
بسم الله الرحمن الرحيم
madaniwallpapers

TITLE

Integrated Water Resource Management by using Water Evaluation And Planning Model: A case study of Lower Bari Doab Canal, Pakistan

Presented by:

Hira Khanam
M.Sc.(Hons.)Agricultural Engineering
Dept. of Irrigation and Drainage.
University of Agriculture ,
Faisalabad.

Outlines:

- Title
- Introduction
- Problem statement
- Objectives
- Methodology
- Results and Discussion
- Conclusion
- Recommendations

INTRODUCTION

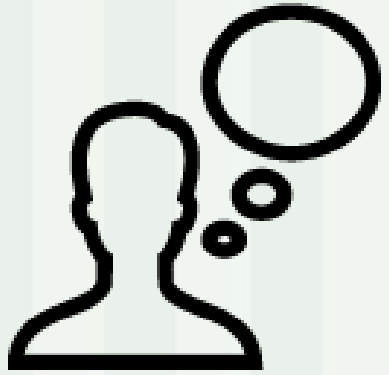
- Water is one of the most essential resources on Earth and is fundamental for life to exist. It is among the top 5 crisis of the world.
- Accessibility of fresh water is declining globally due to environmental and climate changes, industrialization, contamination and other anthropogenic activities
- For Integrated water resource management ,water managers and the policy mak ers requires different tools. Many Simulation models are being adopted for water management in large irrigation schemes , among them is WEAP.
- WEAP is provided with the modeling frame work with an advanced approach which includes water demand priority and supply preference and can use different scenarios for integrated water resource management.

PROBLEM STATEMENT

- Pakistan is also among the countries which are facing the threat of water scarcity.
- The distribution system of Pakistan is purely supply based and does not consider the Crop Water Requirement.
- Water table is declining and the cost of pumping of ground water is also increasing. Rapid Ground water pumping is also causing the saline water intrusion
- Change in climate is affecting the water resources enormously throughout the world and in Pakistan.
- The inadequate political governance and inappropriate policies also causing the mismanagement in the valuable resource of water

OBJECTIVES

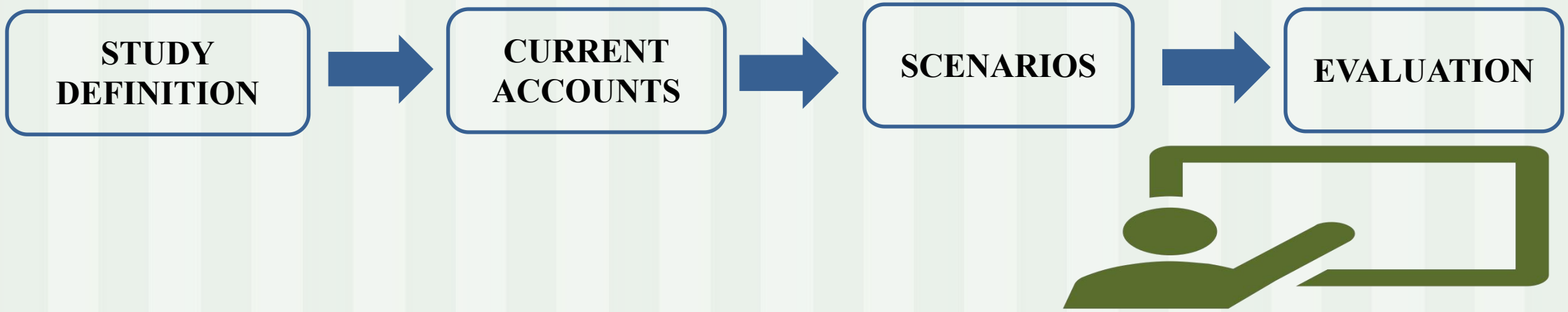
- To investigate the current water allocation scenario in Lower Bari Doab Canal command area.
- To evaluate the water allocation plans under different possible future scenarios



METHODOLOGY

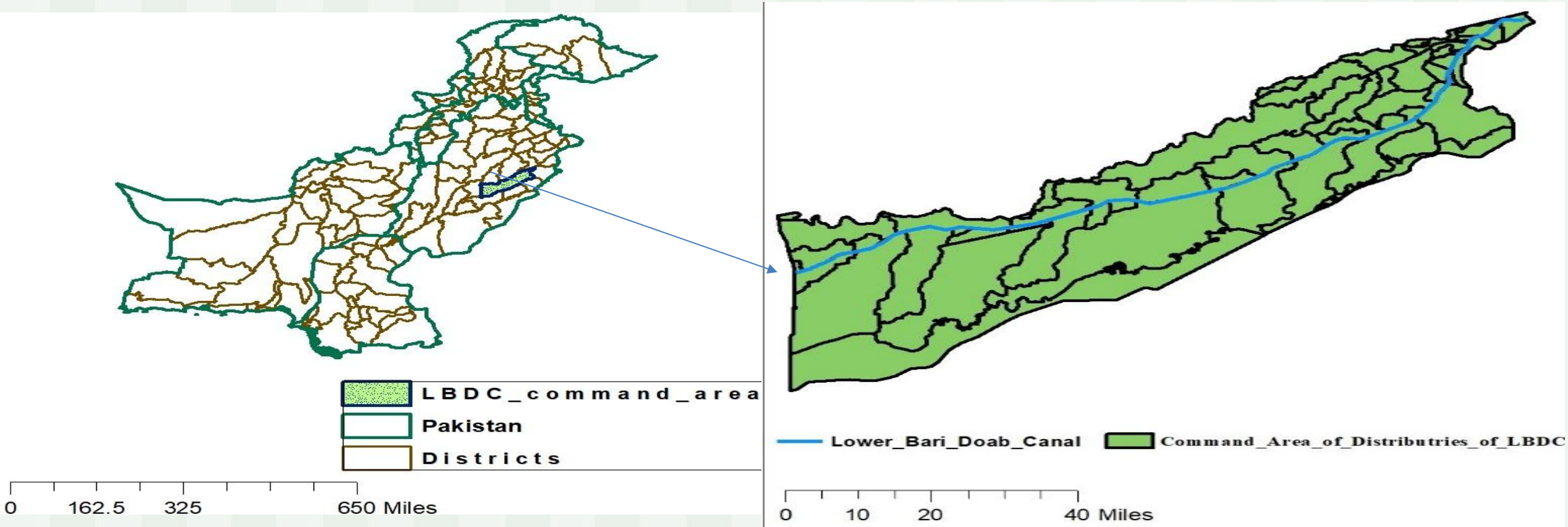
WEAP MODEL DISCRIPTION:

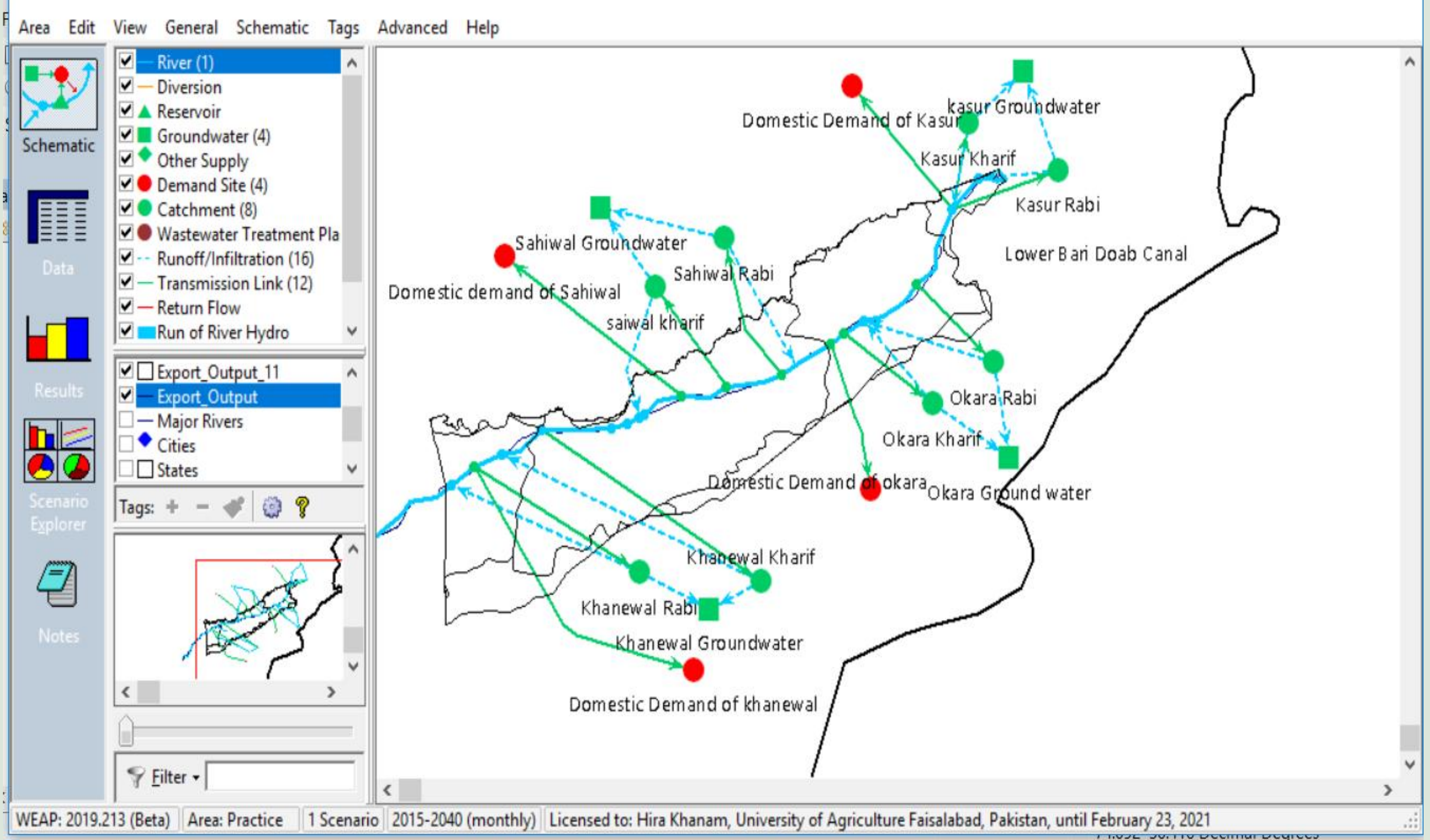
- WEAP was originally developed by Stockholm Environment Institute in Boston, USA (SEI-US)
- WEAP is a software tool for integrated water resources planning.
- Steps include in WEAP application:



STUDY AREA

- The study area is located in the Bari Doab (the area between the rivers Ravi and Sutlej) and comprises the command of LBDC.
- The LBDC serves a cultivable command area of about 1.7 million acres in Districts Kasur, Okara , Sahiwal and Khanewal.




Area
Edit
View
General
Schematic
Tags
Advanced
Help
Schematic
Data
Results
Scenario Explorer
Notes
River (1)
Diversion
Reservoir
Groundwater (4)
Other Supply
Demand Site (4)
Catchment (8)
Wastewater Treatment Pla
Runoff/Infiltration (16)
Transmission Link (12)
Return Flow
Run of River Hydro
Export_Output_11
Export_Output
Major Rivers
Cities
States
Tags:
Filter
Domestic Demand of Kasur
kasur Groundwater
Kasur Kharif
Kasur Rabi
Lower Bari Doab Canal
Sahiwal Groundwater
Sahiwal Rabi
Domestic demand of Sahiwal
saiwal kharif
Okara Rabi
Okara Kharif
Okara Ground water
Domestic Demand of okara
Khanewal Kharif
Khanewal Rabi
Khanewal Groundwater
Domestic Demand of khanewal
WEAP: 2019.213 (Beta)
Area: Practice
1 Scenario
2015-2040 (monthly)
Licensed to: Hira Khanam, University of Agriculture Faisalabad, Pakistan, until February 23, 2021

DATA USED IN WEAP MODEL , SOURCES AND FORMAT

Data	Sources	Time
Climatic data	Pakistan Meteorological dept., Monthly and global assembled and satellite data sets	Daily, Monthly
Flows of LBDC	Irrigation department, GOP	Daily
Land use data	MODIS	Yearly
Soil data	World Soil map.	Daily Discharge data
Population (District wise), Water consumption, Growth rate	Pakistan Bureau of Statistics, World Bank Data	Yearly record

Districts	Distributaries laying within in a district
Okara	3R, 2RA, 2R, 1RB, 1RA, 1R, Joya, Gogera Baloki, Jaandraka, Koh ala, Chachak and Marala, Guba Dich, 1L Balloki, 1AL Feeder, 4L, Thatti Kalsan, Khokhar, Kplot
Sahiwal	14L, 12L, 11L, 13L, 13AL, 12L, 9L, 9AL, Bahab,6R Sahiwal,5R5 AR.4R,4L,5L Gamber, 10LNew, 9AL, Northern buffer, Southern b uffer
Khanewal	15L Khanewal, 8AR Khanewal, 8R,16L, 8BR, 9R
Kasur	Halla, Alpha Balloki, Gurke Balloki, Gogera1, Ojla, Ghumanki

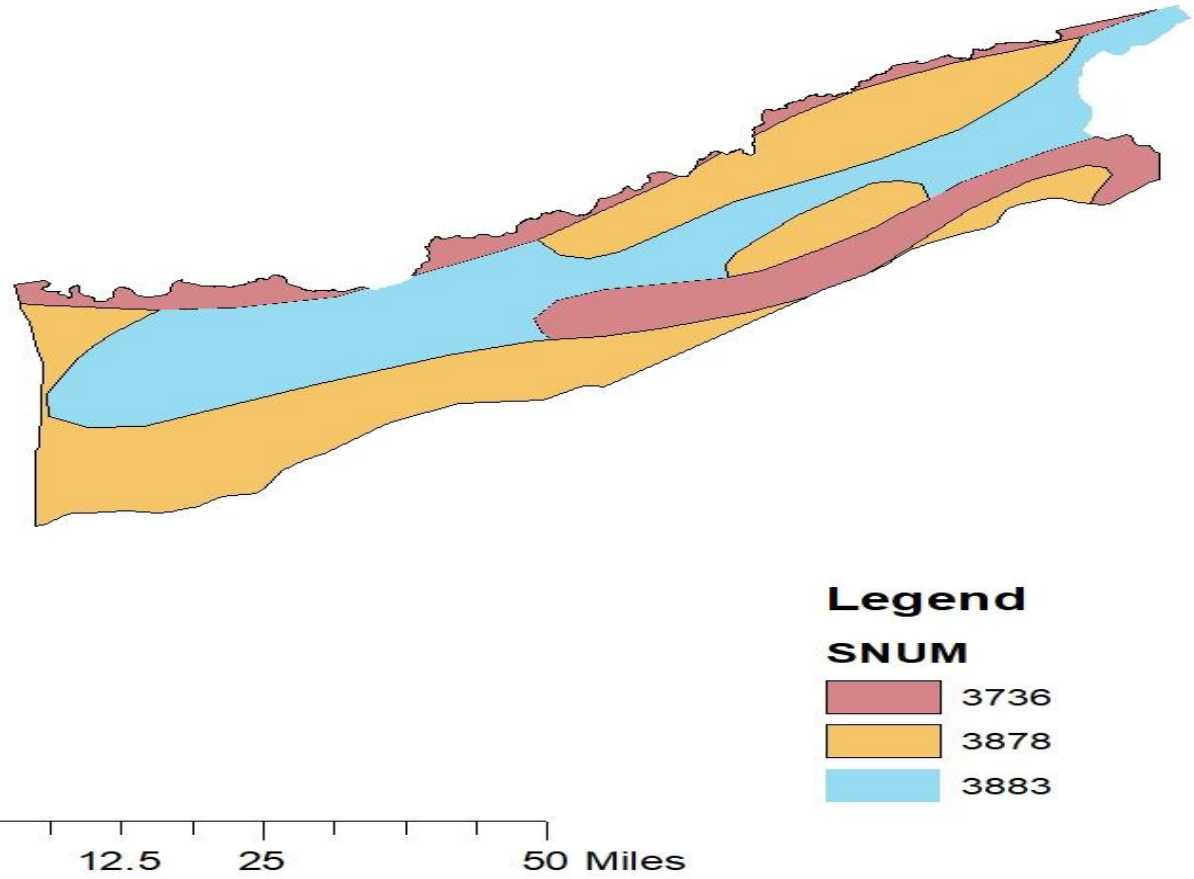
Population and demand sites

Districts	Population
Kasur	792045
Okara	2915324
Sahiwal	2414994
Khanewal	730928

Current account year	2015
Last year of scenarios	2040

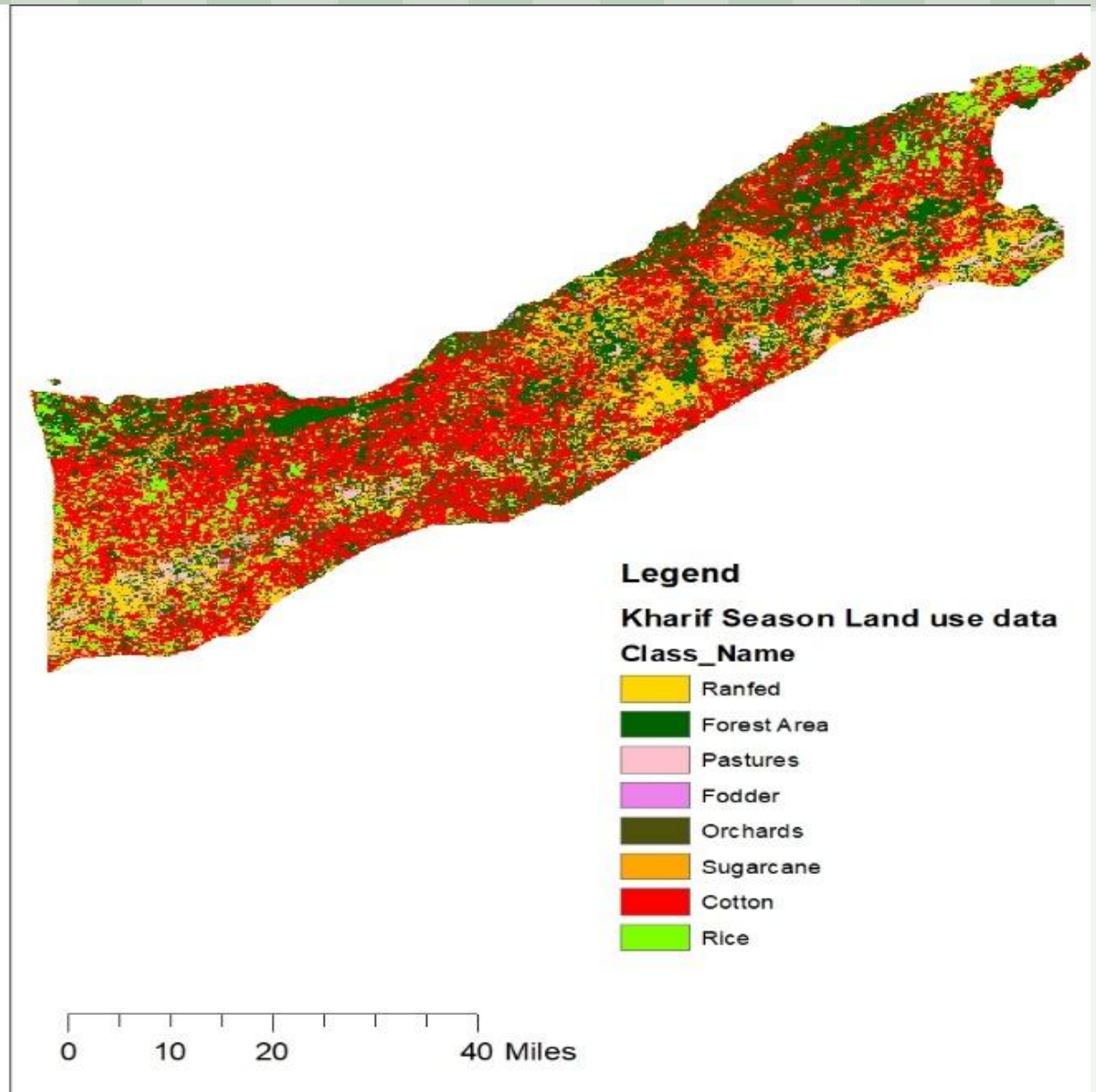
Demand sites	Demand Priority
Domestic Demand of Kasur	1
Kasur Rabi	1
Kasur Kharif	1
Domestic Demand of Okara	2
Okara Rabi	2
Okara Kharif	2
Domestic Demand of Sahiwal	3
Sahiwal Rabi	3
Sahiwal Kharif	3
Domestic Demand of Khanewal	4
Khanewal Rabi	4
Khanewal Kahrif	4

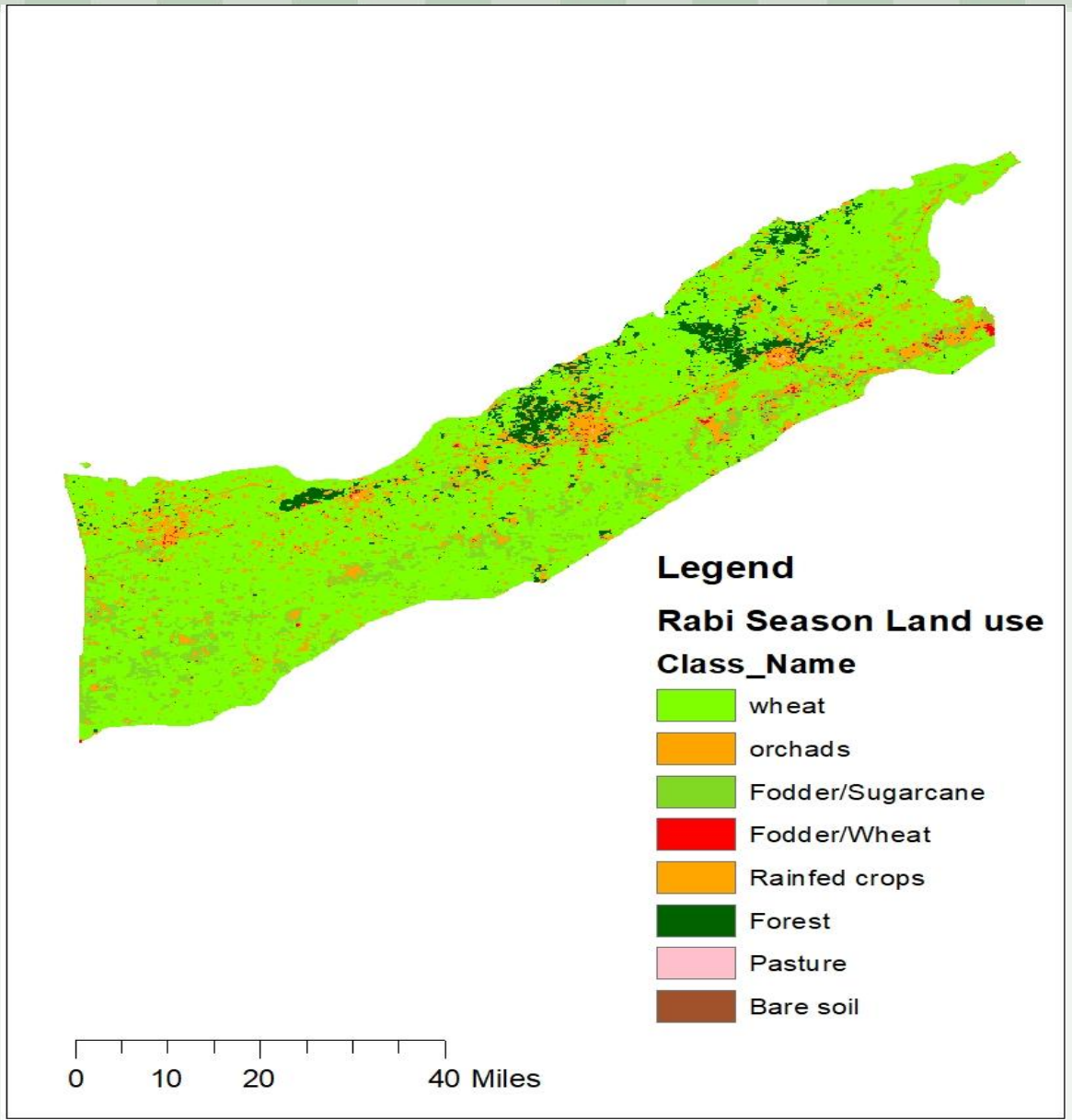
SOIL DATA



Sr. no.	SNUM	Soil Types
1	3736	Clay Loam
2	3878	Loam
3	3883	Clay Loam

Land Use data for the Rabi and Kharif Season





LAND USE FOR THE DISTRICTS of Okara and Kasur

Kharif Land use	Area (Hectares)	Rabi Land use	Area (Hectares)
Rainfed	18462.5	Wheat	89537.5
Orchards	20087.5	Orchards	13618.75
Cotton	41225	Fodder	9406.25
Fodder	743.75	Rainfed	5675
Sugarcane	10093.75		
Rice	5987.5		

Kharif Land Use	Area (Hectares)	Rabi Land Use	Area(Hectares)
Rainfed	525	Wheat	7781.25
Orchards	738	Orchards	206.25
Cotton	2538	Fodder	943.75
Rice	4294	Rainfed	106.25
Fodder	119		

LAND USE FOR THE DISTRICTS of Sahiwal and Khanewal

Kharif Land Use	Area (Hectares)	Rabi Land use	Area (Hectares)	Kharif Land use	Area (Hectares)	Rabi Land use	Area (Hectares)
Rainfed	48150	Wheat	372431.25	**Rain fed**	725.96313	Wheat	64243.75
Fodder	3162.5	Orchards	39950	**Fodder**	50.024375	Orchard	7000
Orchards	44006.25	Fodder	52450	**Orchards**	4056.4819	Fodder	10418.75
Sugarcane	18568.75	Rainfed	17806	**Sugarcane**	650.15875	Rain fed	3162.5
				Cotton	12077.6		
				Rice	6219.4869		

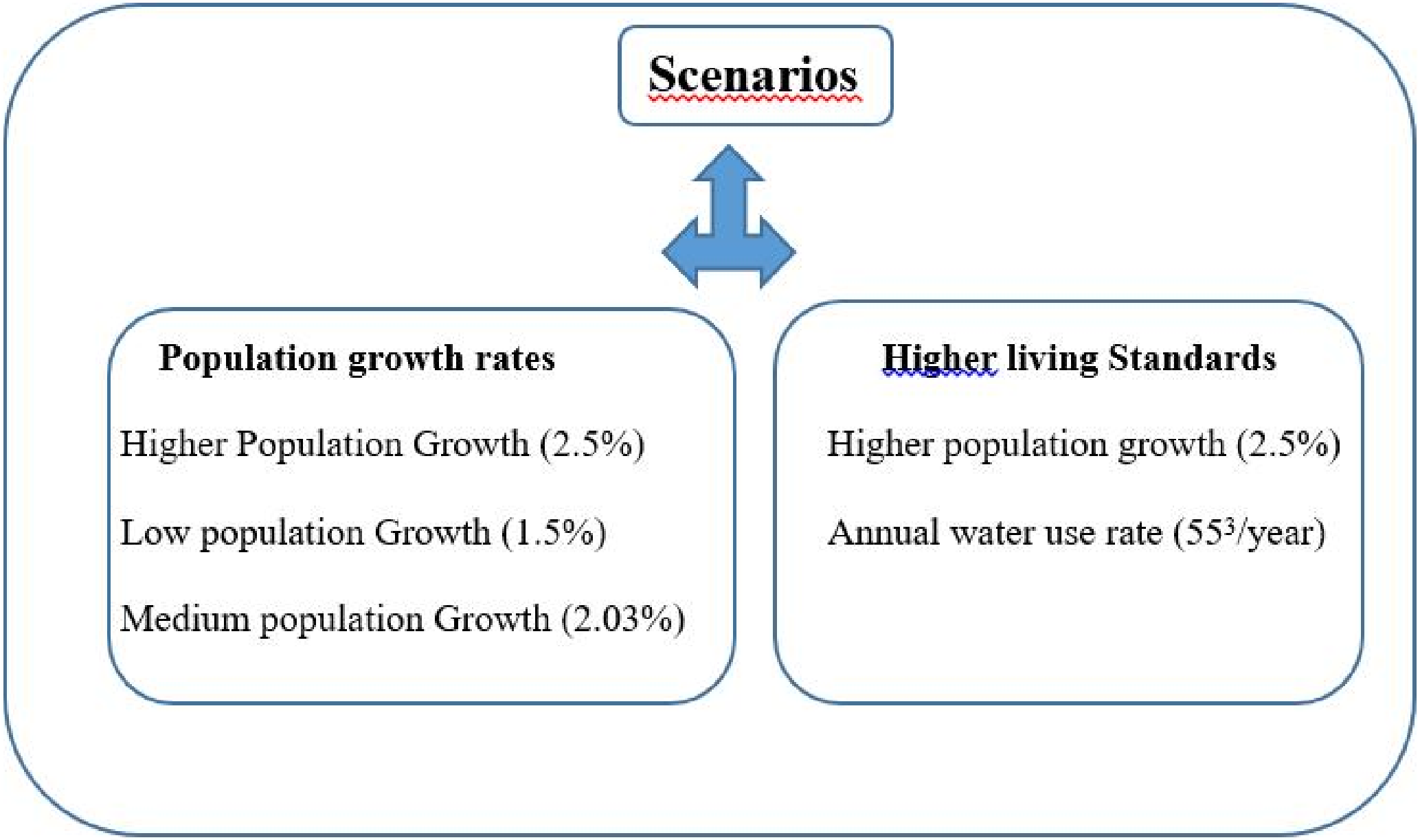
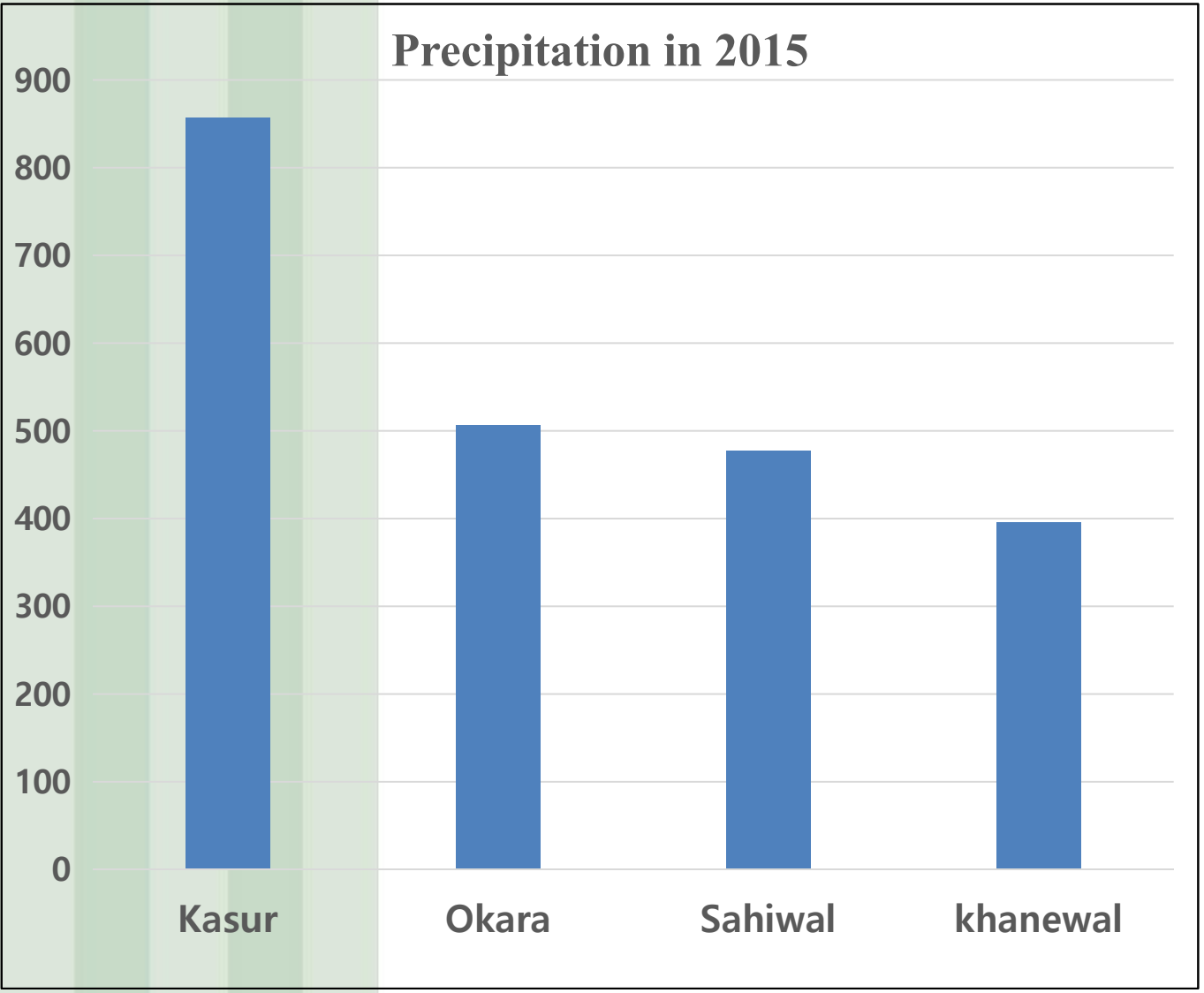
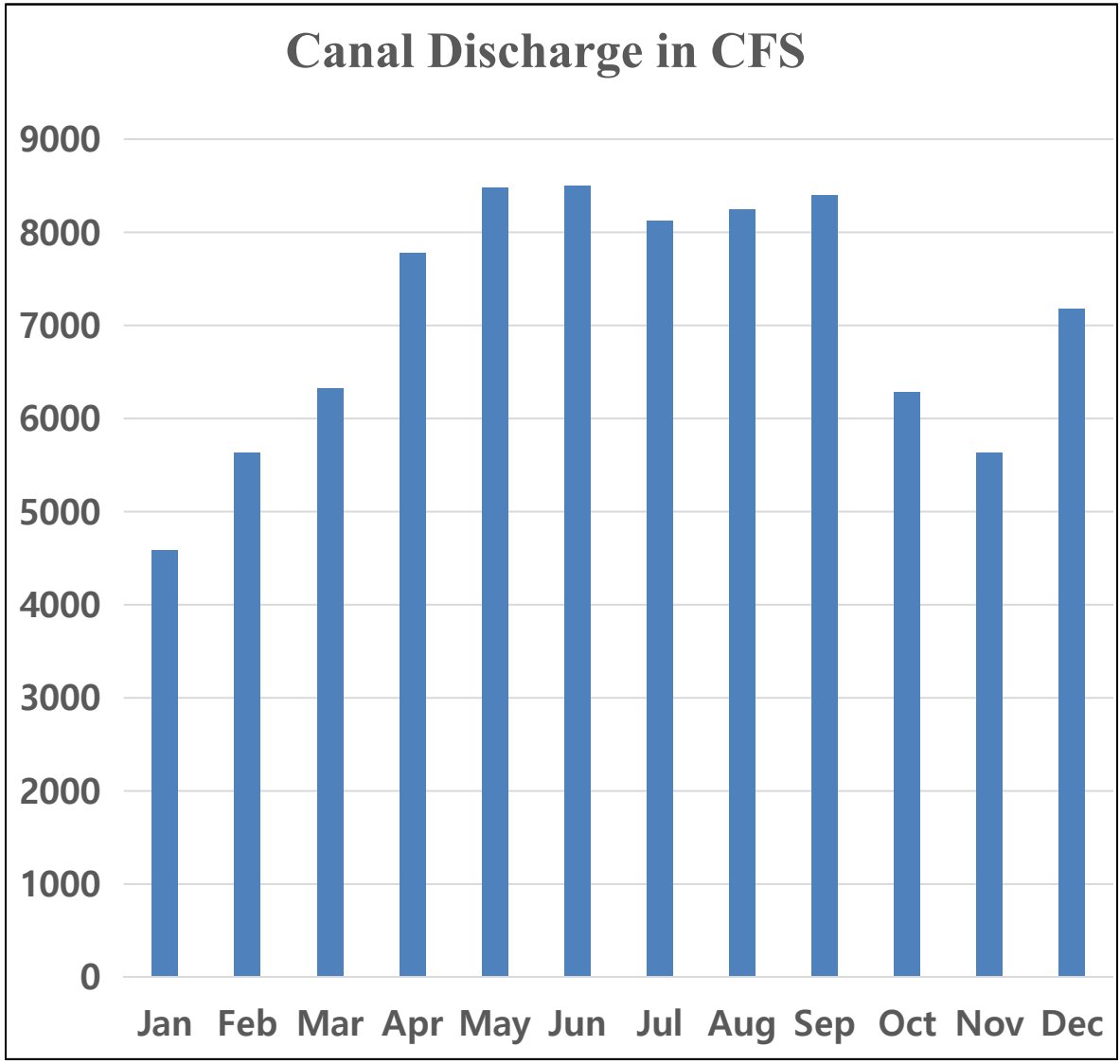


Figure 3.18 Scenarios built in the model

Results:

For the current account year (2015):

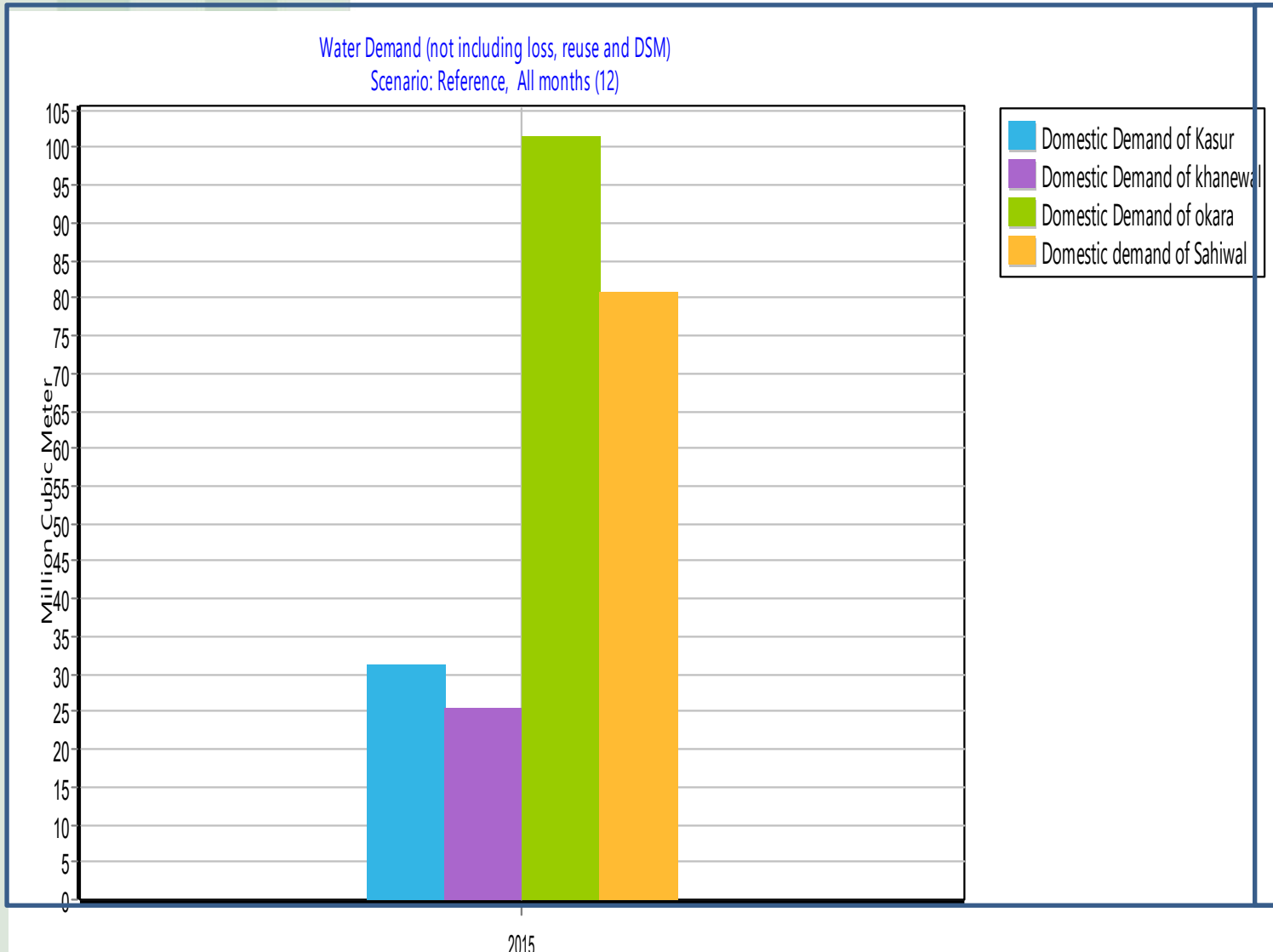




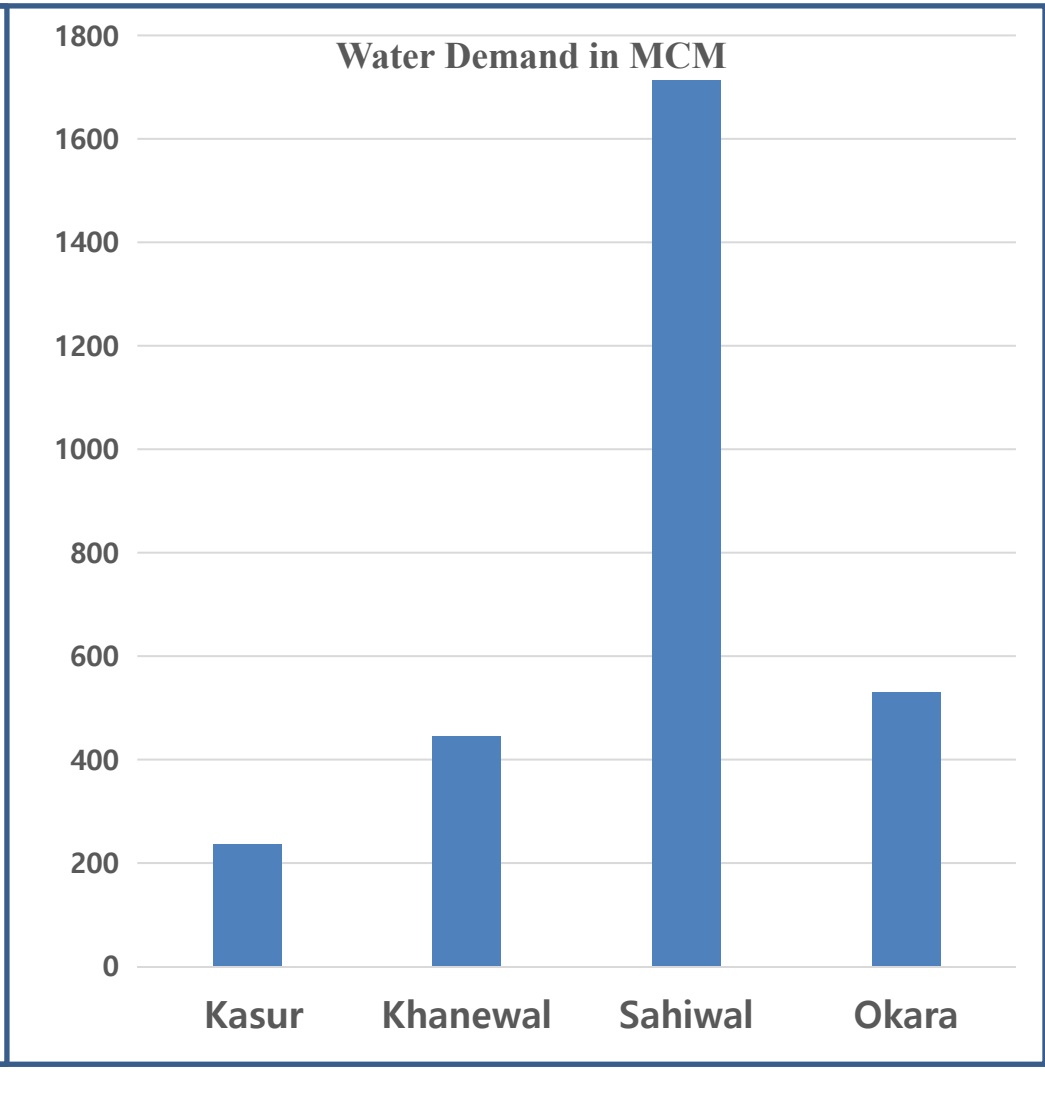
Results:

FOR CURRENT ACCOUNT YEAR (2015):

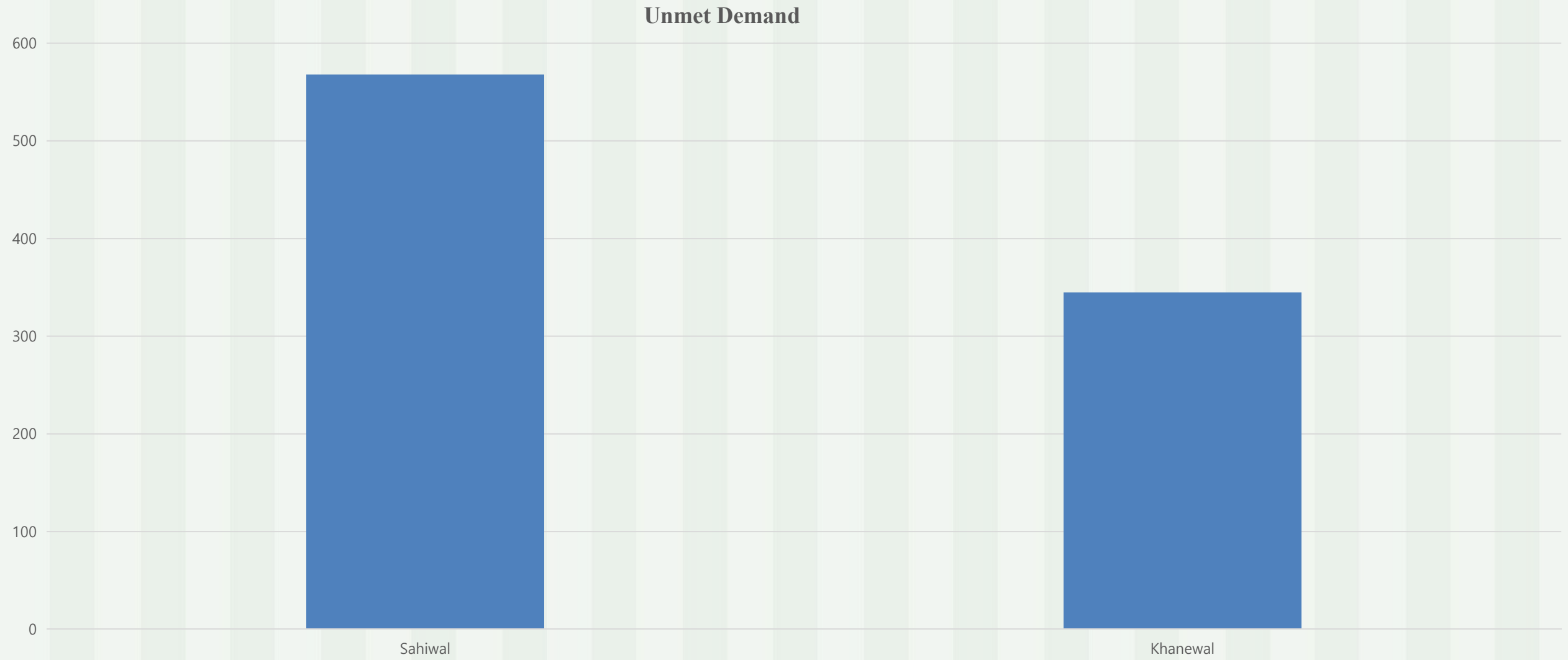
DOMESTIC WATER DEMAND



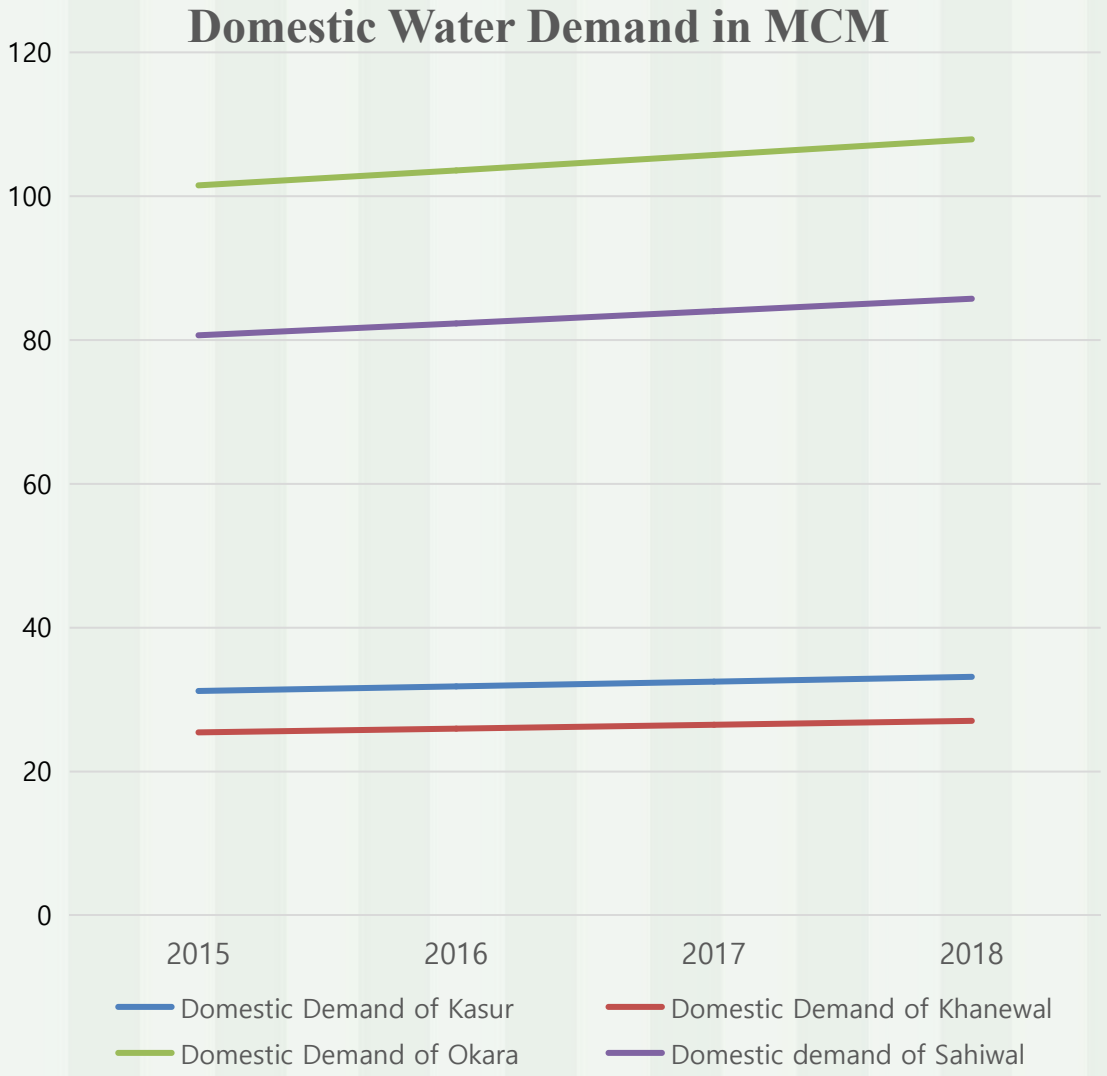
AGRICULTURE WATER DEMAND

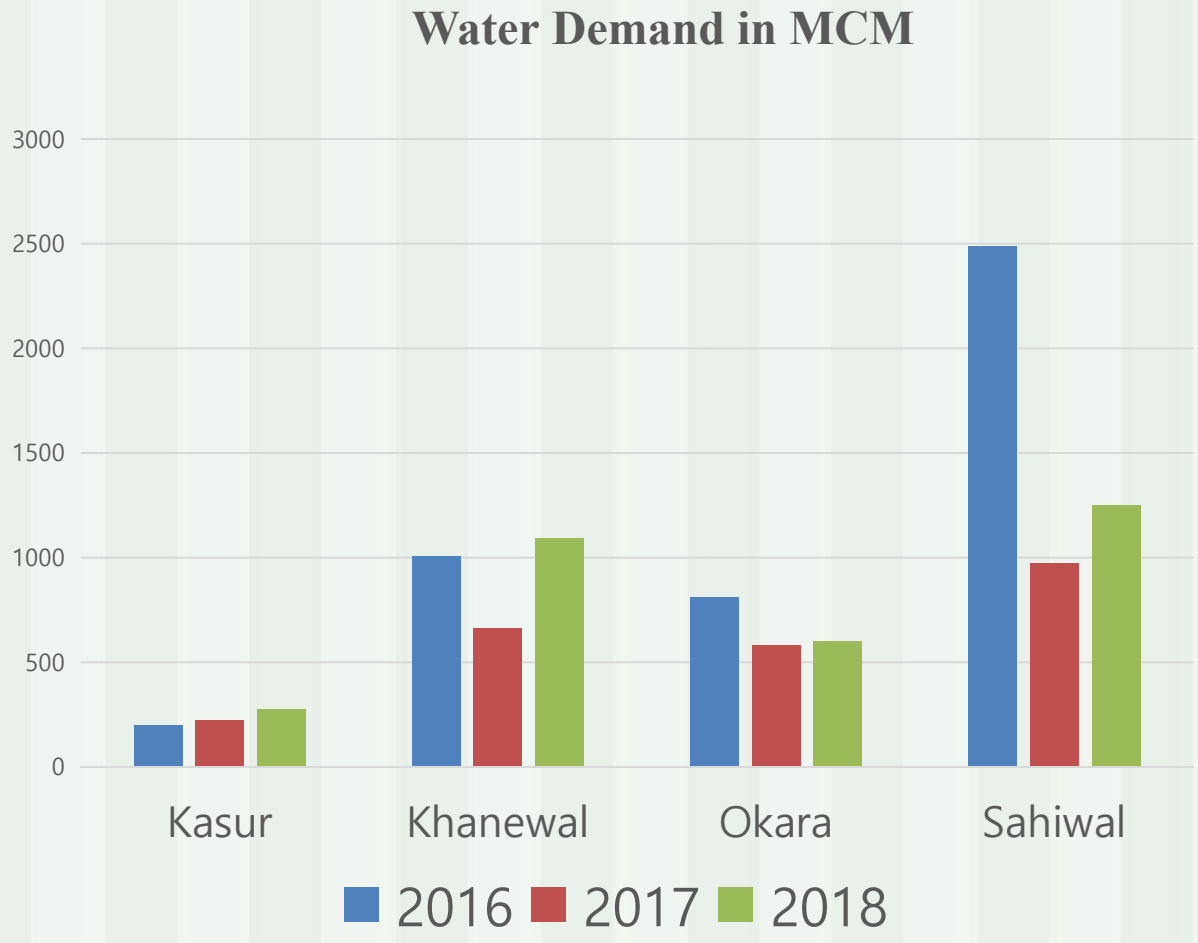


Unmet demand in 2015:



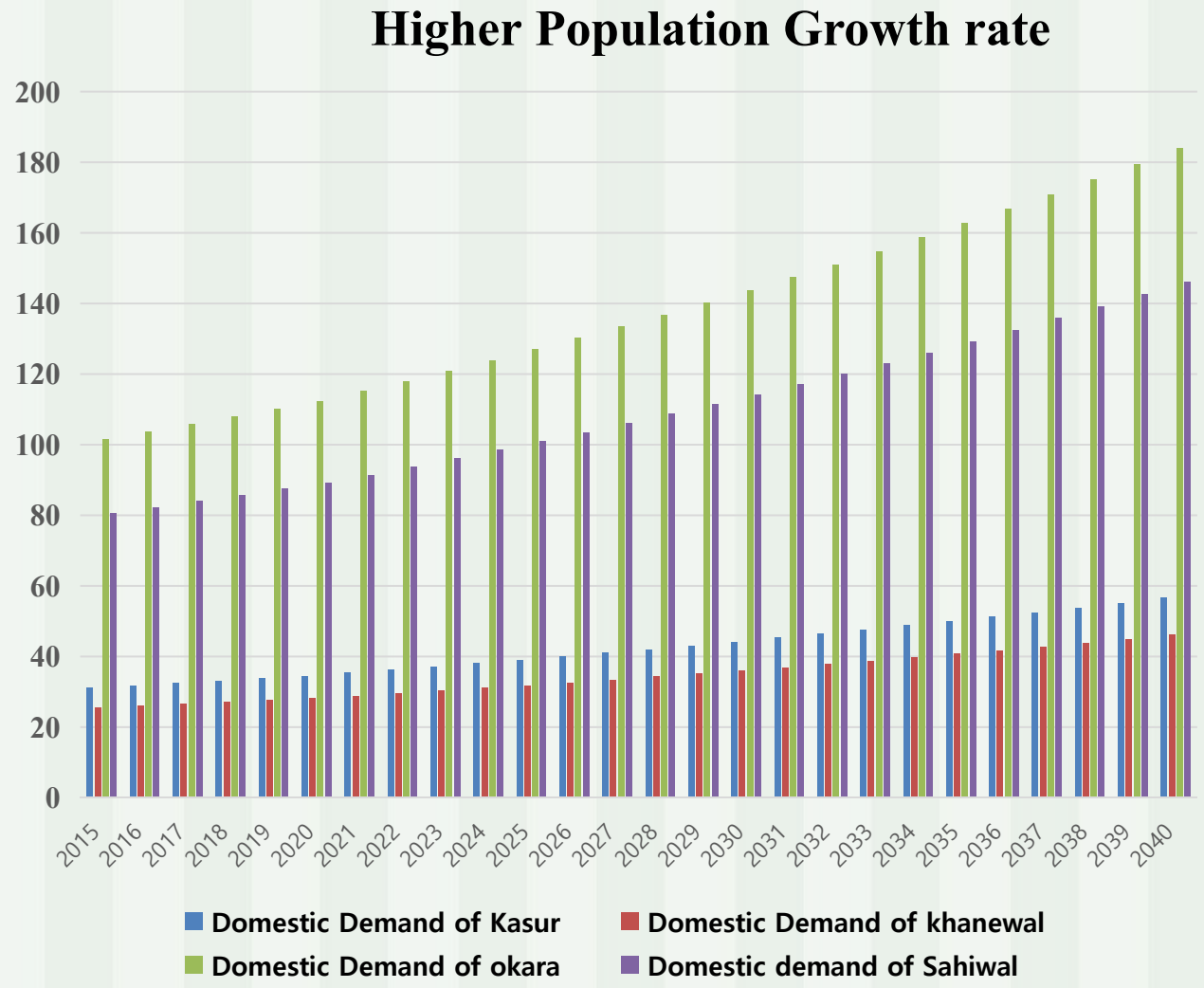
Domestic and Agriculture water demand for the year 2016,2017,2018

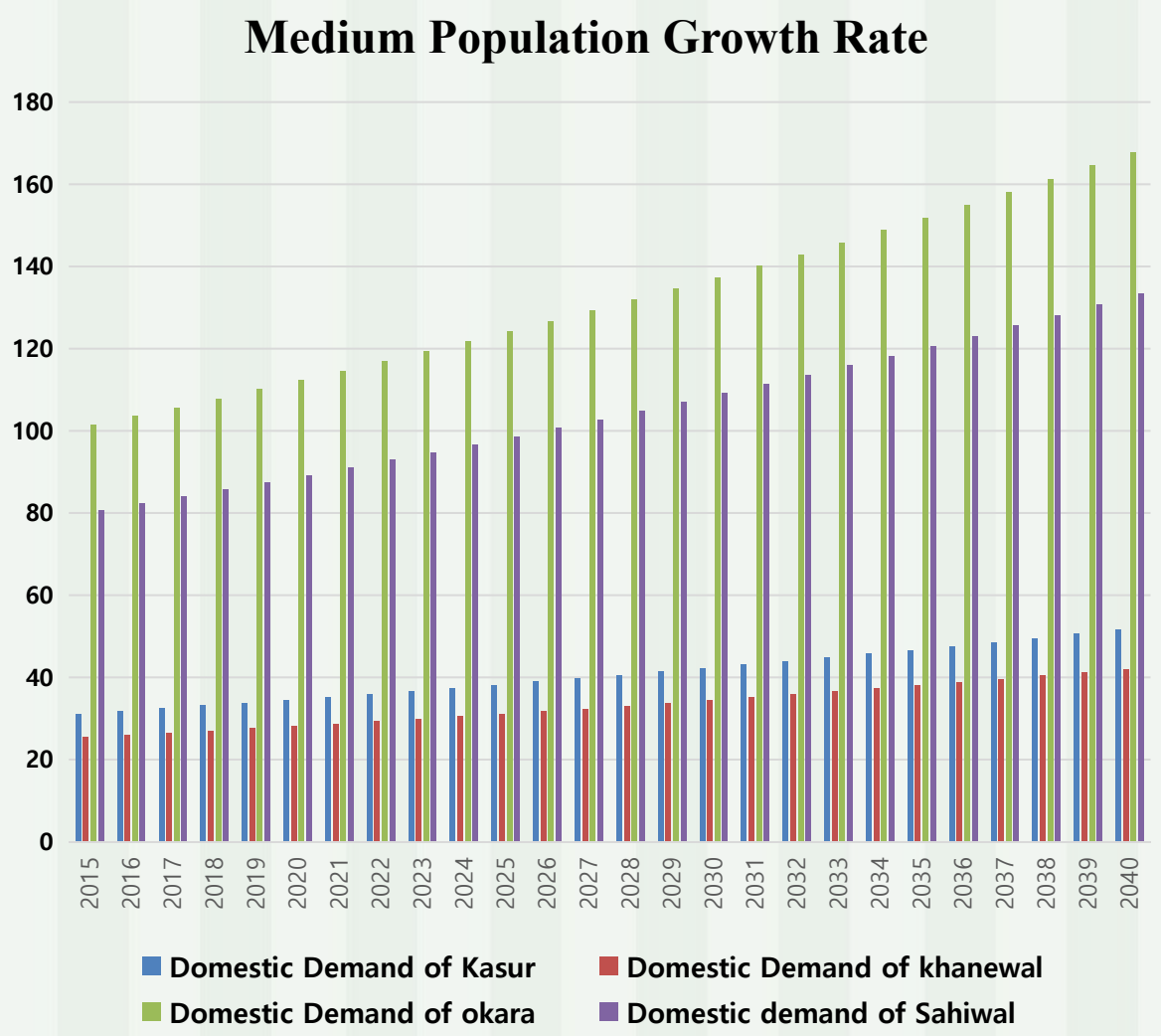




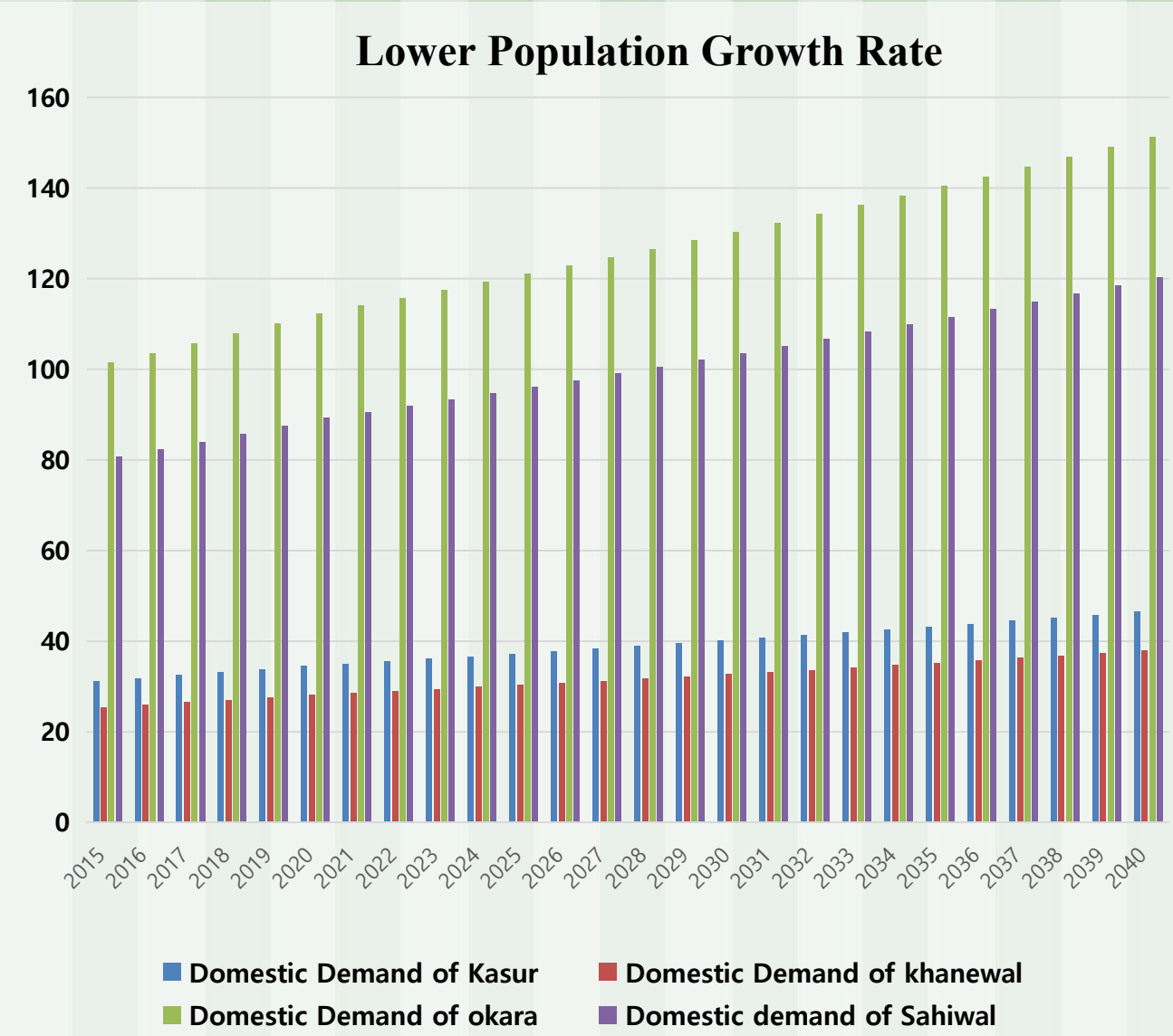
Unmet demand for Sahiwal and Khanewal

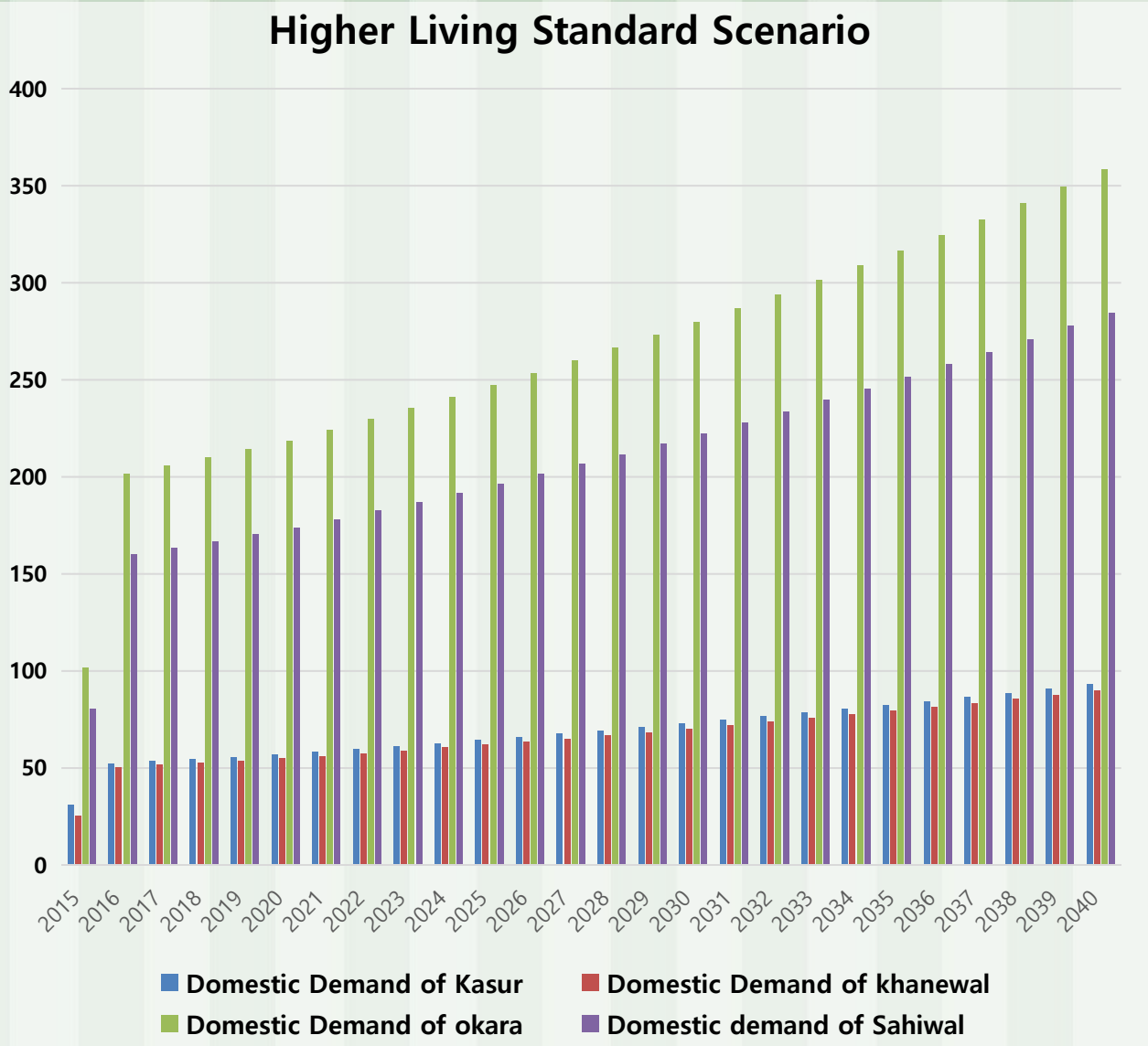
Water demand in response to Higher and Medium population growth rate:





Lower population growth rate and Higher living standard scenario:





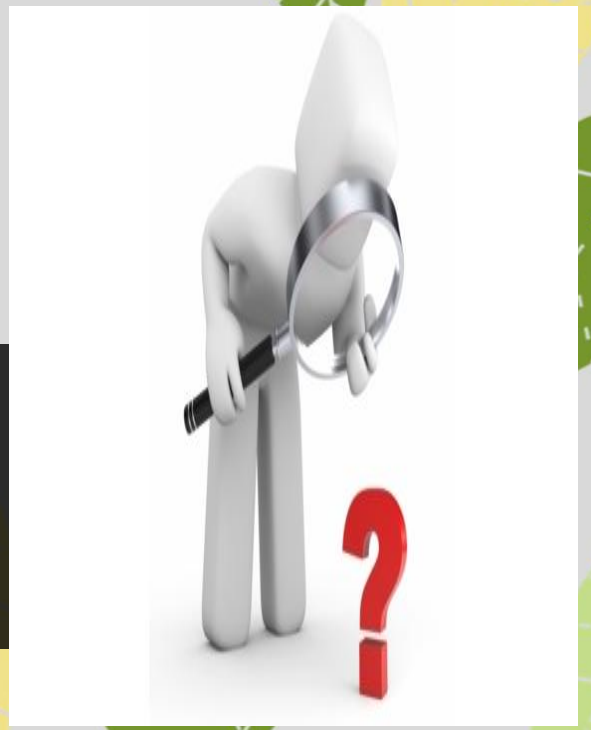
Conclusion:

- Water demand is increasing with increasing population, economic growth, urbanization, Industrialization and Climate change.
- Water demand for the Sahiwal district was found to be maximum because it has the largest land use area of crops
- Unmet demand was found to be the highest for the districts of Sahiwal and Khanewal.
- WEAP is user friendly and can be used easily for the evaluation of di fferent water management strategies and policies before implementation
- The constraints faced includes unavailability of institutional support, sufficient and reliable information and political conflicts.

Recommendations

- Water should be supplied on demand based rather than supply b ased
- Treated waste water can be used for irrigation
- Water efficient crops should be used in the district of Sahiwal and Khanewal.
- The domestic demand can be reduced by maintaining a low
- population growth rate and Consumer education would improve the water use and practices
- WEAP is user friendly and can be used for determining the impact of different water management strategies and policies.

Thank You



+1 23 987 6554

Any Questions ?