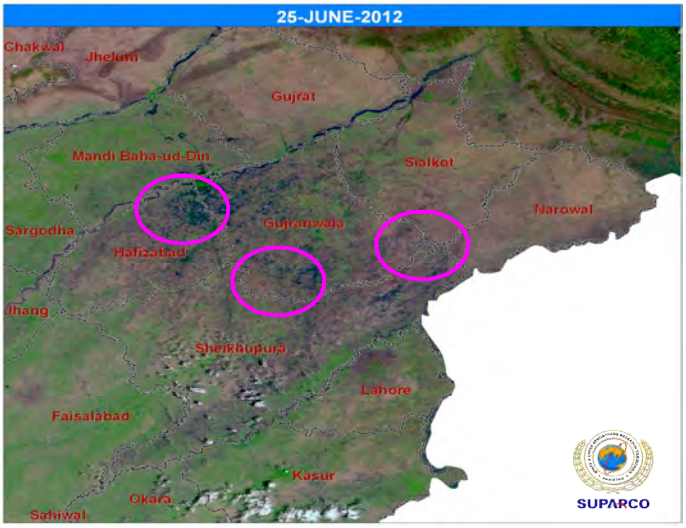


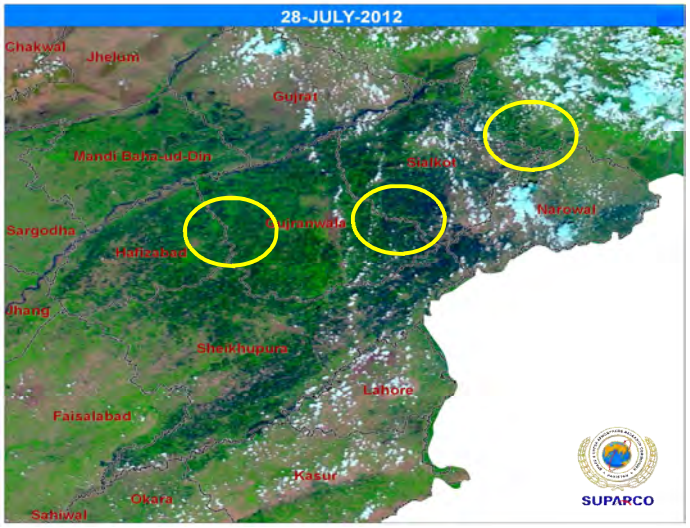
Satellite Imagery: SPOT VGT 1000m

Temporal Change: Kallar Tract, Punjab

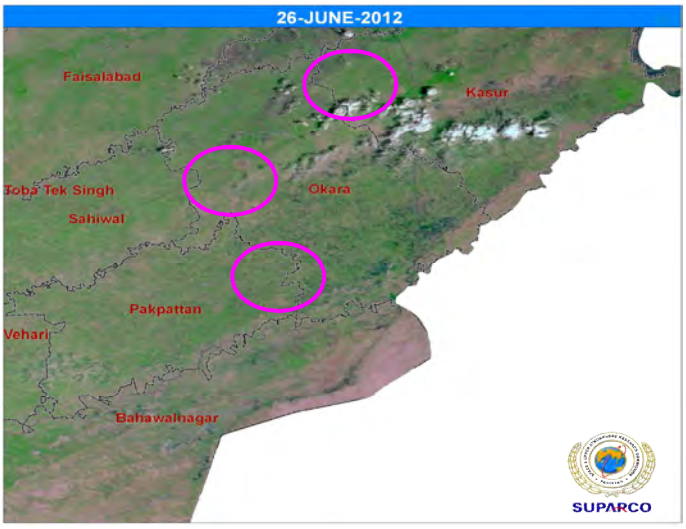


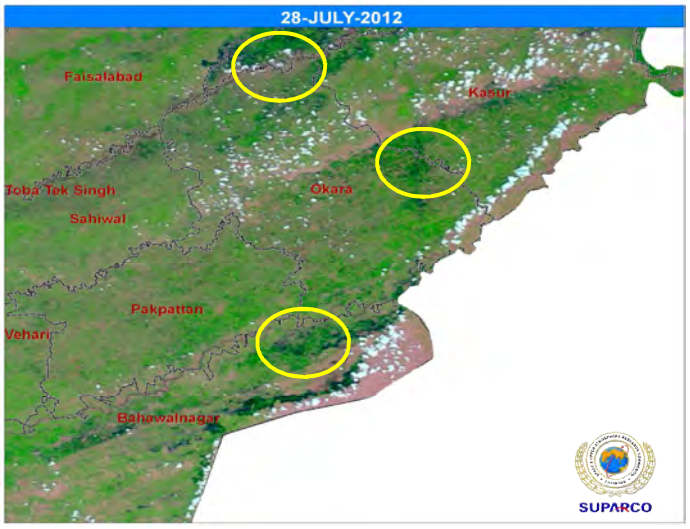






Temporal Change: Sahiwal Division, Punjab

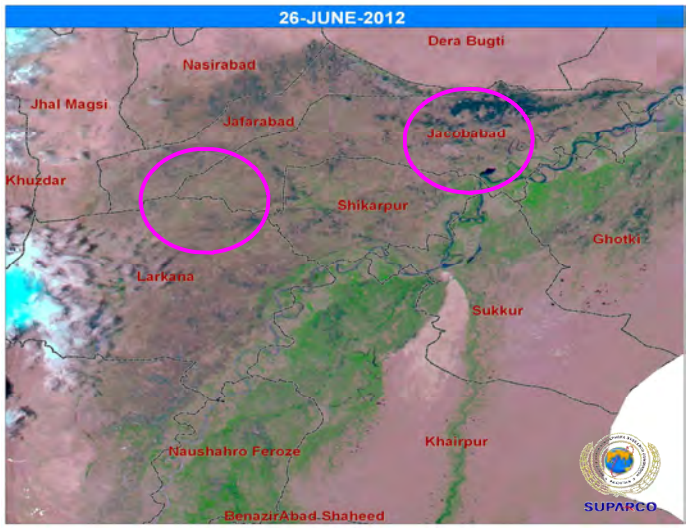


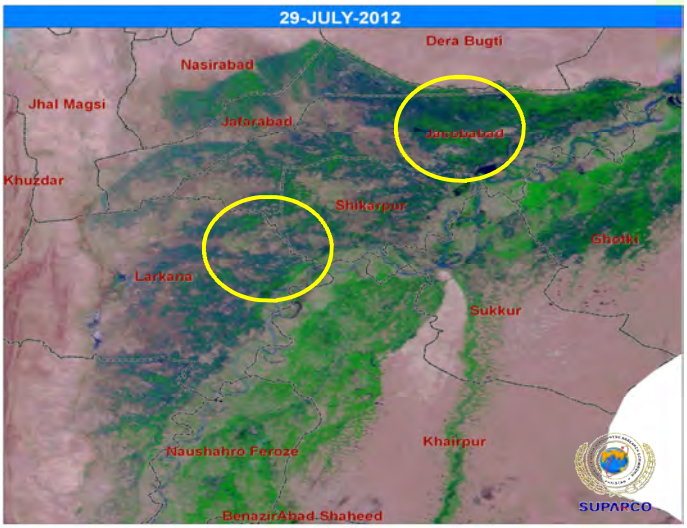


Sowing/Land preparation Active Growth Maturity Harvesting

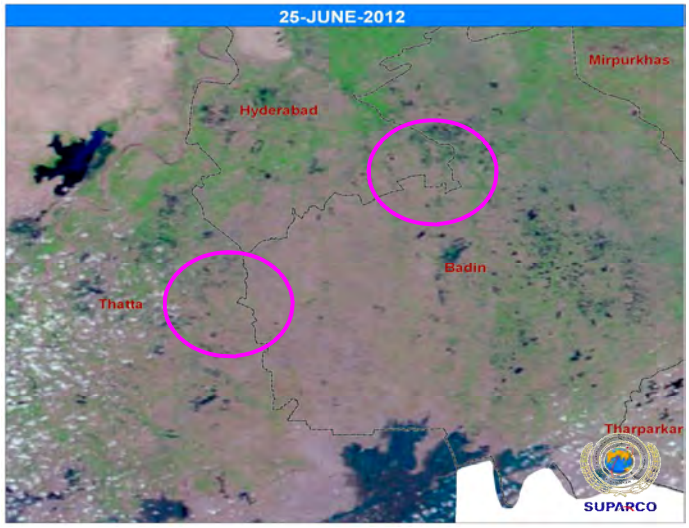
Satellite Imagery: MODIS 250m

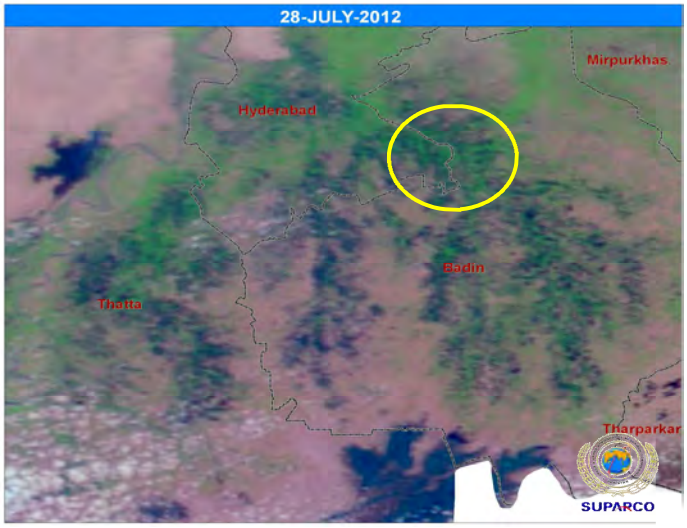
Temporal Change: Larkana Division, Sindh



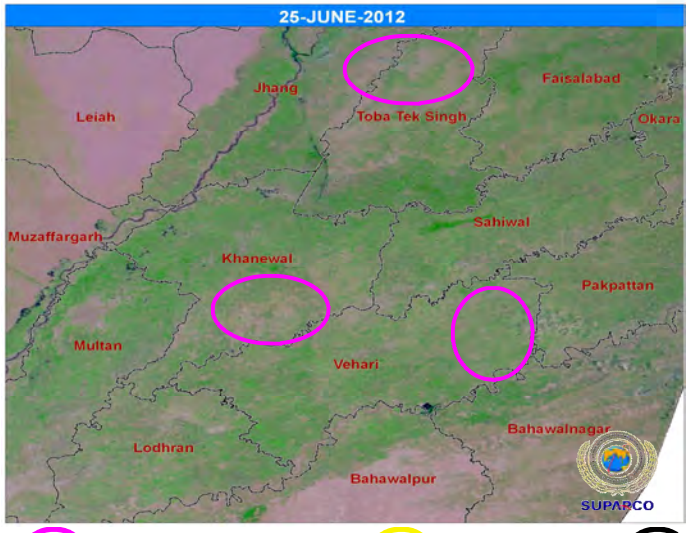


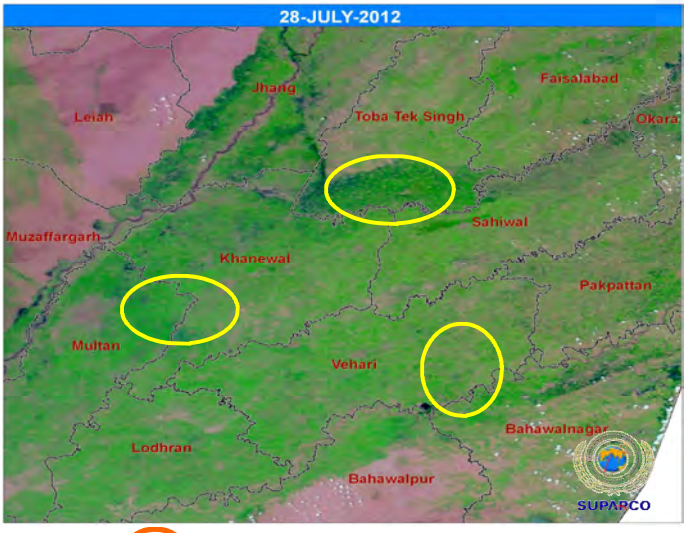
Temporal Change: Indus delta, Sindh





Temporal Change: Southern Punjab

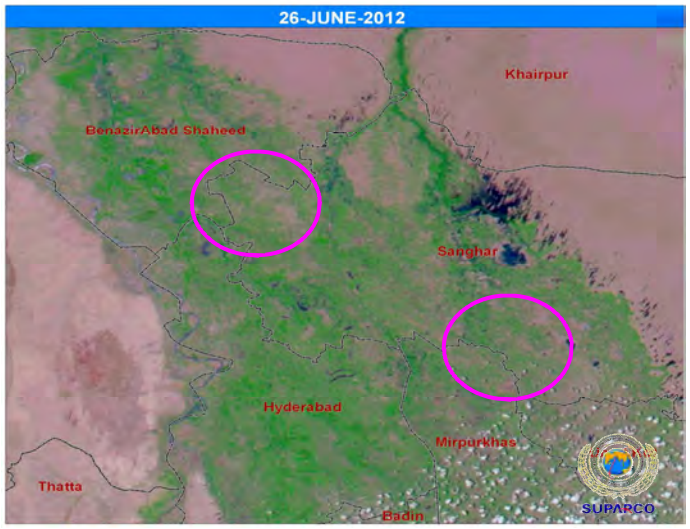


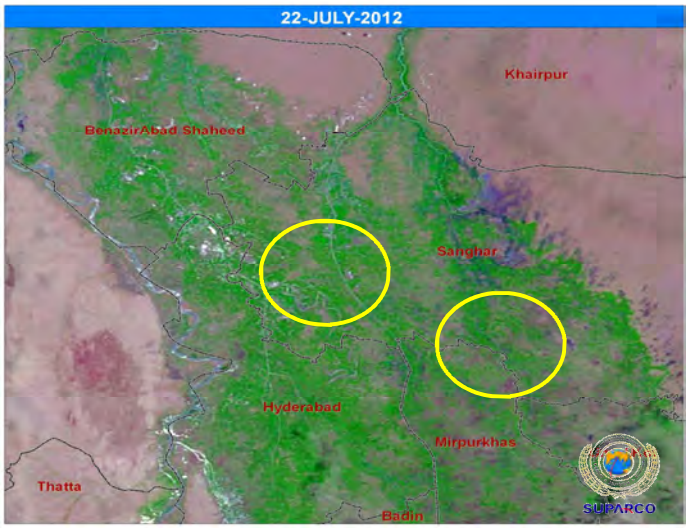


Sowing/Land preparation Active Growth Maturity Harvesting

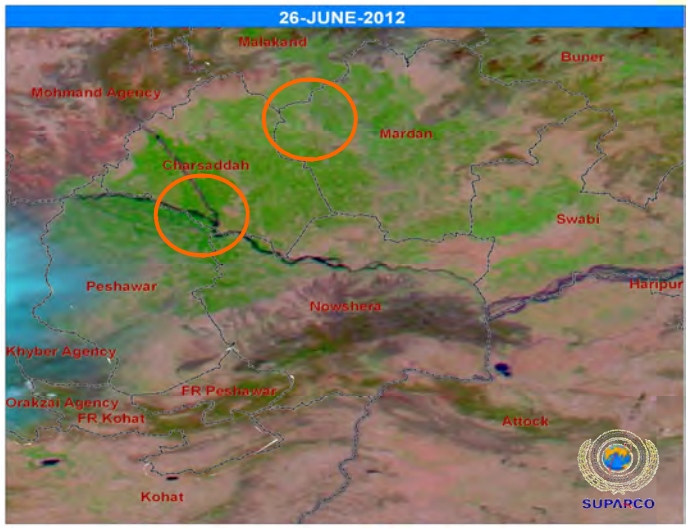
Satellite Imagery: MODIS 250m

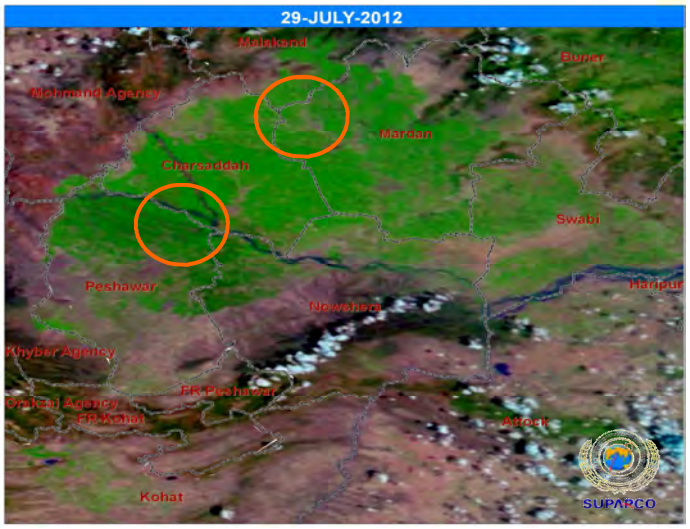
Temporal Change: Sindh



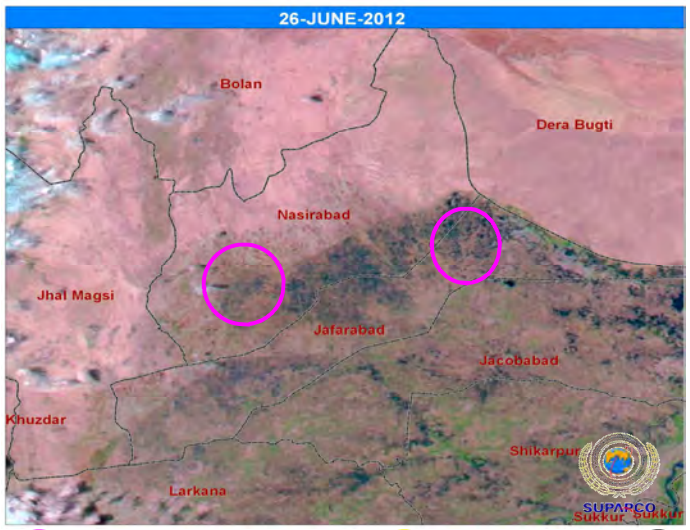


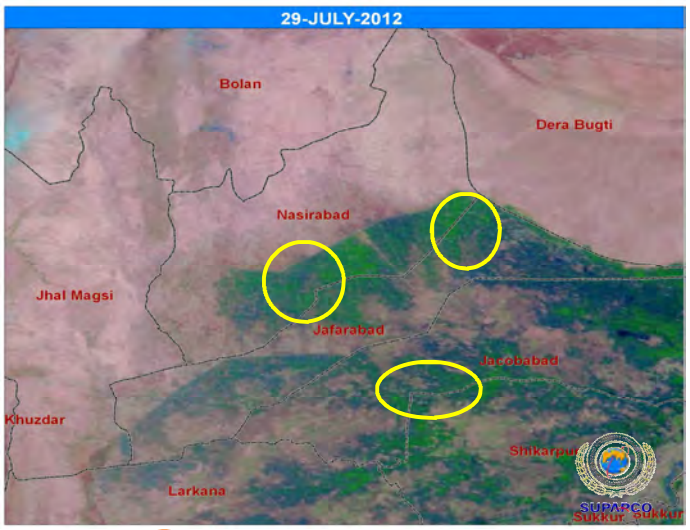
Temporal Change: Peshawar Valley, Khyber Pakhtunkhwa





Temporal Change: Pat Feeder Area of Balochistan





Sowing/Land preparation Active Growth Maturity Harvesting Satellite Imagery: MODIS 250m

Agro-Met Conditions:

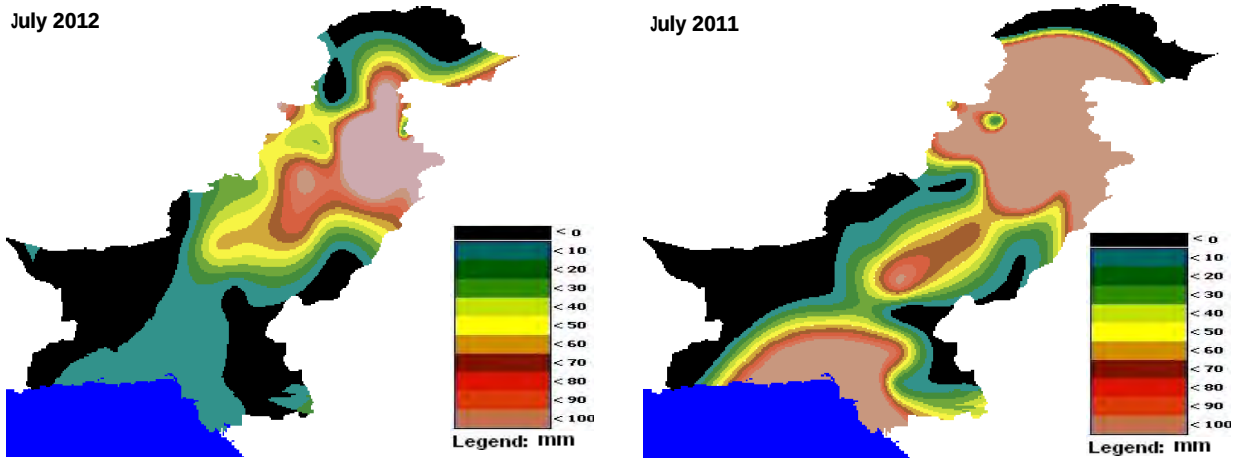
The agro met conditions in July were as follows:

a) Rainfall: There were light and moderate rain showers in 2nd and 3rd week of July. This year monsoon in Pakistan is suppressed than normal monsoon due to El-Nino conditions developing in South- East Asia. The highest monthly rainfall observed was 263 mm in Kotli. Chhor received 23 mm monthly rainfall in rest of Sindh remained hot and dry. Pothohar region (Chakwal, Jhelum Rawalpindi and Attock) also received sufficient moisture for the Summer crops.

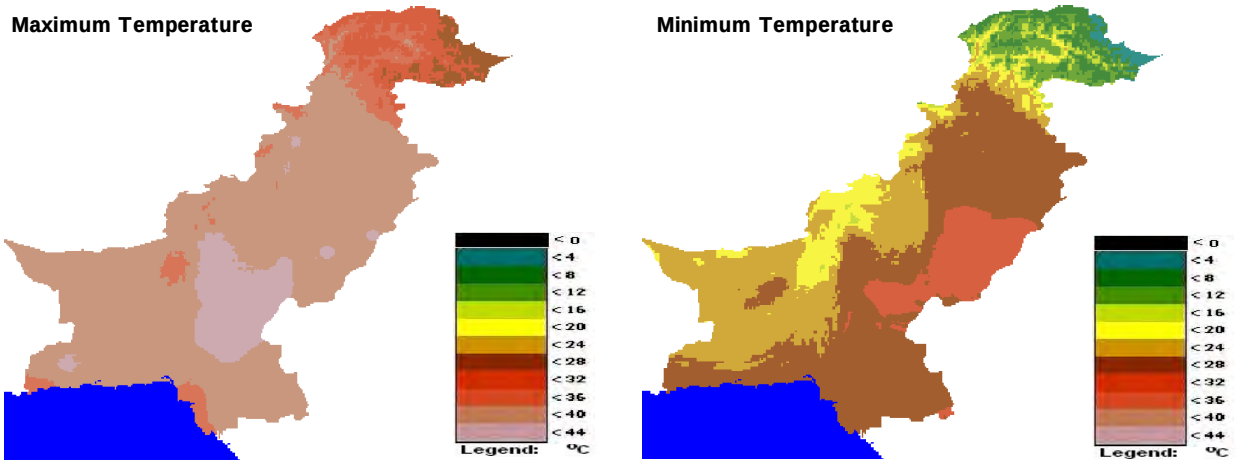
Month	Province	Cumulative Rainfall
July 2012	Punjab	Bhawalnagar 37 mm, Bhakkar 78 mm, Chakwal 79 mm, D G Khan 34 mm, Faisalabad 88 mm, Islamabad 162 mm, Joharabad 127 mm, Jhang 131 mm, Jhelum 215 mm, Khanpur 34 mm, Kamra 110 mm, Lahore 53 mm, M B din 111 mm, Mianwali 43 mm, Multan 42 mm, Mangla 107 mm, Muree 129 mm, Noorpur Thal 43 mm, Okara 57 mm, Gujranwala 157 mm, Sahiwal 98 mm, Sargodha 160 mm, Sialkot 253 mm, T. T. Singh 147mm
	Gigit Baltistan/ Azad Kashmir	Astore 10 mm, Gari Dopatta 57 mm, Gilgit 2 mm, Gupis 5 mm, Kotli 263 mm, Muzafarabad 163 mm, Rawalakot 167mm, Pattan 41 mm,
	Khyber Pakhtunkhwa	Balakot 117 mm, Bannu 30 mm, Cherat 4 mm, D I Khan 84 mm, Kakul 137 mm, Dir 29 mm, Lower Dir 80 mm, Drosh 28 mm, Kalam 14 mm, Kohat 39 mm, Malam Jabba 141 mm, Parachinar 120 mm, Risalpur 122 mm, Saidu Sharif 126 mm
	Sindh	Hyderabad 23 mm, Mithi 10 mm
	Balochistan	Barkhan 138 mm, Lasbela 30 mm, Sibbi 43 mm, Zhob 42 mm,

b) Temperature: Maximum and minimum temperatures remained high in 1st week of July than the same period of last two years, rest of the month temperatures remained normal. Due to rainfall in 2nd and 3rd week the humidity increased on different stations.

Monthly Cumulative Precipitation:

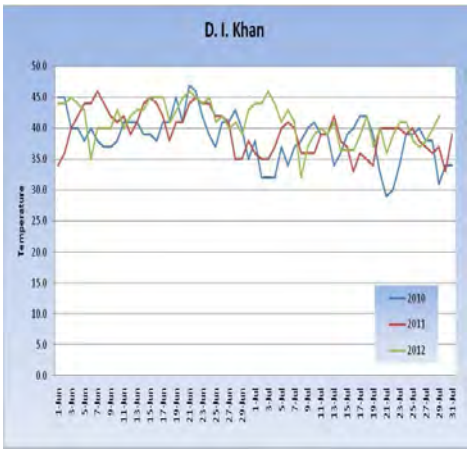


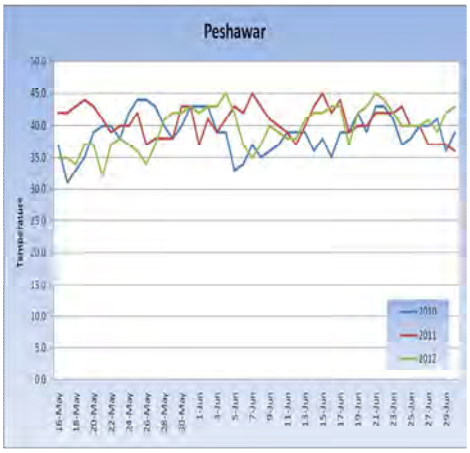
Monthly Temperature: July, 2012

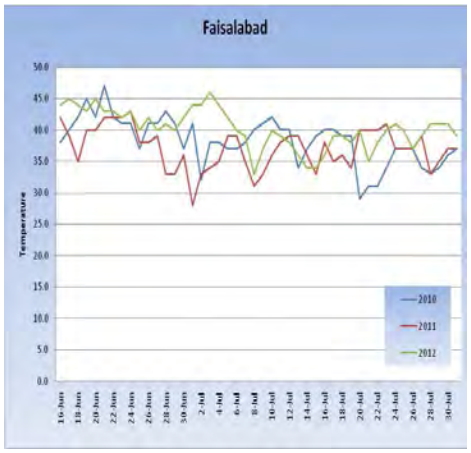


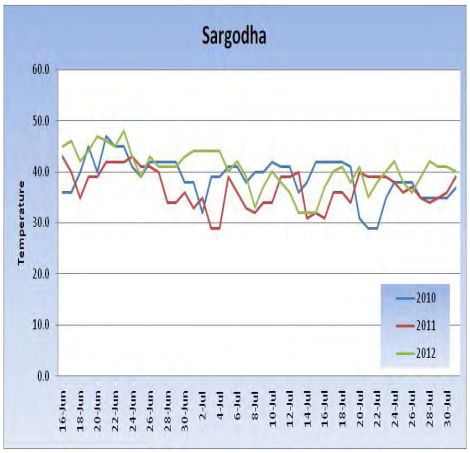
Maximum Temperature : July, 2012

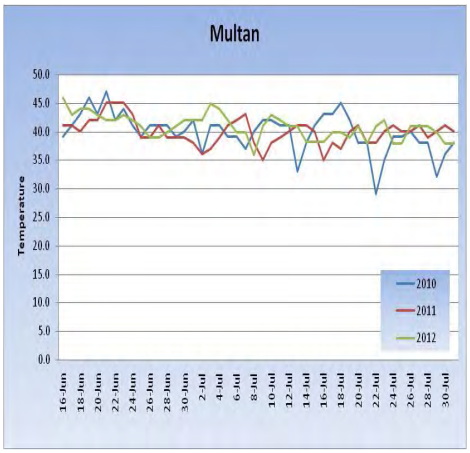
The range of maximum temperature during July, 2012 were as follows:

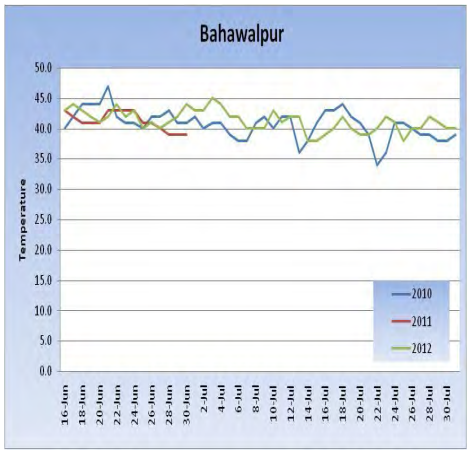


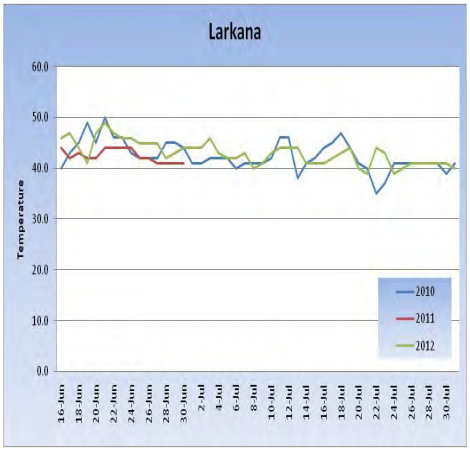


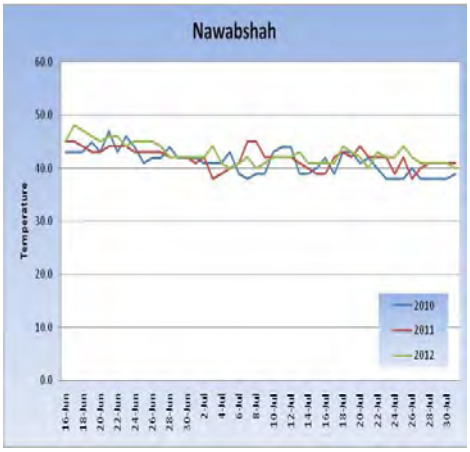


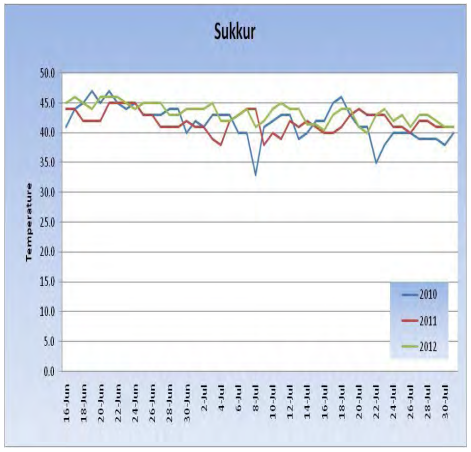






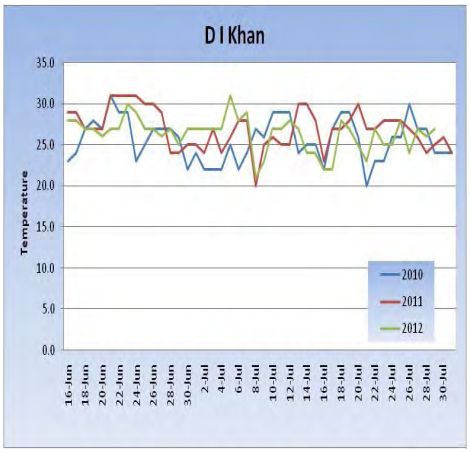


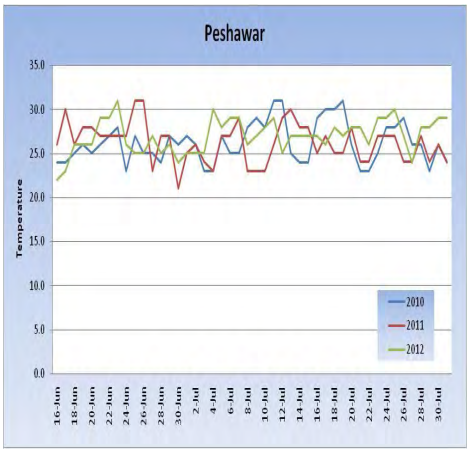


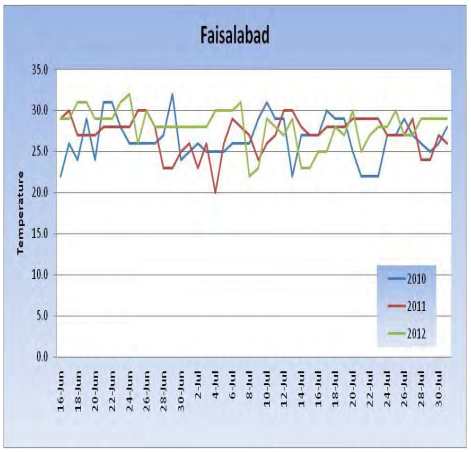


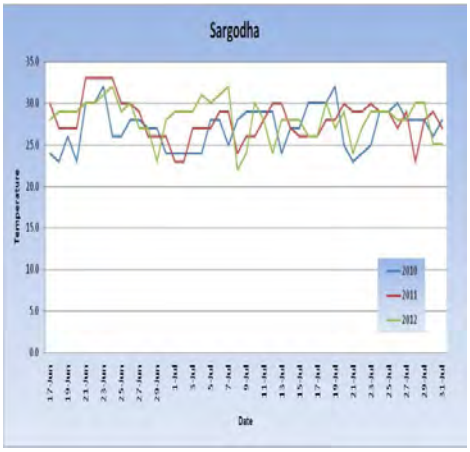
Minimum Temperature : July, 2012

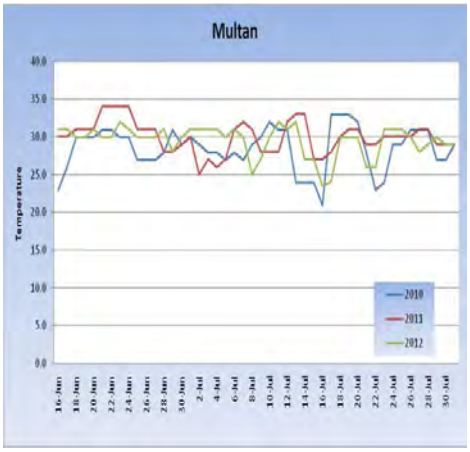
The range of minimum temperature during July, 2012 were as follows:

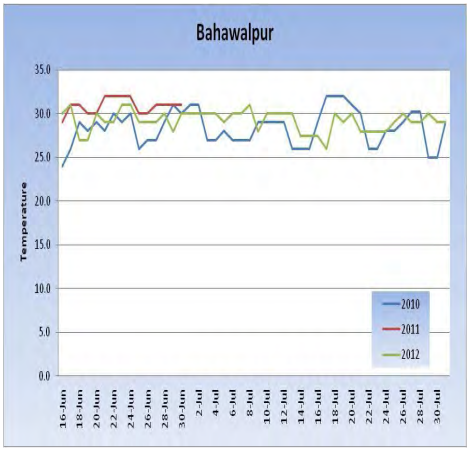


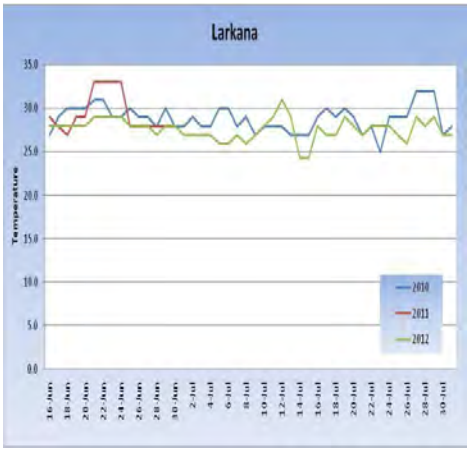


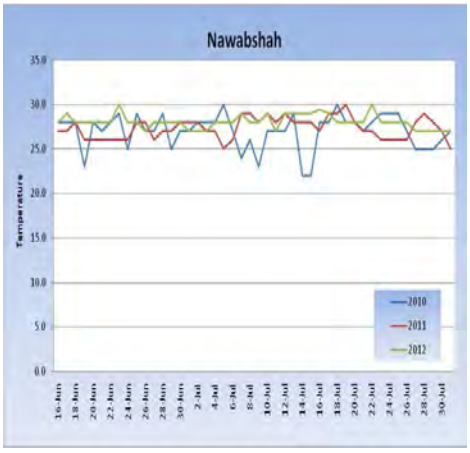


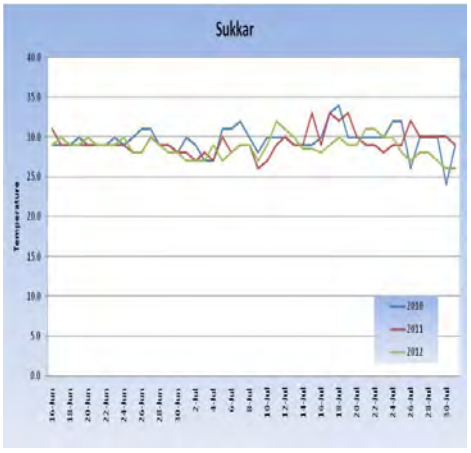






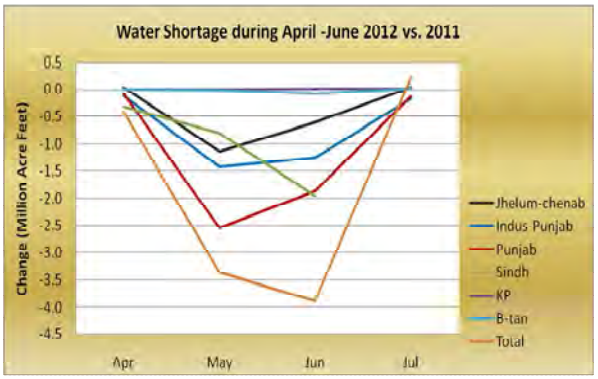


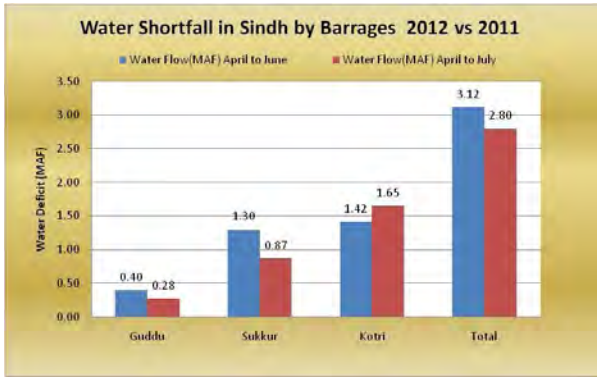




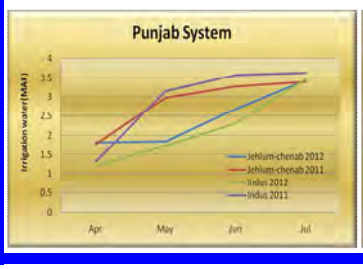
Irrigation Water Supply Situation :

The irrigation water supplies were generally short during April to July period of Kharif season 2012 compared to corresponding period of last year. The water deficit situation surfaced in April and accentuated during May-June as the sowing of cotton and other Kharif crops peaked . The cumulative irrigation water supply during April-July period was 34.815 MAF compared to 42.258 MAF during corresponding period of last year. This makes a shortfall of 17.6 percent. The supplies were 9.767 MAF in Jehlum-Chenab region of Punjab compared to 11.436 MAF last year. The supply drastically reduced in Indus region of Punjab and was 8.724 MAF compared to 11.675 MAF last year –a short fall of 25.3 percent.Taken as a whole, the shortage of irrigation water in Punjab was 20 percent.The situation in Sindh was also analogues and harmonized. The supply in Sindh was 14.625 MAF compared to 17.369 MAF last year ,with a short fall of 15 percent. The shortfall in Sindh was trivial in upstream areas (Guddu 0.28 MAF) and in general increased , traverse to the distance of water bodies downstream (Sukkur 0.87 MAF and Kotri 1.65 MAF). The supplies in KP were normal and Baluchistan observed a short fall of about 8 percent. The statistics and graphs in this regard are given as follows.

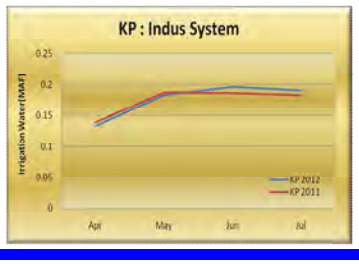


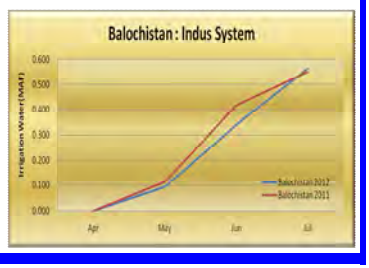


	Month	Year	Punjab			Sindh	KP	Balochistan	Total
			Jhelum-Chenab	Indus	Total				
			Million Acre Feet						
Kharif 2012-13	Apr	2012	1.817	1.202	3.019	1.426	0.133	0.000	4.578
		2011	1.783	1.313	3.096	1.753	0.139	0.000	4.989
		Change	0.034	-0.111	-0.077	-0.327	-0.006	0.000	-0.411
		% Change	1.89	-8.46	-2.50	-18.67	-4.29	0.00	-8.23
	May	2012	1.842	1.743	3.585	2.304	0.183	0.093	6.165
		2011	2.974	3.159	6.133	3.101	0.187	0.112	9.533
		Change	-1.132	-1.416	-2.548	-0.797	-0.004	-0.019	-3.368
		% Change	-38.07	-44.82	-41.55	-25.70	-2.33	-16.78	-35.33
	Jun	2012	2.672	2.315	4.987	3.582	0.196	0.339	9.104
		2011	3.277	3.574	6.851	5.534	0.186	0.419	12.990
		Change	-0.605	-1.260	-1.864	-1.952	0.010	-0.079	-3.886
		% Change	-18.46	-35.24	-27.21	-35.27	5.32	-18.96	-29.91
	Jul	2012	3.436	3.464	6.900	7.312	0.191	0.564	14.967
		2011	3.402	3.629	7.031	6.980	0.183	0.552	14.746
		Change	0.034	-0.165	-0.131	0.332	0.008	0.012	0.221
		% change	1.01	-4.56	-1.86	4.76	4.45	2.19	1.50
	Total	**2012**	**9.767**	**8.724**	**18.490**	**14.625**	**0.703**	**0.997**	**34.815**
		2011	**11.436**	**11.675**	**23.111**	**17.369**	**0.695**	**1.083**	**42.258**
		Change	**-1.669**	**-2.952**	**-4.621**	**-2.744**	**0.008**	**-0.086**	**-7.443**
		% change	**-14.60**	**-25.28**	**-19.99**	**-15.80**	**1.11**	**-7.95**	**-17.61**









Daily Hydrological Status at Indus Basin: July, 2012

The water level in Tarbela on 30th July, 2012 was 1464.25 feet above mean sea level (amsl) and Mangla was at 1155.55 feet (amsl).

Reservoir	Reservoir Level(feet) above mean sea Level on the date of								
	2-Jul		11-Jul		21-Jul		30-Jul		Full Capacity
	2012	2011	2012	2011	2012	2011	2012	2011	
Tarbela	1399.07	1447.10	1438.22	1442.05	1459.44	1450.60	1464.25	1484.60	1550.00
Mangla	1116.45	1182.00	1132.15	1187.25	1146.25	1192.10	1155.55	1195.50	1210.00

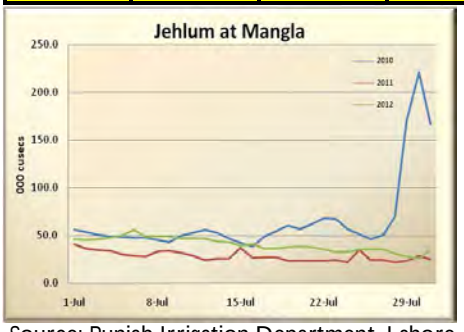
The inflows at RIM stations at Indus and other rivers are as follows:

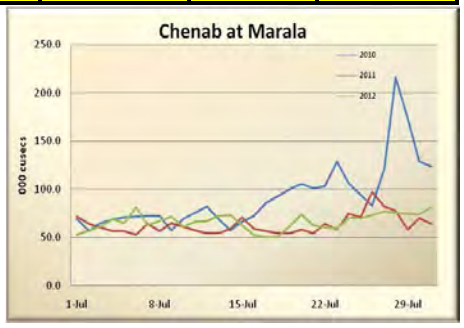
JULY 2012: Daily River Water Inflow (000 cusecs)						
Day	Indus at Tarbela	Indus at Chashma	Indus at Taunsa	Jhelum at Mangla	Chenab at Marala	Kabul at Nowshera
2	211.5	234.6	207.0	36.1	63.9	45.7
3	192.6	234.5	210.6	34.9	60.3	43.6
4	173.6	234.3	214.2	33.7	56.6	41.5
5	158.1	224.9	215.0	30.0	56.6	39.5
6	146.4	220.0	208.3	28.7	52.9	35.9
7	141.6	219.1	202.4	27.5	64.2	33.1
9	159.4	222.5	206.1	34.0	65.1	33.7
10	161.8	221.0	196.4	31.5	61.3	35.8
11	164.1	219.6	186.7	29.0	57.5	37.8
12	148.5	222.7	191.8	23.9	54.3	35.7
13	139.8	221.0	196.2	25.2	54.7	34.0
14	144.1	181.4	181.8	25.3	58.9	33.3
15	158.2	202.5	186.4	36.9	71.2	34.8
16	176.4	213.7	183.9	26.6	58.9	34.9
17	183.0	229.0	179.9	26.7	56.7	39.7
18	189.7	244.5	175.9	26.8	54.4	44.5
19	166.9	226.7	196.2	22.9	54.6	38.7
20	161.9	198.1	218.4	22.9	58.5	36.6
21	164.8	203.0	193.7	22.9	54.6	33.3
23	185.2	188.4	170.1	24.2	58.5	32.0
24	192.0	181.0	170.0	22.0	75.0	32.0
25	199.8	180.9	163.5	35.0	71.3	32.5
27	236.0	226.1	169.0	24.4	82.4	38.7
30	248.3	201.7	234.1	28.4	69.9	42.9
31	219.5	197.4	209.2	25.1	64.2	40.6
Condition	No Flood	No Flood	No Flood	No Flood	No Flood	No Flood

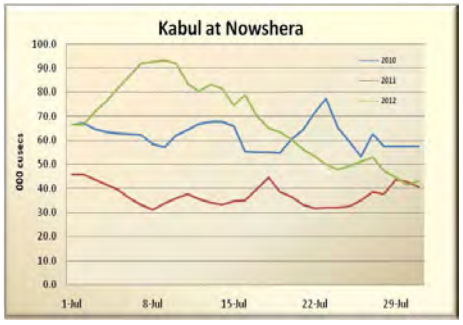












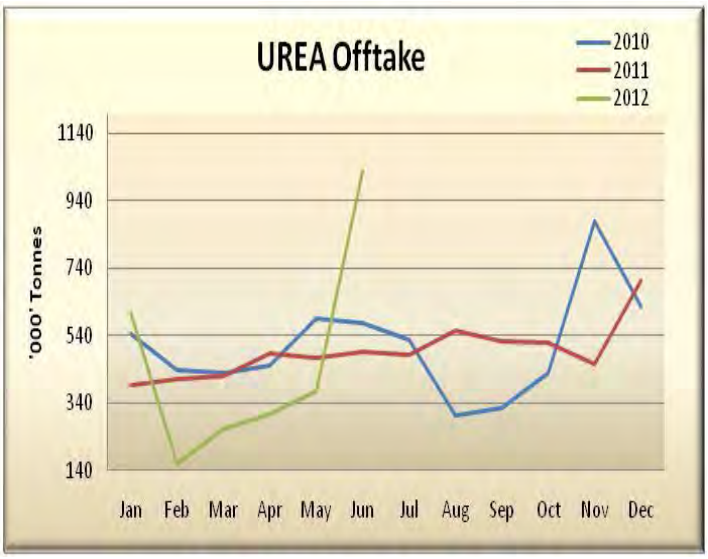
Source: Punjab Irrigation Department, Lahore

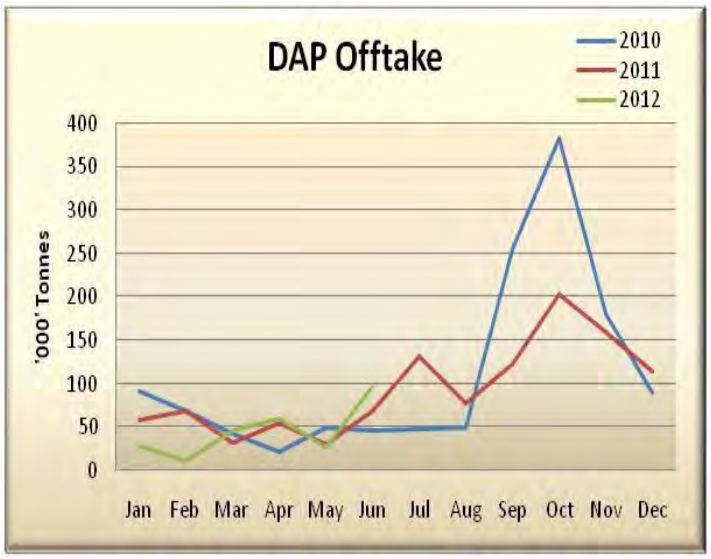
Fertilizer Situation:

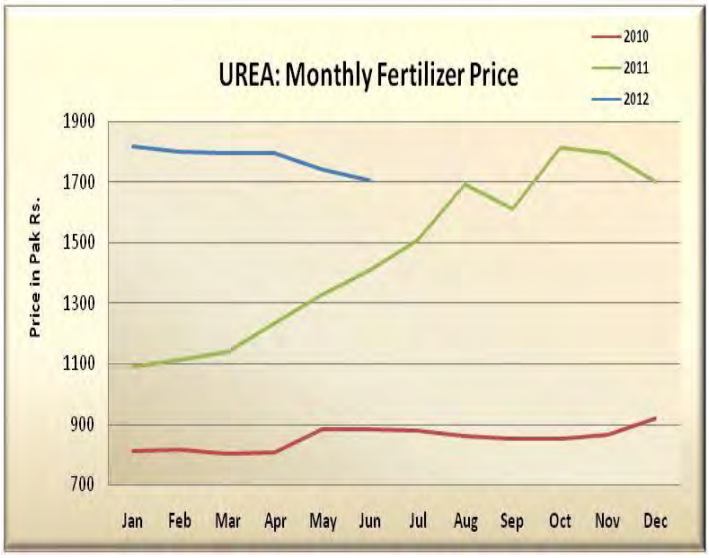
During ongoing Kharif , about 3377 thousand tones of urea including 425 thousand tones of imported supplies, 800 thousand tones of inventory and 2152 thousand tones of local production would be available against 3214 thousand tones estimated demand leaving an inventory of 159 thousand tones. About 726 thousand tones of DAP would be available in the market. The demand estimate are around 552 thousand tones, leaving a closing balance of 173 thousand tones. Thus supply demand situation in respect of both urea and DAP will remain satisfactory

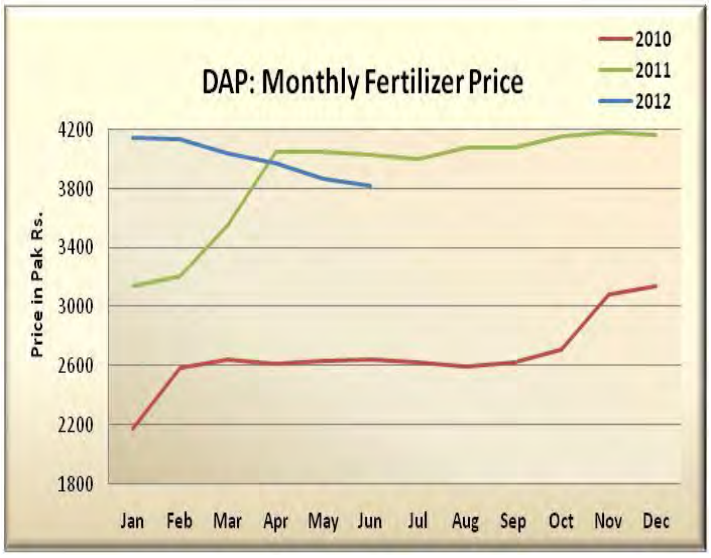
Month	2012-13				2011-12				% Change			
	Nitrogen	Phosphate	Potash	Total	Nitrogen	Phosphate	Potash	Total	Nitrogen	Phosphate	Potash	Total
	(000 tons)											
Apr	169.8	35.8	1.4	207	252.7	33.1	2.8	288.6	-32.8	8.2	-50.0	-28.3
May	197.3	21.7	1.6	220.6	252.2	25.7	1.2	279.1	-21.8	-15.6	33.3	-21.0
Jun	533.2	57.7	1.2	592.1	257.4	41.9	1.4	300.7	107.1	37.7	-14.3	96.9
Jul*	280.9	70	2.5	353.4	272.8	78.1	3.1	354	3.0	-10.4	-19.4	-0.2
Total	1181.2	185.2	6.7	1373.1	1035.1	178.8	8.5	1222.4	14.1	3.6	-21.2	12.3

*P= Provincial assumed at the level of last year









ISNET/CSE Workshop on Food Security in Dakar, Senegal 11-16 July 2012

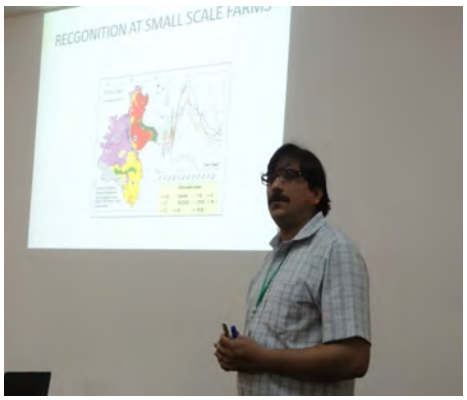










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Punjab: Field View - July 2012

Field Preparation in Jhelum



Sowing of Autumn Maize in Gujrat



Rice in Gujrat



Rice sowing in progress in Wazirabad



Rice sown in Kamonki



Rice planting in Lahore



Vegetables sowing at Kala shah Kaku



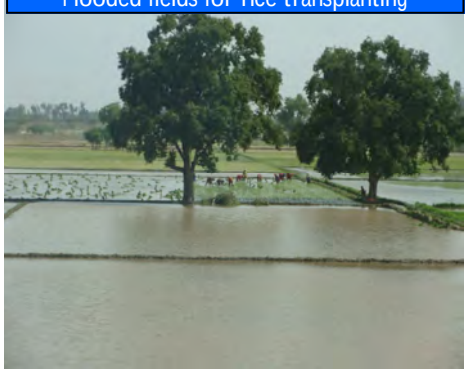
Picking of vegetables at Kala Shah Kaku



Rice transplanting at Muridke



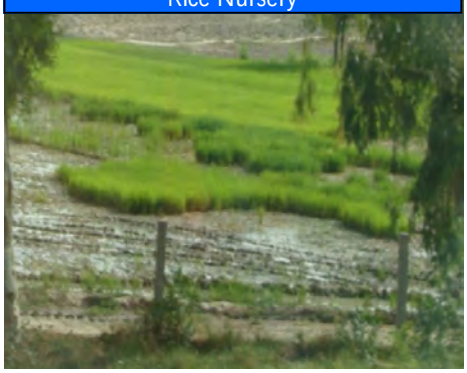
Flooded fields for rice transplanting



Fields irrigated for rice transplanting



Rice Nursery



Khyber Pakhtunkhwa & Punjab : Field view—July 2012

Healthy Litchi Plant at Pindgakhra, KP



Damaged Litchi Fruit by Heat wave and water Shortage



Bitter gourd at Pindgakhra, KP



Bitter gourd Crop management at Pindgakhra, KP



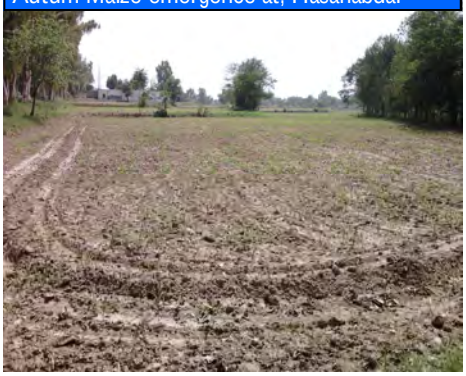
Natural Honey bee hive in orchard.



Field preparation for Maize sowing



Autum Maize emergence at, Hasanabdal



Patchy Maize crop development due to water shortage



Healthy maize crop at, Hasanabdal



Sugarcane crop at, Chichawatni



Cotton at boll formation at, Chichawatni



Insect infestation on cotton plant, at Sahiwal



NEWS/UPCOMING EVENTS:

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