SECTION 2

RAPID FERTILIZER USE ASSESSMENT

FERTILIZER USE AND CROP YIELD

To assess fertilizer use at the farm-gate level, a Rapid Fertilizer Use Assessment (RFUA) was carried out during 2015 in collaboration with the Provincial Agriculture Extension Department in twenty-four districts across Sindh. The data collected through RFUA is used to prepare fertilizer use maps for each of the major crops. The trends of average crop(s) yields under different fertilizer use scenarios obtained by the interviewed farmers are also described. The number of farmers interviewed in each district was 60 (sample size) and the total farmers / respondents were 1440. The selection of farmers reveals that the sample was skewed towards medium level to progressive farmers with whom the agriculture extension workers frequently interact. The use of potassium (K) and/or micronutrients (alone or with FYM) in addition to NP improved crop yields. However, FYM alone may not fulfil crop requirement. Use of K, micronutrients and FYM in appropriate combination(s) along with N and P is recommended for achieving optimal crop productivity and improving soil health.

KEY INDICATORS

- Major crops grown by farmers
- Yield of major crops
- Farm size
- Crop-wise use of fertilizers (inorganic/chemical fertilizers)
  - Crop-wise use of Urea
  - Crop-wise use of Di-ammonium Phosphate (DAP)
  - Crop-wise use of Calcium Ammonium Nitrate (CAN)
  - Crop-wise use of Sulphate of Potash (SOP) and Muriate of Potash (MOP)
- Crop-wise use of organic sources of nutrients/FYM
- Farmers availing soil and water test facilities

KEY FINDINGS

91% Wheat

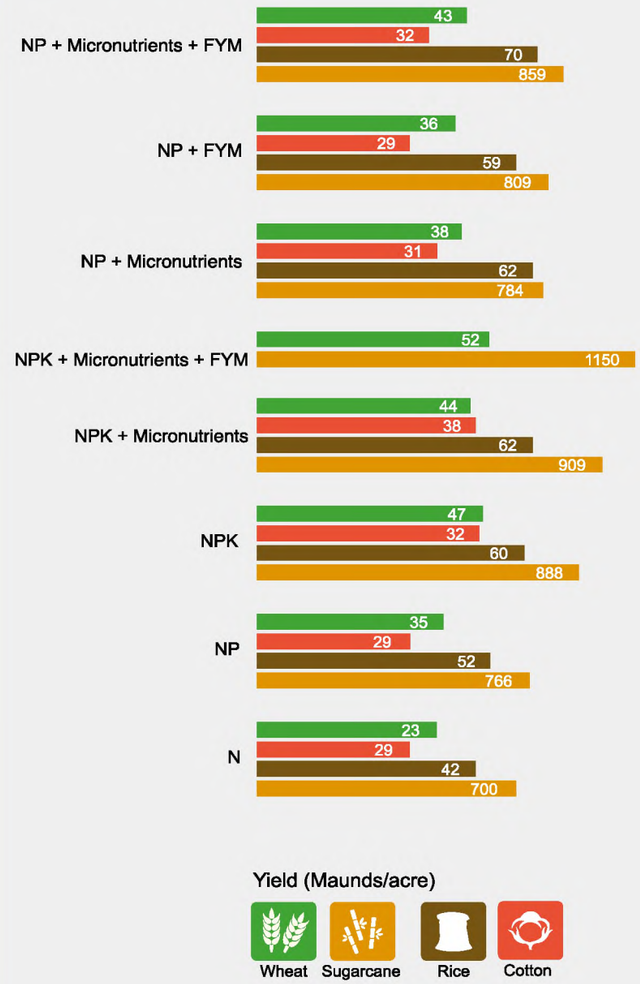
46% Cotton

44% Rice

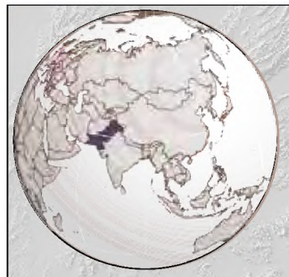
33% Sugarcane

3% Maize

Farm Size (Acres)	**Percent Farmers**
▪ < 5	06%
▪ 5-10	18%
▪ >10	76%
Laboratory Analysis	
▪ Soil Test	17%
▪ Water Test	09%
Major Problems	
▪ Soil-related Constraints	≈ 70%
▪ Salinity	35%
▪ Water-logging	36%
▪ Sodicity	08%
Others	≈ 30%
▪ Canal water shortage	
▪ Load shedding	
▪ High prices of fertilizers	
▪ Low commodity prices	
Use of Organic Sources	
▪ Wheat	17%
▪ Cotton	04%
▪ Rice/Paddy	03%
▪ Sugarcane	03%
▪ Other Crops	02%
▪ Maize	0.3%



MAJOR CROPS IN SINDH



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Map Legend

Administrative limits

- Country
- Province
- District

Major crops

- Wheat
- Rice
- Millet
- Cotton
- Sugarcane
- Vegetables
- Oilseeds and Pulses
- Fodder
- Mango
- Orchard

About Map

The map shows major crops grown in each district. The information is derived from the Development Statistics of Sindh (2013) by Sindh Bureau of Statistics.

Data Sources

FAO, GAUL, Bureau of Statistics, Government of Sindh

Map Scale and Datum

Datum: WGS 84 Nominal scale: 1:2,698,500 at A3

0 30 60 90 120 150
Kilometers

Date: 13 Feb 2015

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Sindh_MC_05_20150910

APPLICATION OF UREA TO WHEAT IN SINDH

JACOBABAD
KASHMORE
SHIKARPUR
KAMBAR SHAHDADKOT
LARKANA
GHOTKI
SUKKUR
DADU
NAUSHAHRO FEROZE
KHAIRPUR
SHAHEED BENAZIRABAD
SANGHAR
JAMSHORO
MATIARI
TANDO ALLAHYAR
HYDERABAD
UMER KOT
MIRPUR KHAS
KARACHI
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THATTA
BADIN
THARPARKAR
SUJAWAL

PUNJAB
BALOCHISTAN
INDIA
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Map Legend

Administrative limits

- Country
- Province
- District

Application of Urea (kg/acre)

- <= 50
- 51 - 100
- 101 - 150
- 151 - 200

About Map

The map shows the use of Urea for Wheat in each district. The data indicates over use of Urea in central Sindh and lower use in upper rice growing districts as well as in coastal districts Badin and Thatta.

Data Sources

FAO, GAUL, The Government of Sindh, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,036,900 at A3
Datum: WGS 84

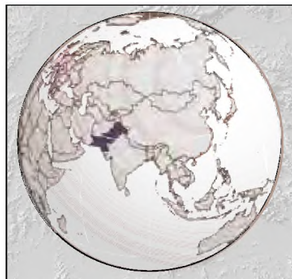
N

0 30 60 90 120 150
Kilometers

Date: 11 May 2016

Created by: IM Unit, FAO Pakistan
Map Number: PAK_Soil Fertility Atlas_Punjab_UreaWheat _2.1_20160511

APPLICATION OF UREA TO RICE / PADDY IN SINDH



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Map Legend

Administrative limits

- Country
- Province
- District

Application of Urea (kg/acre)

- <= 50
- 51 - 100
- 101 - 150
- 151 - 200
- No significant data

About Map

The map shows use of Urea for Rice in each district. The data indicates the higher use of Urea in two districts in each of rice growing areas in lower (Badin and Tando Muhammad Khan) and upper (Larkana and Jacobabad) Sindh. Urea usage in other rice growing districts is low.

Data Sources

FAO, GAUL, The Government of Sindh, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,036,900 at A3

Datum: WGS 84

N

0 30 60 90 120

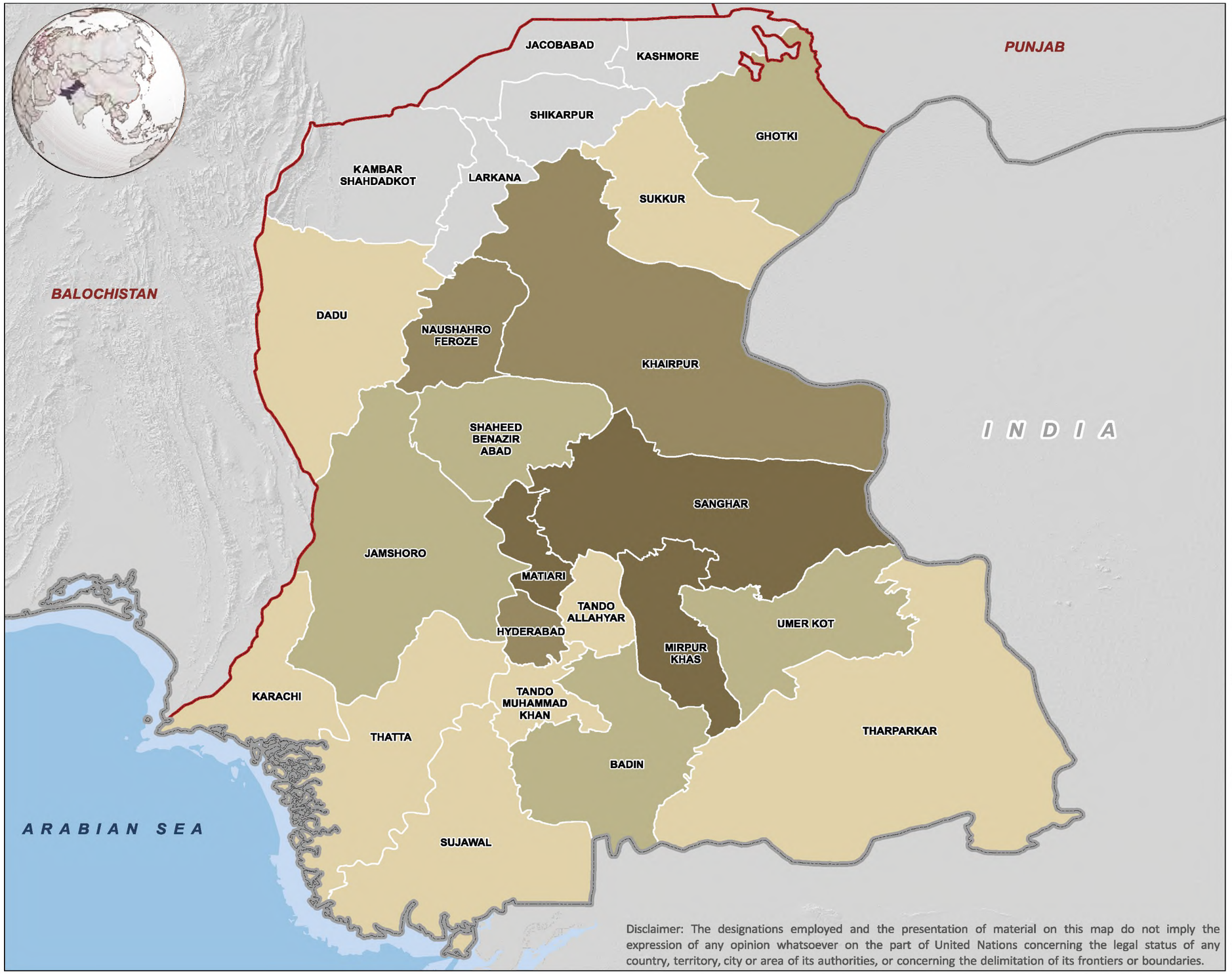
Kilometers

Date: 05 May 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Sindh_UreaRice _2.2_20160505

APPLICATION OF UREA TO COTTON IN SINDH



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Map Legend

Administrative limits

- Country
- Province
- District

Application of Urea (kg/acre)

- <= 100
- 101 - 150
- 151 - 200
- 201 - 250
- No significant data

About Map

The map shows use of Urea for cotton in each district. Higher usage is obvious in most central districts in the main cotton growing areas.

Data Sources

FAO, GAUL, The Government of Sindh, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,036,900 at A3

Datum: WGS 84

N

0 30 60 90 120 150

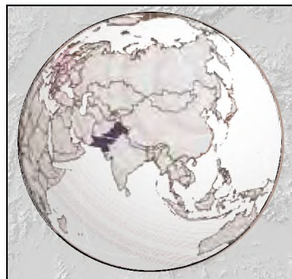
Kilometers

Date: 12 May 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Sindh_UreaCot _2.4_20160511

APPLICATION OF UREA TO SUGARCANE IN SINDH



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Map Legend

Administrative limits

- Country
- Province
- District

Application of Urea (kg/acre)

- <= 100
- 101 - 150
- 151 - 200
- 201 - 250
- No significant data

About Map

The map shows the use of Urea for Sugarcane in each district. The data shows the higher usage of Urea in Mirpur Khas, Tando Muhammad Khan and Hyderabad followed by adjoining districts and Ghotki in upper Sindh. However, Urea use for Sugarcane is low in all other districts of the province.

Data Sources

FAO, GAUL, The Government of Sindh, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,036,900 at A3

Datum: WGS 84

N

0 30 60 90 120 150

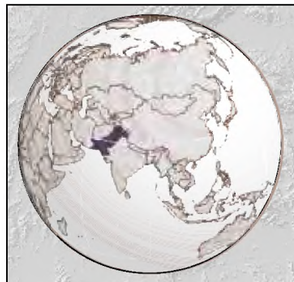
Kilometers

Date: 12 May 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Sindh_Urea Sugarcane_2.5_20160512

TOTAL USE OF UREA IN SINDH



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Map Legend

Administrative limits

- Country
- Province
- District

Total use of Urea per district (kg/acre)

- <= 200
- 201 - 400
- 401 - 600
- 601 - 800

About Map

The map shows the total use of Urea for major crops: Wheat, Rice, Cotton and Sugarcane. Higher use of Urea is obvious in Sanghar and Mirpur Khas followed by cotton growing districts. Rice growing districts in southern parts consume more Urea than those in the upper Sindh. In remaining districts of mixed crops, Urea usage is less.

Data Sources

FAO, GAUL, The Government of Sindh, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,036,900 at A3

Datum: WGS 84

N

0 30 60 90 120 150

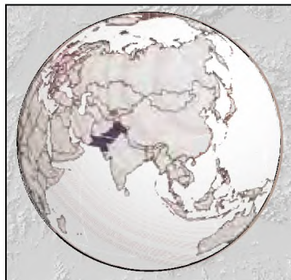
Kilometers

Date: 12 May 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Sindh_Urea_2.6_20160512

APPLICATION OF DI-AMMONIUM PHOSPHATE (DAP) TO WHEAT IN SINDH



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Map Legend

Administrative limits

- Country
- Province
- District

Application of DAP (kg/acre)

- <= 50
- 51 - 75
- 76 - 100

About Map

The map shows use of DAP for Wheat in different districts. Higher usage of DAP is obvious in the wheat-cotton growing areas, being maximum in Jamshoro. Lower use of DAP is apparent in whole of southern and upper rice growing districts of Sindh.

Data Sources

FAO, GAUL, The Government of Sindh, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,036,900 at A3

Datum: WGS 84

N

0 30 60 90 120 150

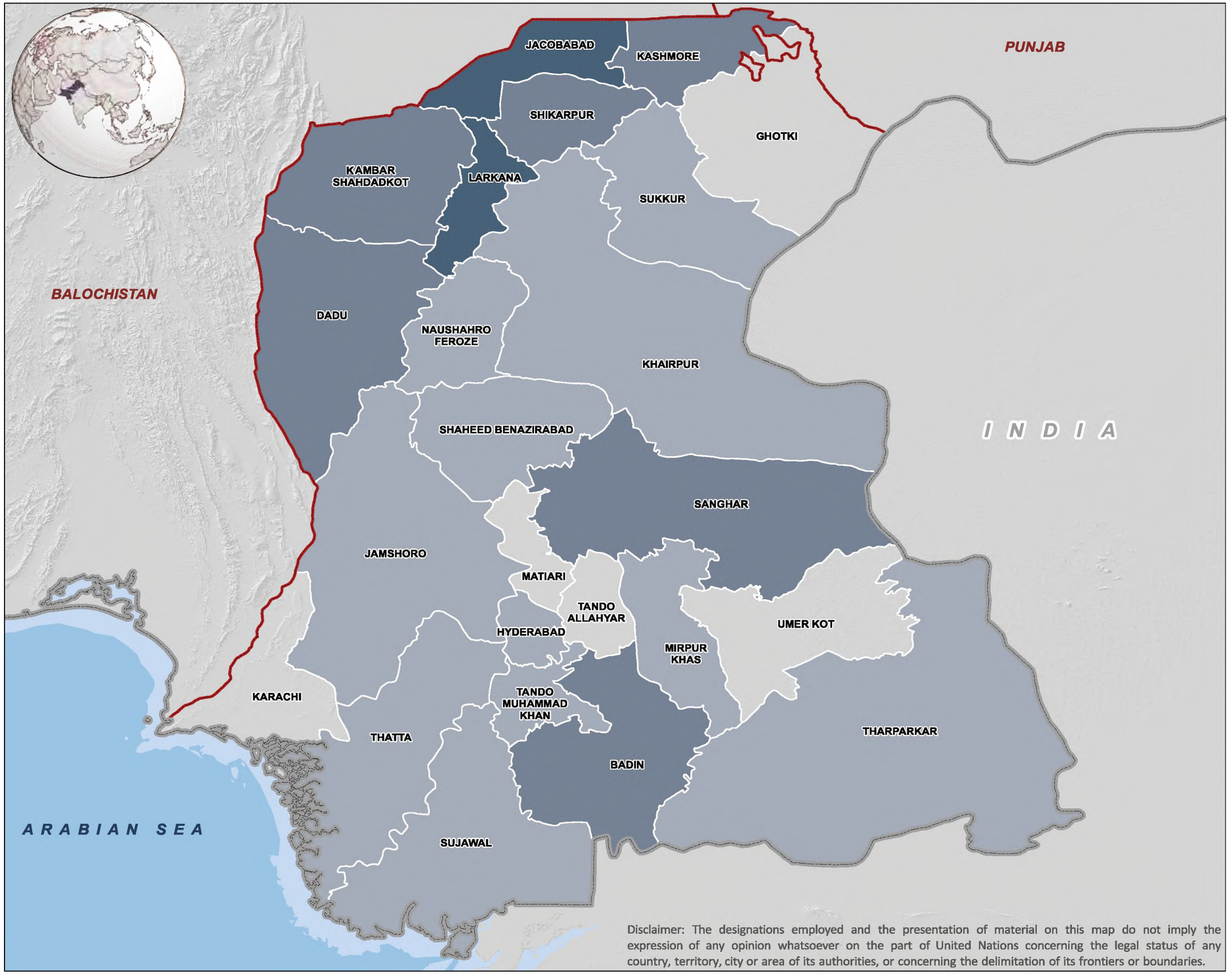
Kilometers

Date: 29 July 2015

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Sindh_DAP _4.1_20160513

APPLICATION OF DI-AMMONIUM PHOSPHATE (DAP) TO RICE IN SINDH



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Map Legend

Administrative limits

- Country
- Province
- District

Application of DAP (kg/acre)

- <= 25
- 26 - 50
- 51 - 75
- No significant data

About Map

The map shows use of DAP for Rice in different districts. Maximum use of DAP is seen in Jacobabad and Larkana followed by other rice growing districts in upper Sindh and also in Sanghar and Badin.

Data Sources

FAO, GAUL, The Government of Sindh, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,036,900 at A3

Datum: WGS 84

N

0 30 60 90 120 150

Kilometers

Date: 17 May 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Sindh_DAPRi _4.2_20160517

APPLICATION OF DI-AMMONIUM PHOSPHATE (DAP) TO COTTON IN SINDH

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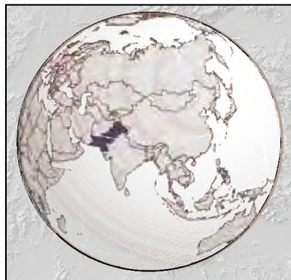

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Map Legend

Administrative limits

- Country
- Province
- District

Application of DAP (kg/acre)

- <= 25
- 26 - 50
- 51 - 75
- 76 - 100
- No significant data

About Map

The map shows the use of DAP for cotton in each district. Overall DAP use is in the lower range in most of the cotton growing districts, except Naushahro Feroze and Jamshoro districts, respectively, with medium and higher DAP use.

Data Sources

FAO, GAUL, The Government of Sindh, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,036,900 at A3

Datum: WGS 84

N

0 30 60 90 120 150

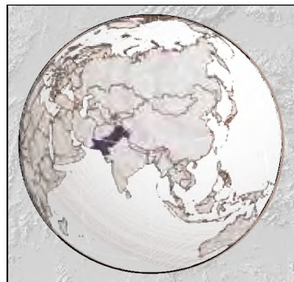
Kilometers

Date: 17 May 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_DAPCot_4.4_20160517

APPLICATION OF DI-AMMONIUM PHOSPHATE (DAP) TO SUGARCANE IN SINDH



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Map Legend

Administrative limits

- Country
- Province
- District

Application of DAP (kg/acre)

- <= 50
- 51 - 75
- 76 - 100
- No significant data

About Map

The map shows use of DAP for Sugarcane in each district. The application of DAP in Cotton growing areas and a few Rice growing areas is predominantly high. In addition, more application rates are quite obvious in Mirpur Khas, Tando Allah Yar and Hyderabad districts.

Data Sources

FAO, GAUL, The Government of Sindh, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,036,900 at A3

Datum: WGS 84

N

0 30 60 90 120 150

Kilometers

Date: 17 May 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Sindh_DAPSug _4.5_20160517

TOTAL USE OF DI-AMMONIUM PHOSPHATE (DAP) IN SINDH

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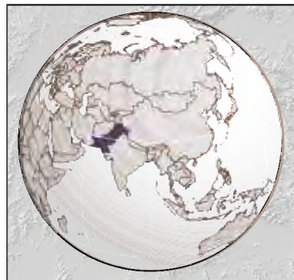

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Map Legend

Administrative limits

- Country
- Province
- District

Total use of DAP per district (kg/acre)

- <= 50
- 51 - 100
- 101 - 150
- 151 - 200

About Map

The map shows total DAP use for the four major crops: Wheat, Rice, Sugarcane and Cotton. The overall higher usage of DAP is obvious in the cotton growing districts. Further, the total usage did not appear to relate with percentage of cultivated area of different districts.

Data Sources

FAO, GAUL, The Government of Sindh, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,036,900 at A3

Datum: WGS 84

N

0 30 60 90 120 150

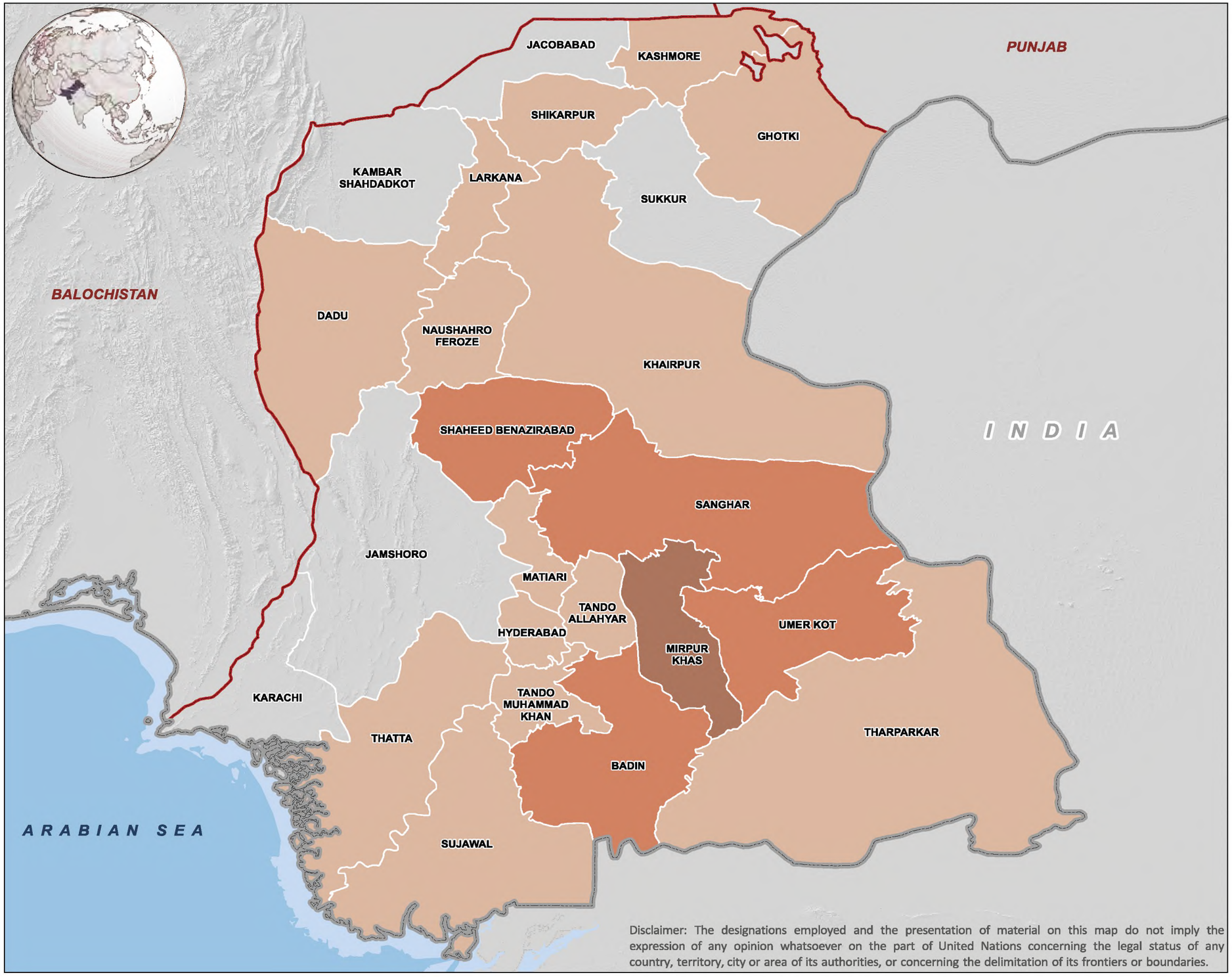
Kilometers

Date:16 May 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Sindh_ DAP_4.6_20160516

TOTAL USE OF CALCIUM AMMONIUM NITRATE (CAN) IN SINDH



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Map Legend

Administrative limits

- Country
- Province
- District

Total use of CAN per district (kg/acre)

- <= 50
- 51 - 100
- 101 - 150
- No significant data

About Map

The map shows total use of CAN for major crops: Wheat, Rice, Cotton and Sugarcane. The use of CAN appears to be common throughout the province. Relatively higher use is indicated in Mirpur Khas with medium usage in four adjoining districts; whereas CAN use is low in all remaining districts irrespective of the crop regions.

Data Sources

FAO, GAUL, The Government of Sindh, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,036,900 at A3

Datum: WGS 84

N

0 30 60 90 120 150

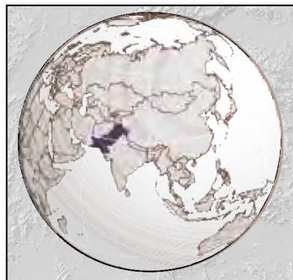
Kilometers

Date: 13 May 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Sindh_CANt _3.6_20160513

DISTRICT-WISE USE OF NITROGEN IN SINDH



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Map Legend

Administrative limits

- Country
- Province
- District

Amount of Nitrogen [N] (Kg/acre)

- < 50
- 51 - 100
- 101 - 150
- No significant data

About Map

The map shows the use of N derived from Urea, DAP and CAN applied in each district. The data shows comparatively higher use of N in Sanghar and Mirpur Khas followed by most of the cotton growing districts. The variations in use of Nitrogen compared to Urea application may be due to the consideration of different sources for Nitrogen.

Data Sources

FAO, GAUL, The Government of Sindh, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,036,900 at A3

Datum: WGS 84

N

0 30 60 90 120 150

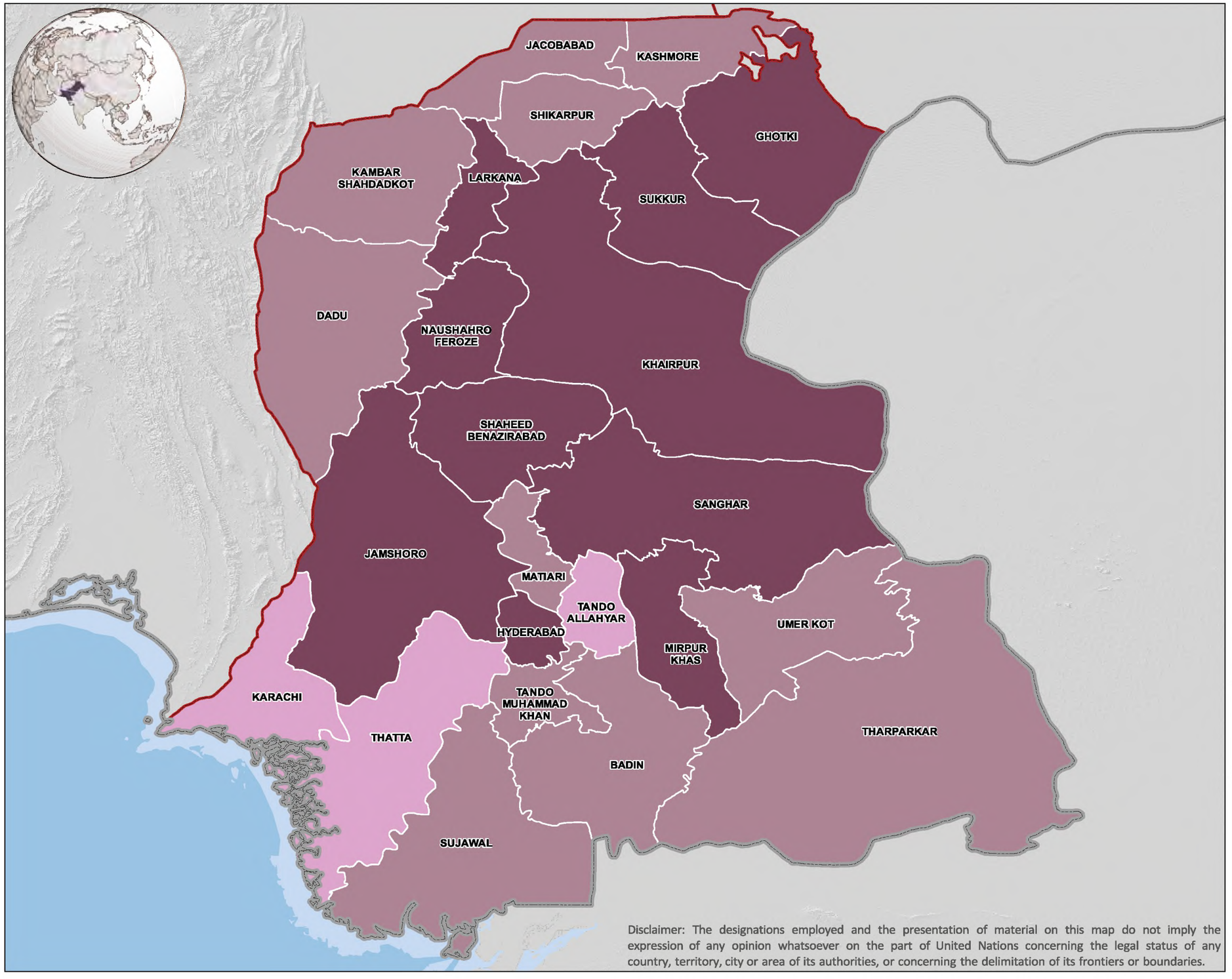
Kilometers

Date: 05 May 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_N_5.1_20150516

DISTRICT-WISE USE OF PHOSPHORUS IN SINDH



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Map Legend

Administrative limits

- Country
- Province
- District

Amount of Phosphorus
P_2O_5 (Kg/acre)

- < 25
- 26 - 50
- No significant data

About Map

The map shows overall use of Phosphorus irrespective of the source (fertilizer) applied in each district. Apparently, the total P applied is comparatively higher in most of the Cotton growing districts followed by Rice growing areas.

Data Sources

FAO, GAUL, The Government of Sindh, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,036,900 at A3

Datum: WGS 84

N

0 30 60 90 120 150

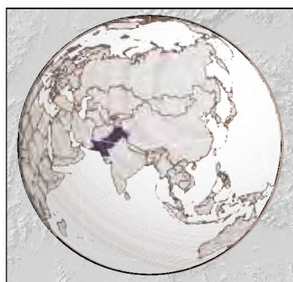
Kilometers

Date: 16 May 2016

Created by: IM Unit, FAO Pakistan

Map Number : PAK_Soil Fertility Atlas_Sindh_ P_5.2_20160516

DISTRICT-WISE USE OF POTASSIUM IN SINDH



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BADIN
SUJAWAL

Disclaimer: The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of United Nations concerning the legal status of any country, territory, city or area of its authorities, or concerning the delimitation of its frontiers or boundaries.

Map Legend

Administrative limits

- Country
- Province
- District

Amount of Potassium K_2O (Kg/acre)

- < 50
- 51 - 100
- 101 - 150
- Data not available/ No significant data

About Map

The map shows the use of K derived from SOP and MOP applied in each district. Apparently higher application rates are obvious in most of the Cotton and Rice growing districts.

Data Sources

FAO, GAUL, The Government of Sindh, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,036,900 at A3

Datum: WGS 84

N

0 30 60 90 120 150

Kilometers

Date: 16 May 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Sindh_ Kd_5.3_20160516

REGION-WISE COMPARATIVE FERTILIZER CONSUMPTION IN SINDH

Region	Total consumption of fertilizer (kg/acre)	Respondents
Mixed Crops	4,673	540
Cotton-Wheat	3,476	360
Rice-Wheat	2,848	540

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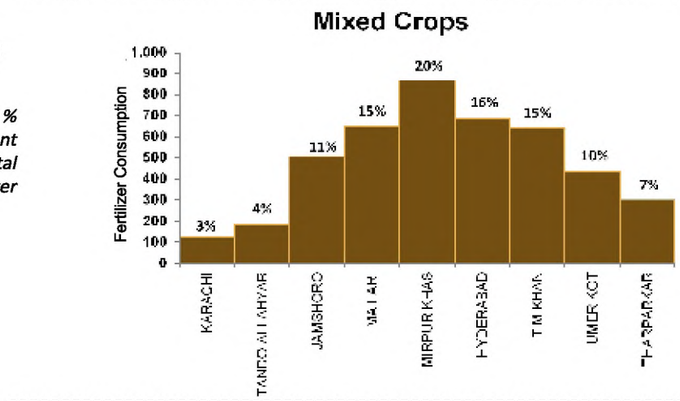
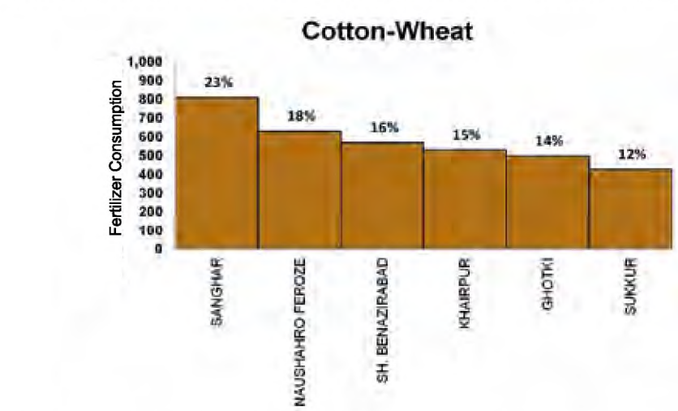
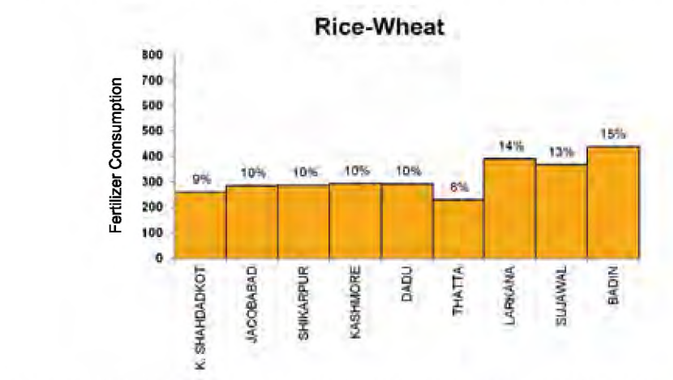
Mixed Crops
Cotton-Wheat
Rice-Wheat

Note: The numbers in % above each bar represent each district's share in total consumption of fertilizer in the particular region







About Map

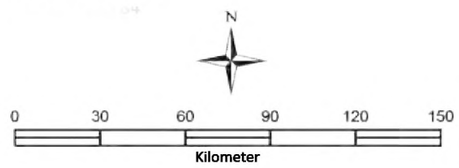
The map shows region-wise comparative fertilizer consumption in Sindh. The accumulated consumption was calculated for Wheat, Rice, Cotton and Sugarcane, if grown in the same field in a year. However, actual usage will vary depending on the crop(s) sown. This information is based on the Rapid Fertilizer Use Assessment. About 39% higher fertilizer use is evident from the Mixed Crops than the Rice-Wheat region. Moveover, the use of fertilizers in the Mixed Crops than the Cotton-Wheat region is about 26%. District-wise more fertilizers are being consumed in Mirpur Khas, Sanghar and Badin, respectively.

Data Source

The Government of Sindh, FAO, GAUL, RFUA (2015)

Map Scale and **Datum**

Nominal scale: 1:2,698,500 at A3
Datum: WGS 84



Date: 23 April 2017
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