SECTION 2

RAPID FERTILIZER USE ASSESSMENT

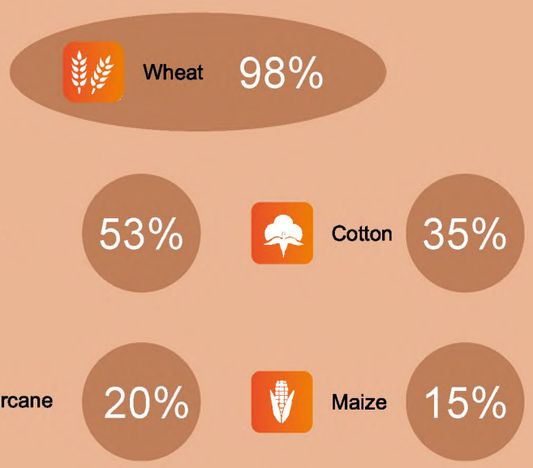
FERTILIZER USE AND CROP YIELD

To assess fertilizer use at farm-gate, a Rapid Fertilizer Use Assessment (RFUA) was carried out during 2015 in collaboration with the Provincial Agriculture Extension Department (Directorate General Agriculture Extension & Adaptive Research, Punjab) in thirty-six districts across Punjab. 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 sample size in each district was 33 and total number of samples collected is 1188. The selection of farmers reveals that the sample size was skewed towards medium level to progressive farmers with whom 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.

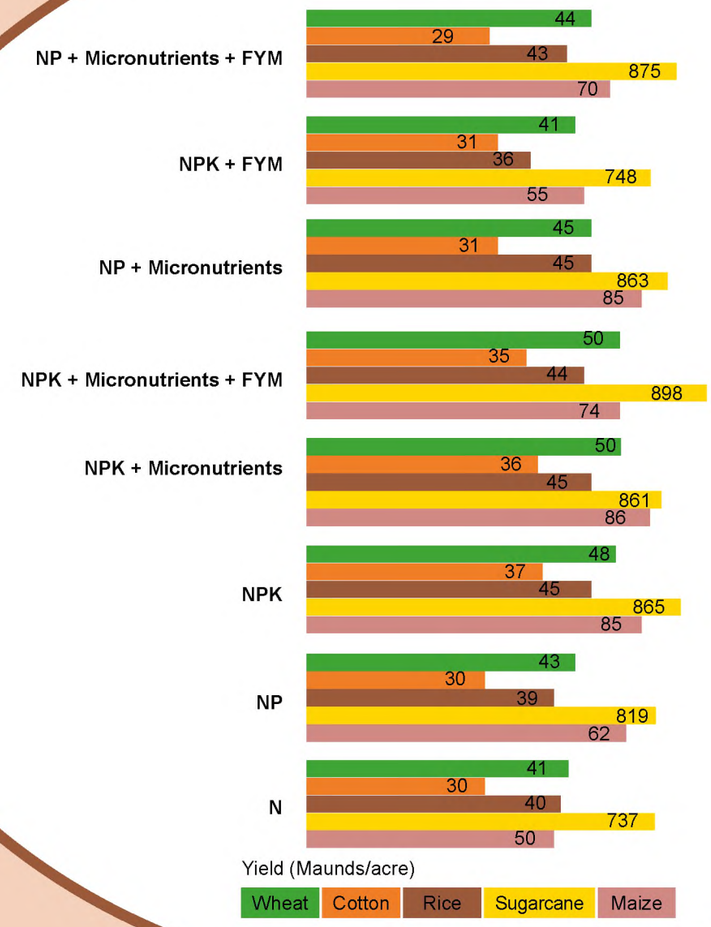
KEY INDICATORS

- 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

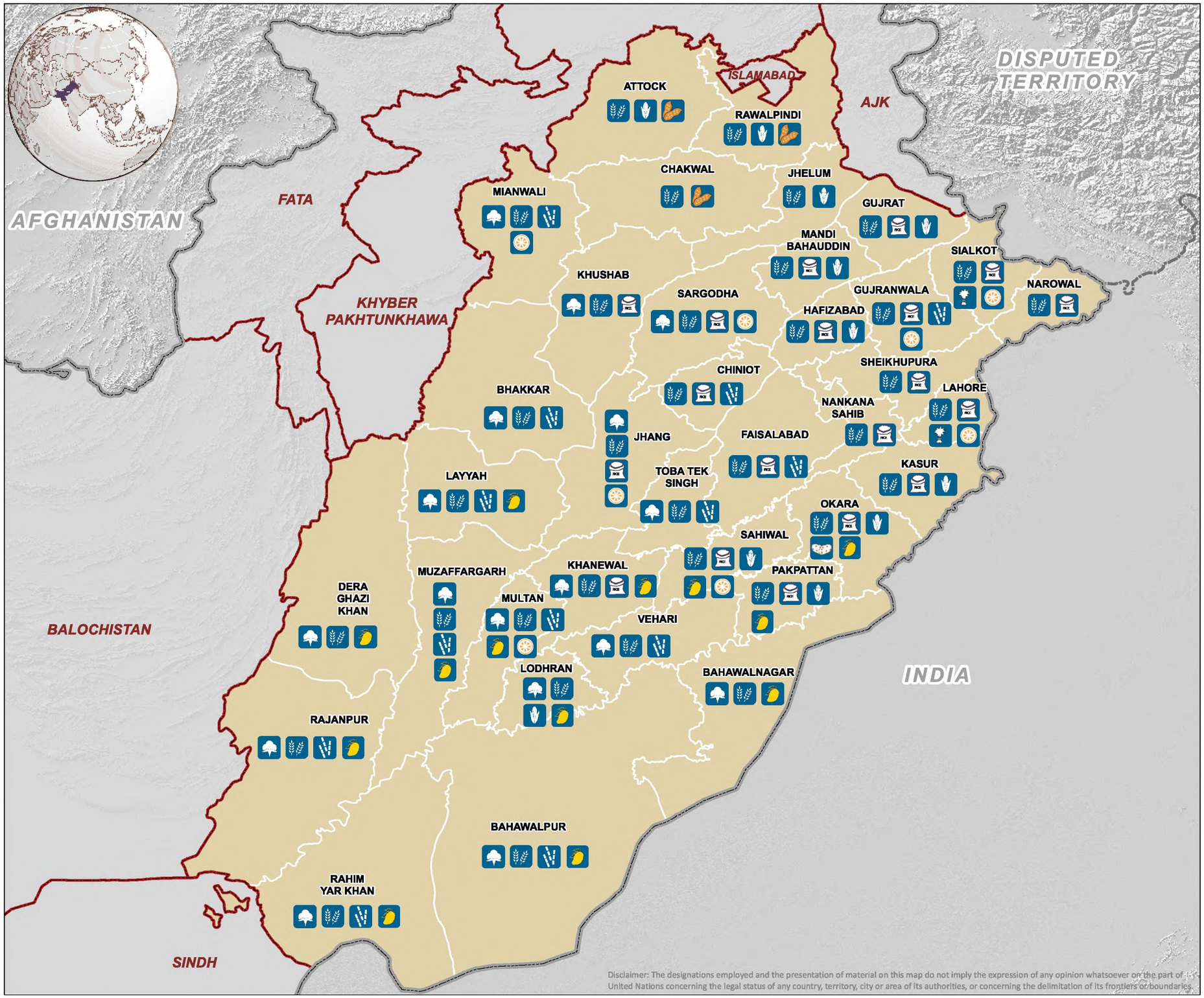
KEY FINDINGS



Farm Size (Acres)	Percent Farmers
▪ < 5	12%
▪ 6-15	37%
▪ 16-25	23%
▪ 26-50	14%
▪ > 50	14%
Laboratory Analysis	
▪ Soil Test	28%
▪ Water Test	20%
Major Problems	
Soil-related Constraints	>40%
▪ Salinity	20%
▪ Water-logging	14%
▪ Sodicity	7%
Others	<50%
▪ Canal water shortage	
▪ Load shedding	
▪ High prices of fertilizers	
▪ Low commodity prices	
Use of Organic Sources	
▪ Wheat	25%
▪ Rice/Paddy	8%
▪ Cotton	5%
▪ Sugarcane	6%
▪ Maize	3%
▪ Other Crops	4%



MAJOR CROPS IN PUNJAB



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Map Legend

Administrative limits

- Country
- Province
- District

Major crops

- Wheat
- Rice
- Maize
- Cotton
- Sugarcane
- Groundnut
- Potato
- Fodder
- Mango
- Citrus

About Map

The map shows major crops grown in each district. The information is derived from Rapid Fertilizer Use Assessment carried out in 2015. The sample size was 33 farmers interviewed per district and total number of respondents in Punjab were 1188.

Data Sources

FAO, GAUL, Rapid Fertilizer Use Assessment (2015)

Map Scale and Datum

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

0 50 100 150 200

Kilometers

Date: 18 Feb 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_MC_05_20150910

APPLICATION OF UREA TO WHEAT IN PUNJAB

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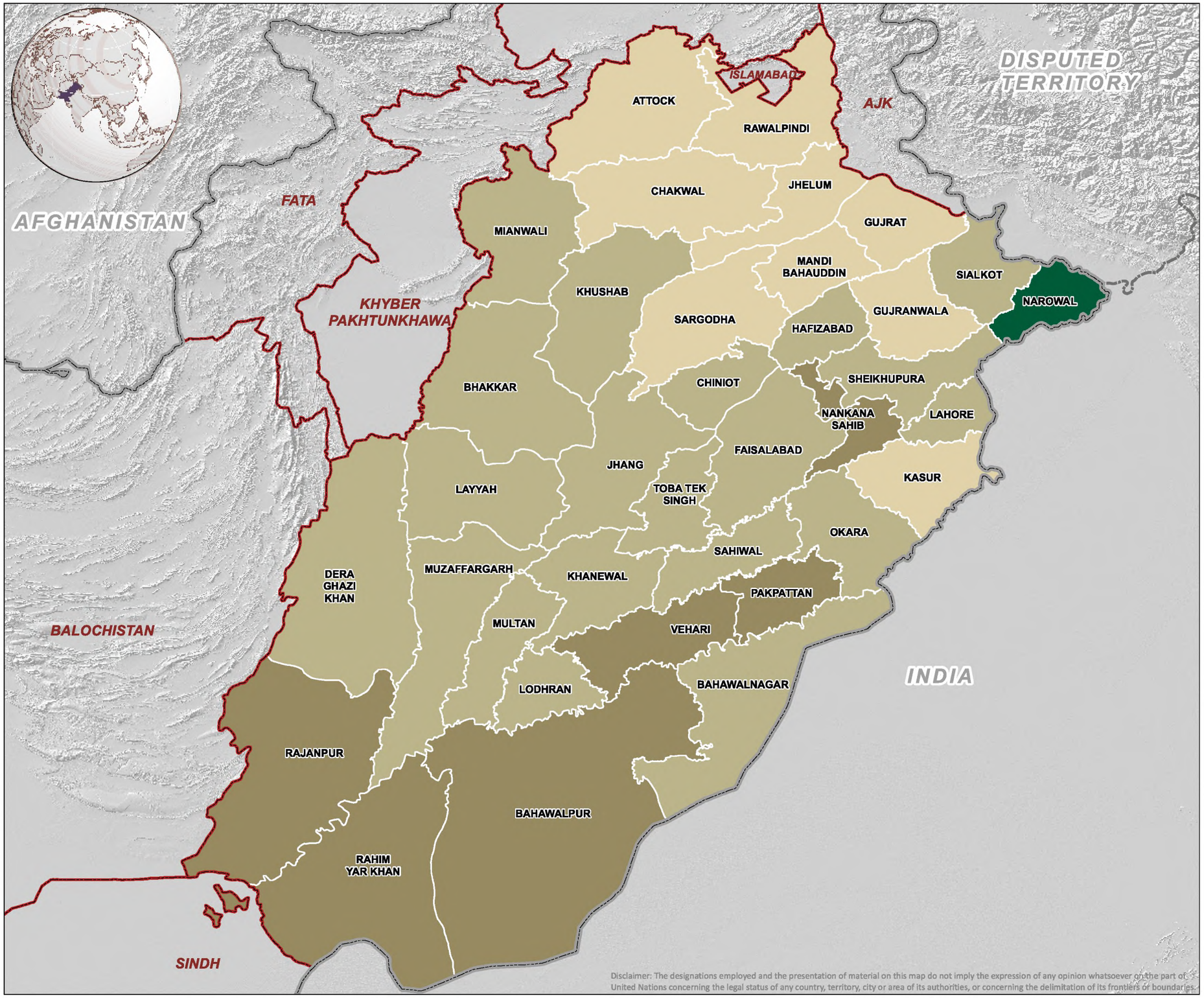

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Map Legend

Administrative limits

- Country
- Province
- District

Application of Urea (kg/acre)

- ≤ 70.0
- 70.1 - 100.0
- 100.1 - 120.0
- 120.1 - 140.0

About Map

The map shows that majority of the farmers use barely equal or less than the recommended (100 kg/acre) Urea, while fewer apply adequate or even higher dose. This trend needs rationalization considering the N contributed from other sources and soil test values.

Data Sources

FAO, GAUL, Government of the Punjab, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,698,500 at A3

Datum: WGS 84

N

0 50 100 150 200

Kilometers

Date: 19 Feb 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_UreaWheat_2.1_20150910

APPLICATION OF UREA TO RICE/PADDY IN PUNJAB

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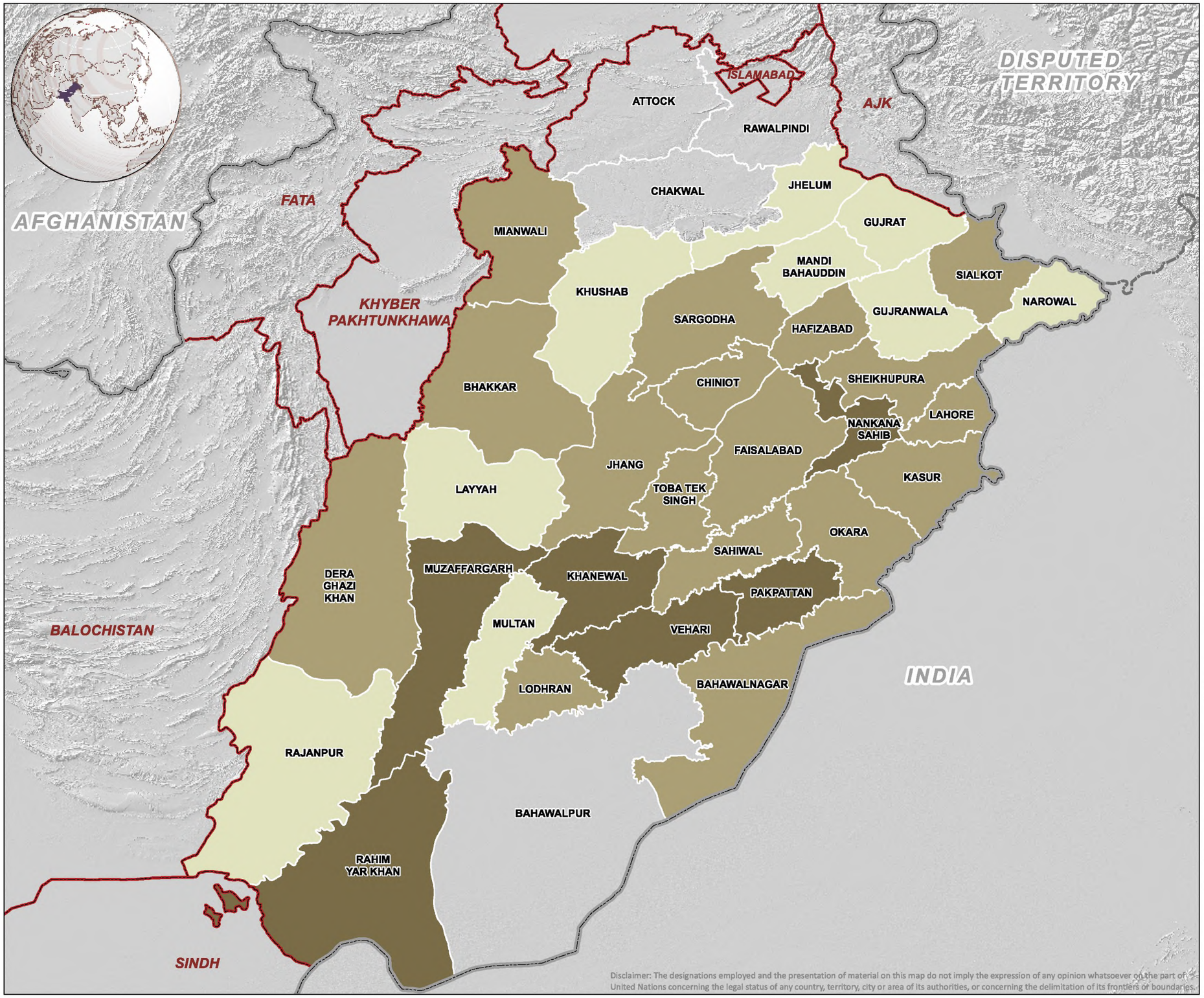

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Map Legend

Administrative limits

- Country
- Province
- District

Application of Urea (kg/acre)

- ≤ 70.0
- 70.1 - 100.0
- 100.1 - 130.0
- No significant data

About Map

Urea use in core rice growing areas is adequate (Sialkot, Sheikhupura, Hafizabad, Nankana Sahib) or lesser (Narowal, Gujranwala, Gujrat, Mandi Bahauddin) even than the generalized recommendation of Agriculture Department of the Punjab. Farmers in the non-core areas (Pakpattan, Vehari, Khanewal, Muzaffargarh, Rahim Yar Khan) apply relatively higher rates.

Data Sources

FAO, GAUL, Government of the Punjab, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,698,500 at A3

Datum: WGS 84

N

0 50 100 150 200

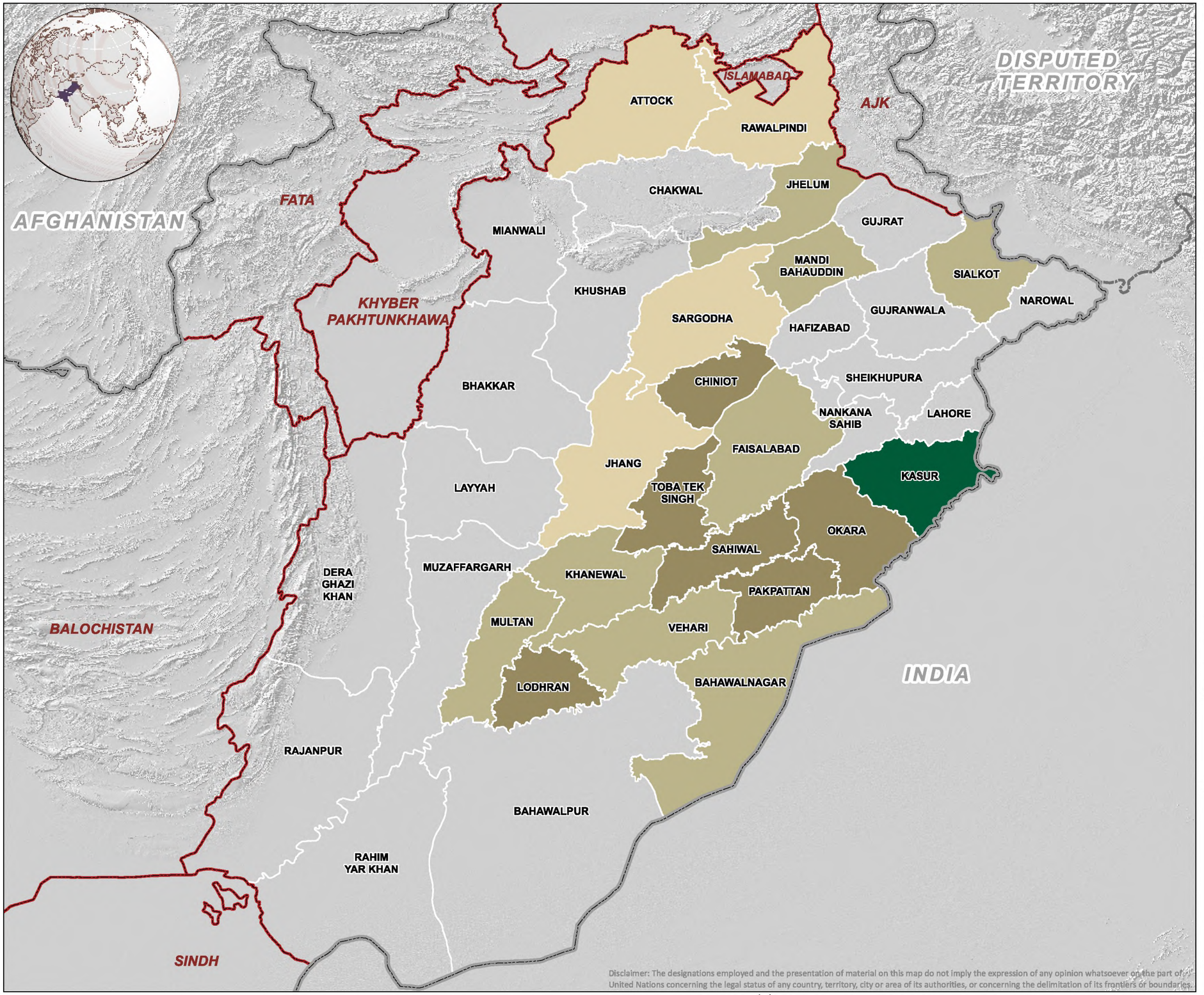
Kilometers

Date: 19 Feb 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_UreaRi_2.2_20150508

APPLICATION OF UREA TO MAIZE IN PUNJAB



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Map Legend

Administrative limits

- Country
- Province
- District

Application of Urea (kg/acre)

- ≤ 100.0
- 100.1 - 150.0
- 150.1 - 200.0
- 200.1 - 250.0
- No significant data

About Map

Farmers in primary maize growing districts (Chiniot, Kasur, Okara, Sahiwal, Toba Tek Singh) apply adequate quantity of urea to maize crop. Moreover, maize growers in Jhang use lesser and in Faisalabad and Lahore districts use intermediate quantity of urea.

Data Sources

FAO, GAUL, Government of the Punjab, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,698,500 at A3

Datum: WGS 84

N

0 50 100 150 200

Kilometers

Date: 22 Feb 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_UreaMaize_2.3_20150910

APPLICATION OF UREA TO COTTON IN PUNJAB

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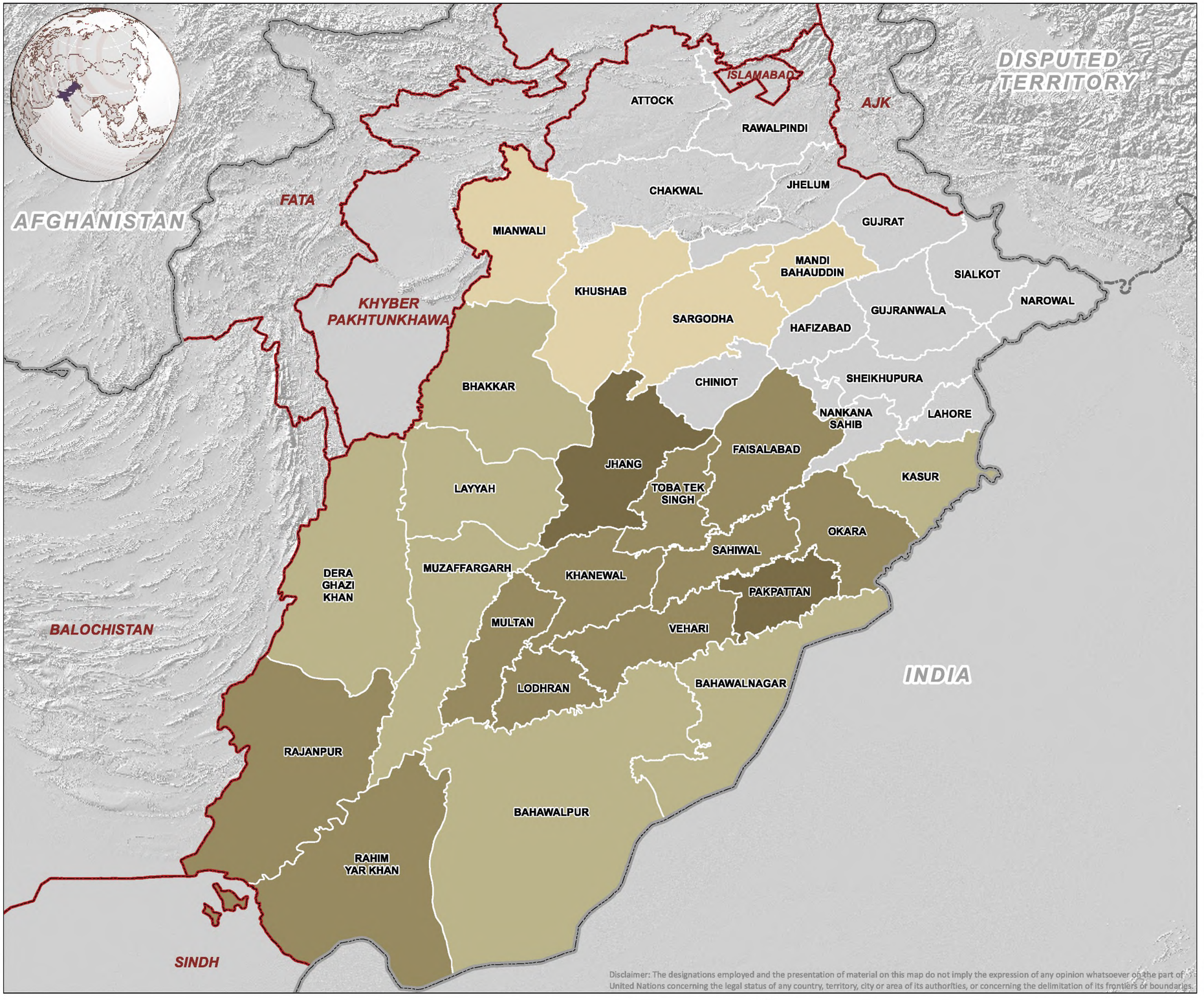

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Map Legend

Administrative limits

- Country
- Province
- District

Application of Urea (kg/acre)

- ≤ 100.0
- 100.1 - 150.0
- 150.1 - 200.0
- 200.1 - 250.0
- No significant data

About Map

In most of the core cotton growing (Khanewal, Multan, Vehari, Lodhran, Rajanpur and Rahim Yar Khan) as well as in non-core cotton growing (Pakpattan and Jhang) districts, urea application is excessive.

Data Sources

FAO, GAUL, Government of the Punjab, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,698,500 at A3

Datum: WGS 84

N

0 50 100 150 200

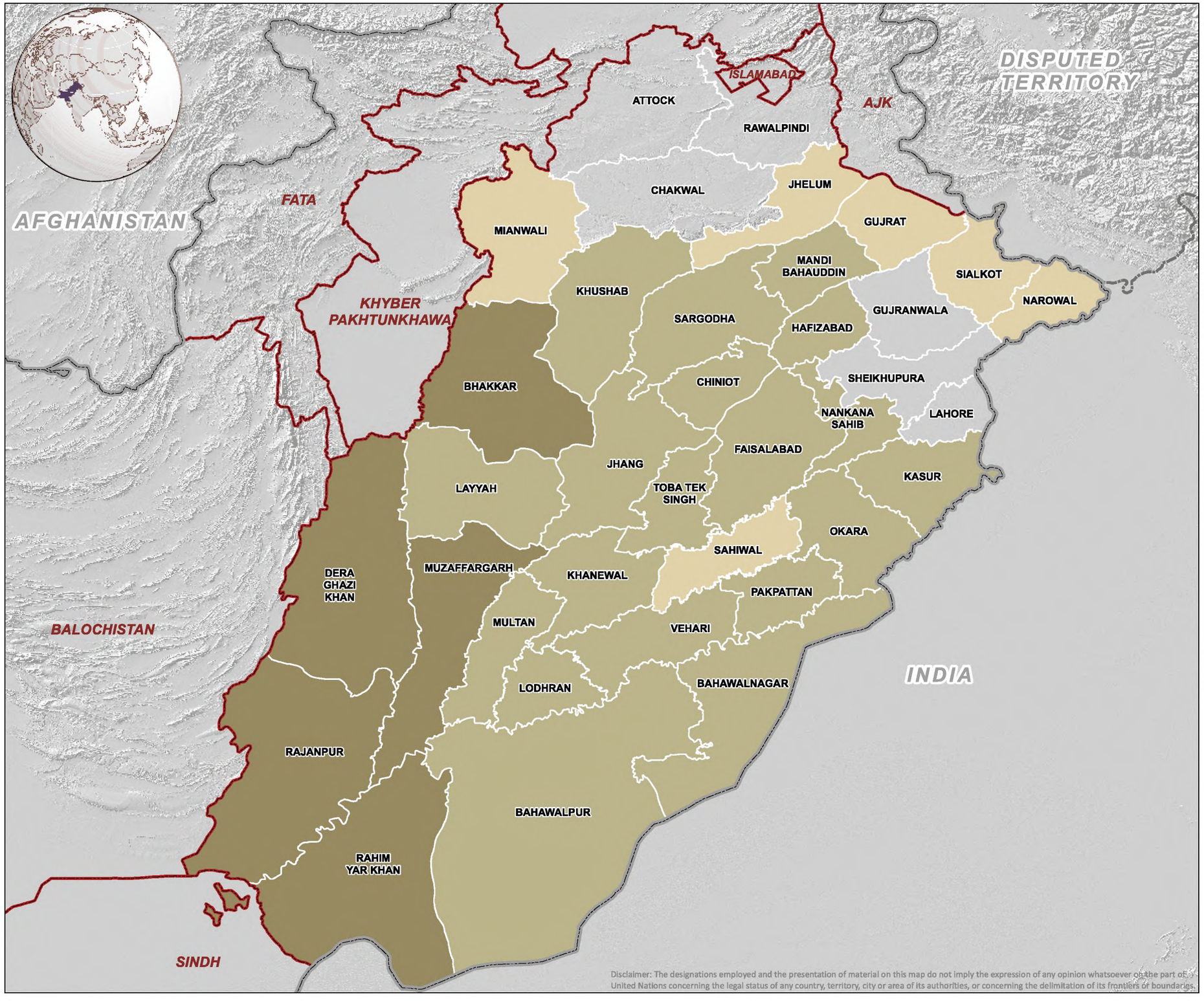
Kilometers

Date: 22 Feb 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_UreaCot_2.4_20150910

APPLICATION OF UREA TO SUGARCANE IN PUNJAB



Map Legend

Administrative limits

- Country
- Province
- District

Application of Urea (kg/acre)

- ≤ 100.0
- 100.1 - 200.0
- 200.1 - 300.0
- No significant data

About Map

In five districts (Bhakkar, Muzaffargarh, Dera Ghazi Khan, Rahim Yar Khan and Rajanpur), urea use is relatively higher that could meet crop requirements on fertile soils. In most other districts, applied urea appears less than the crop requirements, and thus needs consideration of the soil fertility status and crop type (e.g., ratoon) for optimum production.

Data Sources

FAO, GAUL, Government of the Punjab, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,698,500 at A3

Datum: WGS 84

N

0 50 100 150 200

Kilometers

Date: 22 Feb 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_UreaSg_2.5_20150910

TOTAL USE OF UREA IN PUNJAB

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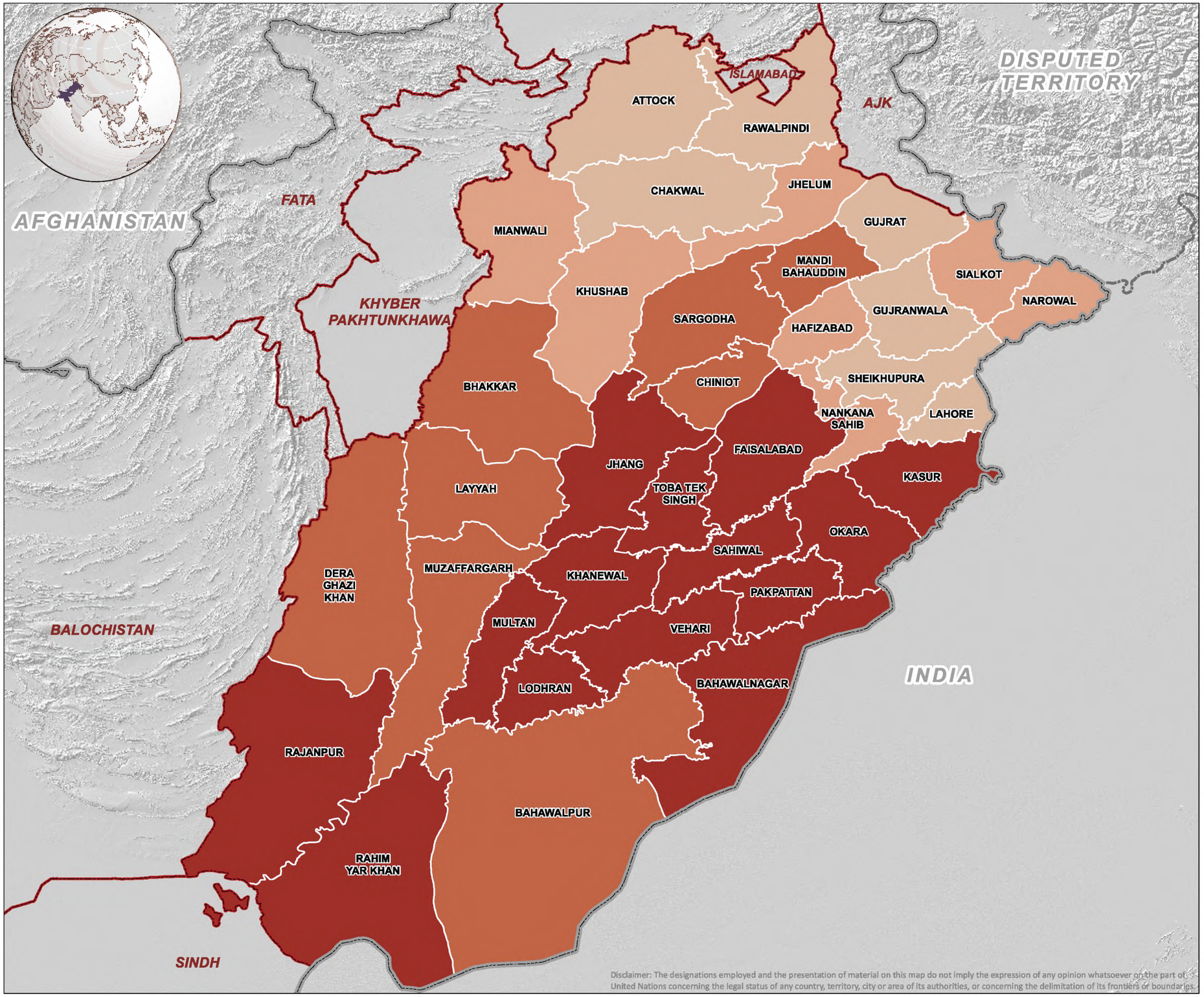

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Map Legend

Administrative limits

- Country
- Province
- District

Total use of Urea per district (kg/acre)

- ≤ 200.0
- 200.1 - 400.0
- 400.1 - 600.0
- 600.1 - 800.0

About Map

This map indicates total use of urea for all five major crops if grown on a field in same year. However, actual usage will be variable and lesser depending on the crop(s) grown.

Data Sources

FAO, GAUL, Government of the Punjab, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,698,500 at A3

Datum: WGS 84

N

0 50 100 150 200

Kilometers

Date: 23 Feb 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_ Urea_17_20150910

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

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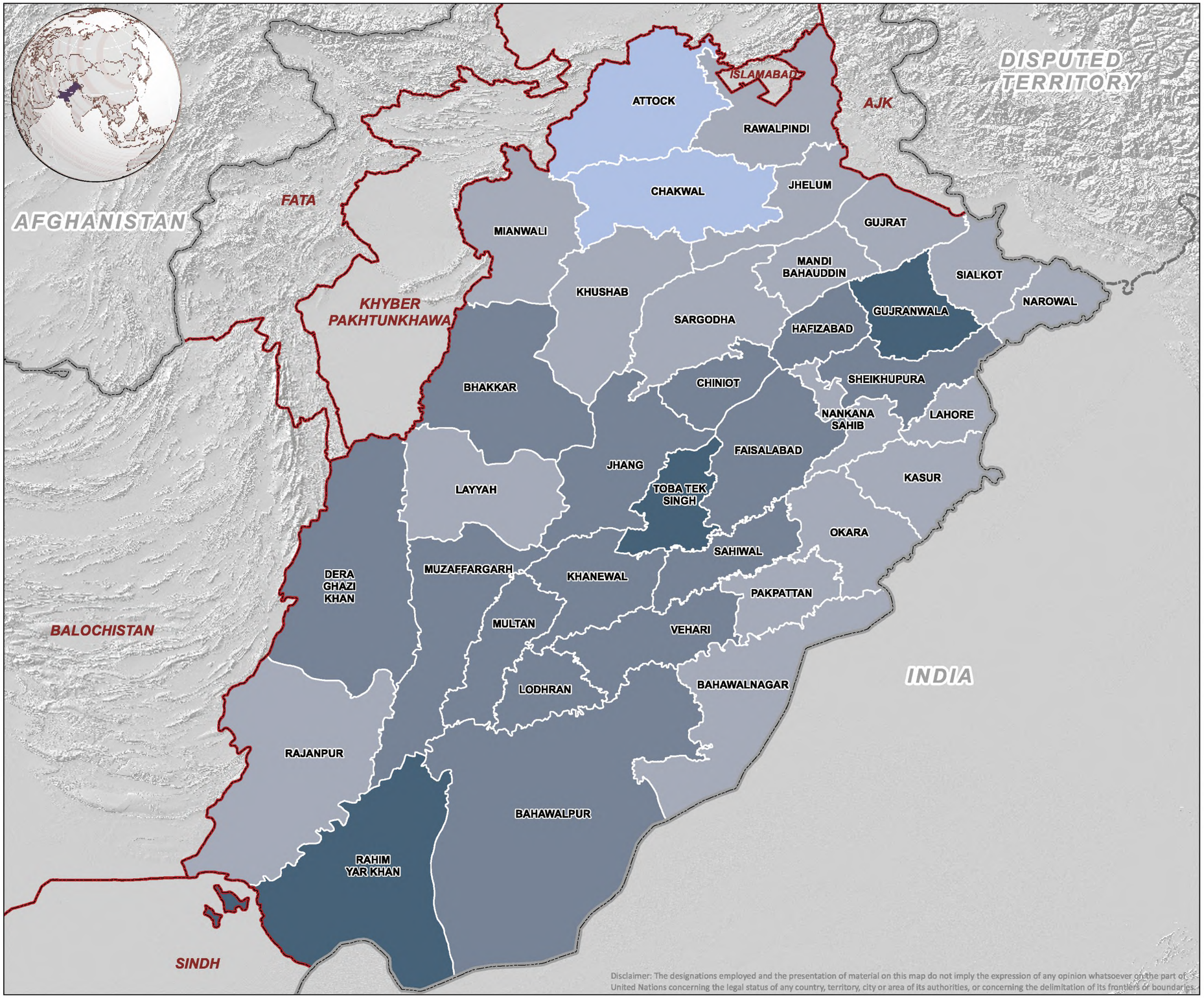

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Map Legend

Administrative limits

- Country
- Province
- District

Application of DAP (kg/acre)

- ≤ 50.0
- 50.1 - 65.0
- 65.1 - 80.0
- 80.1 - 100.0

About Map

The map indicates that use of DAP is common throughout the Punjab. However, applied rates are highly variable, with adequate use in only three districts (Gujranwala, Toba Tek Singh and Rahim Yar Khan) and medium P usage in most of the remaining districts.

Data Sources

FAO, GAUL, Government of the Punjab, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,698,500 at A3

Datum: WGS 84

N

0 50 100 150 200

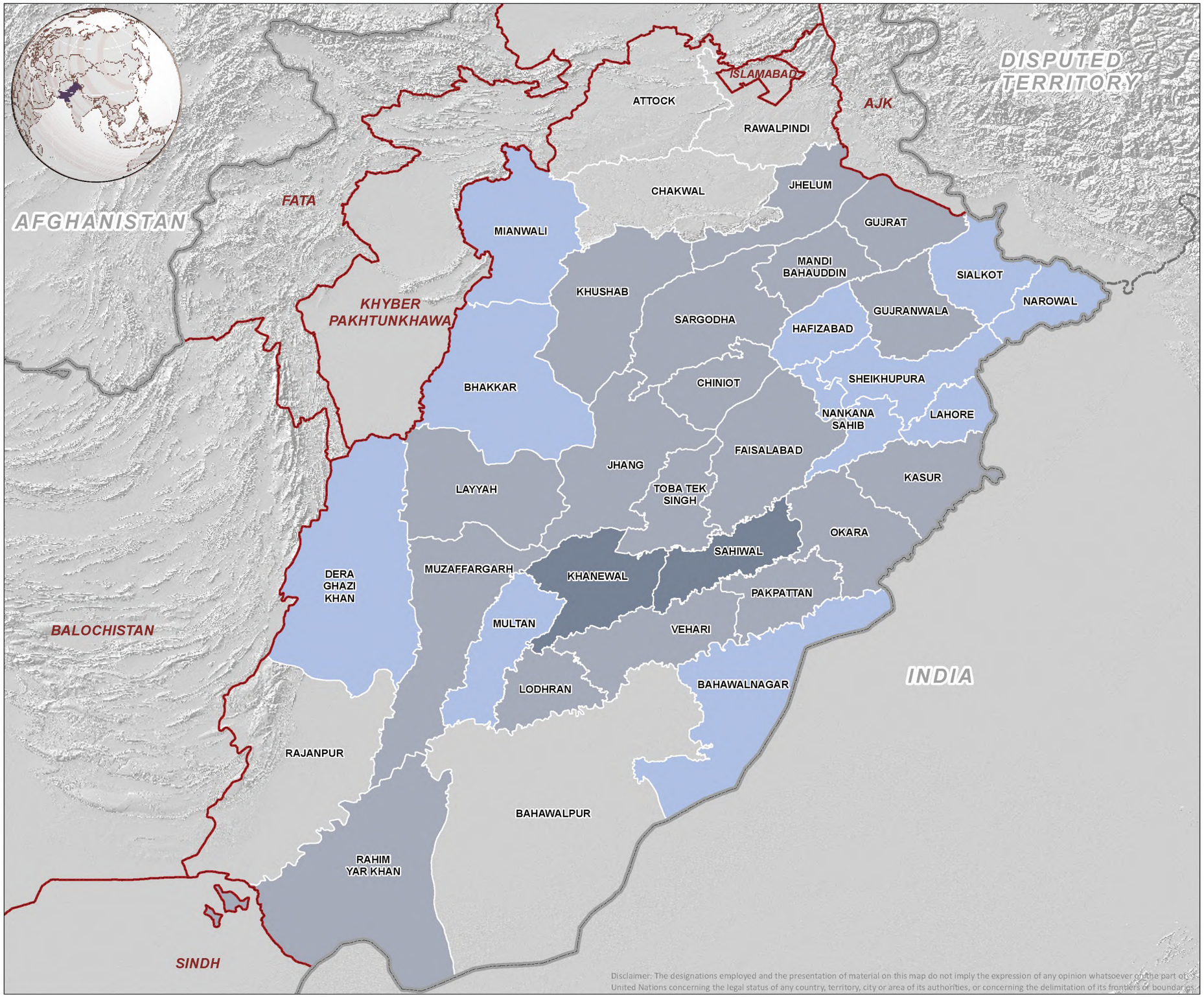
Kilometers

Date: 24 Feb 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_DAP _4.1_20150325

APPLICATION OF DI-AMMONIUM PHOSPHATE (DAP) TO RICE/PADDY IN PUNJAB



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Map Legend

Administrative limits

- Country
- Province
- District

Application of DAP (kg/acre)

- ≤ 50.0
- 50.1 - 70.0
- 70.1 - 90.0
- No significant data

About Map

The map shows relatively low DAP use in core rice growing areas. In most remaining districts in other cropping zones DAP application rates are relatively higher.

Data Sources

FAO, GAUL, Government of the Punjab, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,698,500 at A3

Datum: WGS 84

N

0 50 100 150 200

Kilometers

Date: 24 Feb 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_DAPRi_4.2_20150325

APPLICATION OF DI-AMMONIUM PHOSPHATE (DAP) TO MAIZE IN PUNJAB

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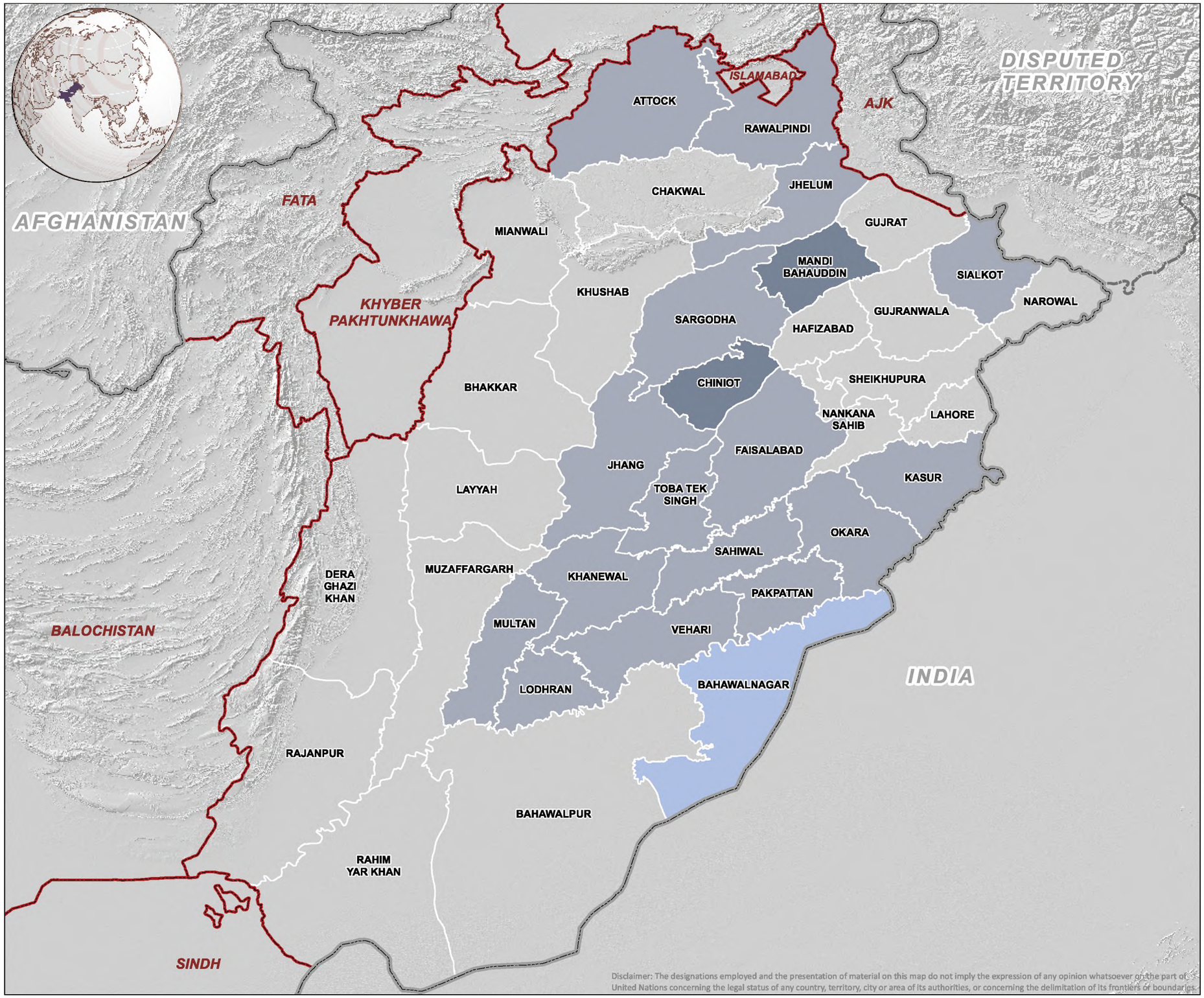

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Map Legend

Administrative limits

- Country
- Province
- District

Application of DAP (kg/acre)

- ≤ 50.0
- 50.1 - 100.0
- 100.1 - 150.0
- No significant data

About Map

The map shows that except for Bahawal Nagar district, medium rates of DAP are applied to maize crop. Further, the adequate information is lacking for about 50% of the districts across Punjab.

Data Sources

FAO, GAUL, Government of the Punjab, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,698,500 at A3

Datum: WGS 84

N

0 50 100 150 200

Kilometers

Date: 24 Feb 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_DAPMaize_4.3_20150325

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

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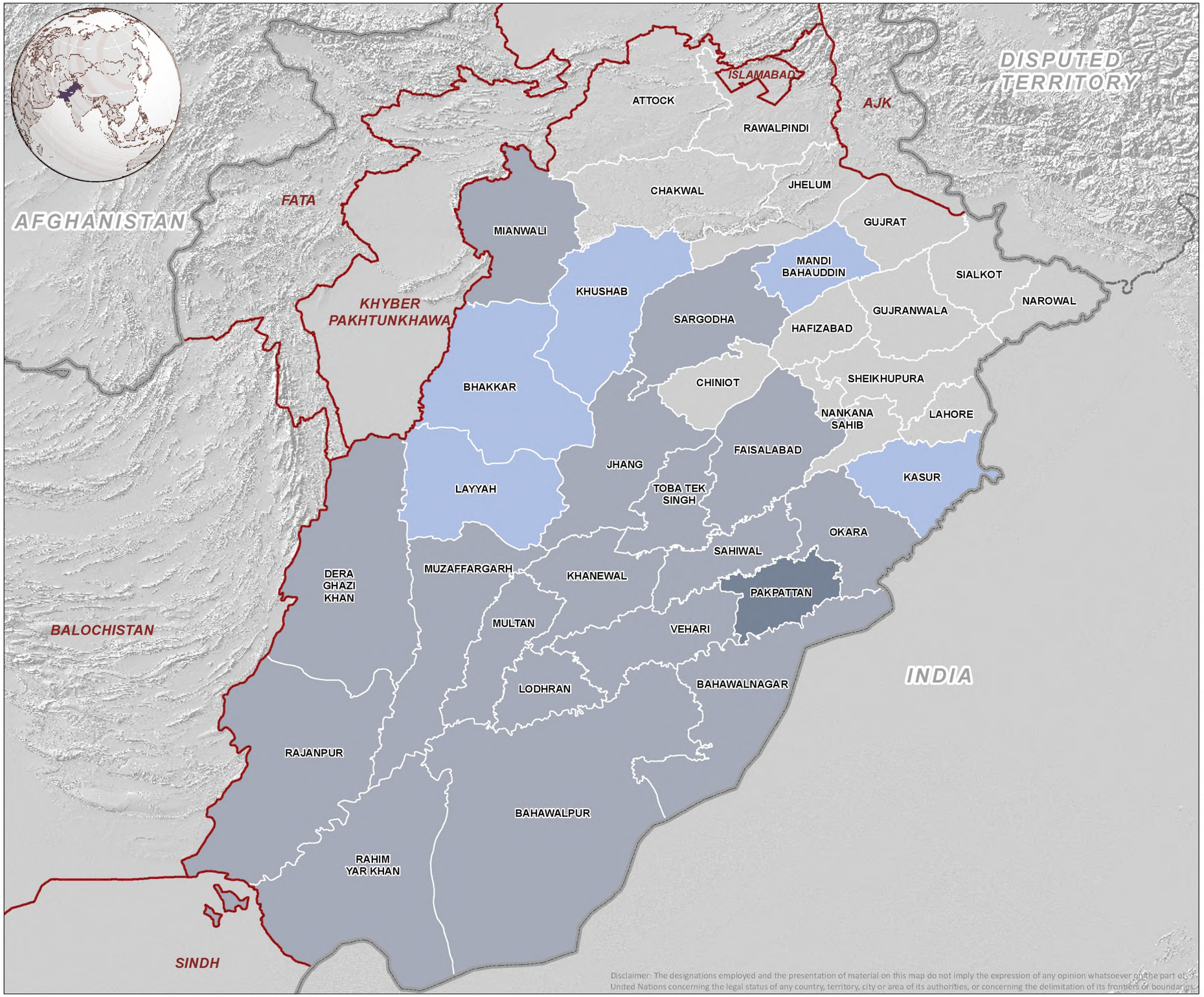

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Map Legend

Administrative limits

- Country
- Province
- District

Application of DAP (kg/acre)

- ≤ 50.0
- 50.1 - 75.0
- 75.1 - 100.0
- No significant data

About Map

The map shows that adequate DAP is used in core cotton growing areas.

Data Sources

FAO, GAUL, Government of the Punjab, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,698,500 at A3

Datum: WGS 84

N

0 50 100 150 200

Kilometers

Date: 24 Feb 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_DAPCot_4.4_20150910

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

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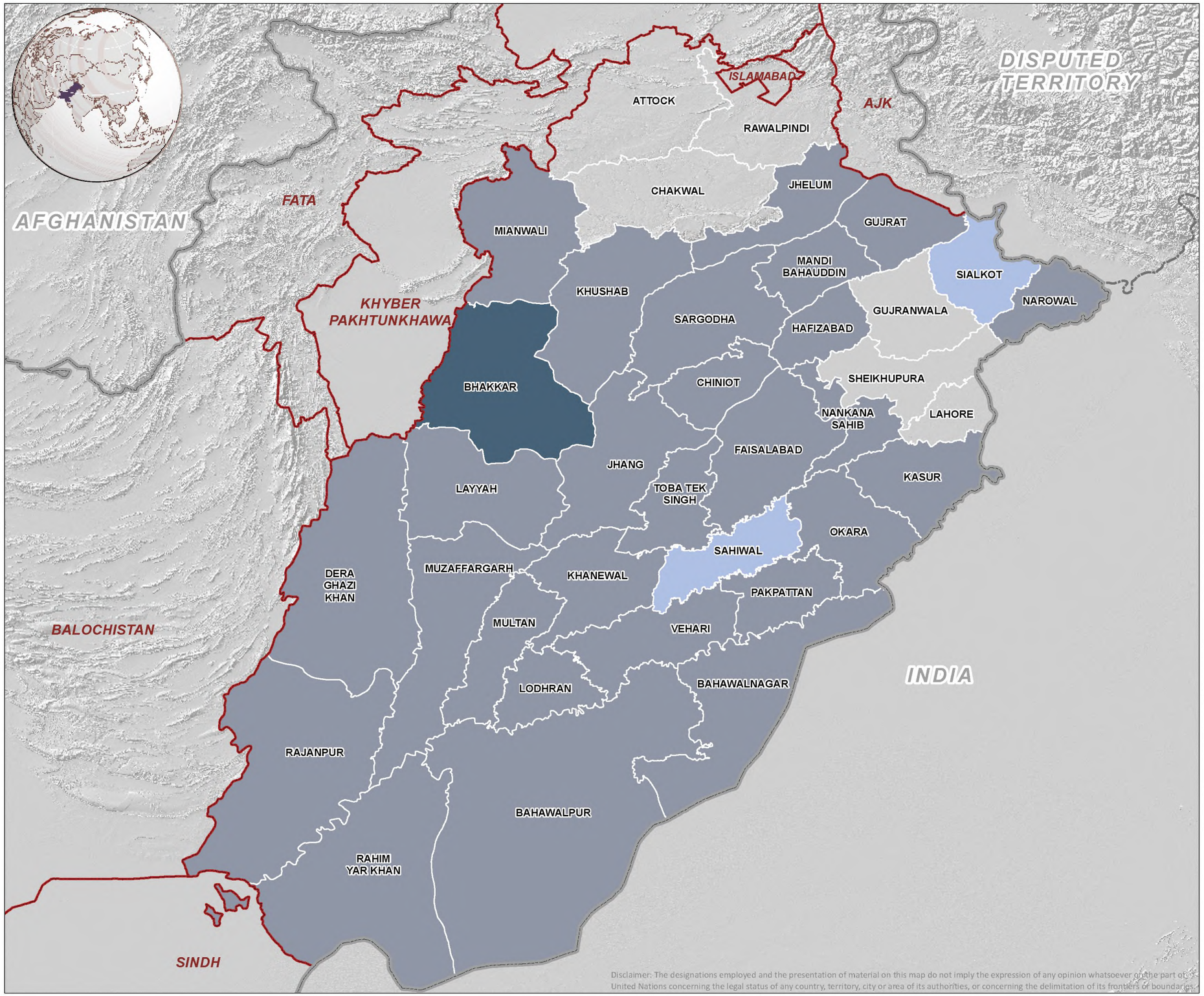

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Map Legend

Administrative limits

- Country
- Province
- District

Application of DAP (kg/acre)

- ≤ 50.0
- 50.1 - 100.0
- 100.1 - 150.0
- No significant data

About Map

The map shows that adequate or even higher than the DAP rates recommended for fertile soils are applied to sugarcane in most of the Punjab. The DAP use being highest in Bhakkar and lowest in Sahiwal and Sialkot districts.

Data Sources

FAO, GAUL, Government of the Punjab, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,698,500 at A3

Datum: WGS 84

N

0 50 100 150 200

Kilometers

Date: 24 Feb 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_DAPSug_4.5_20150910

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

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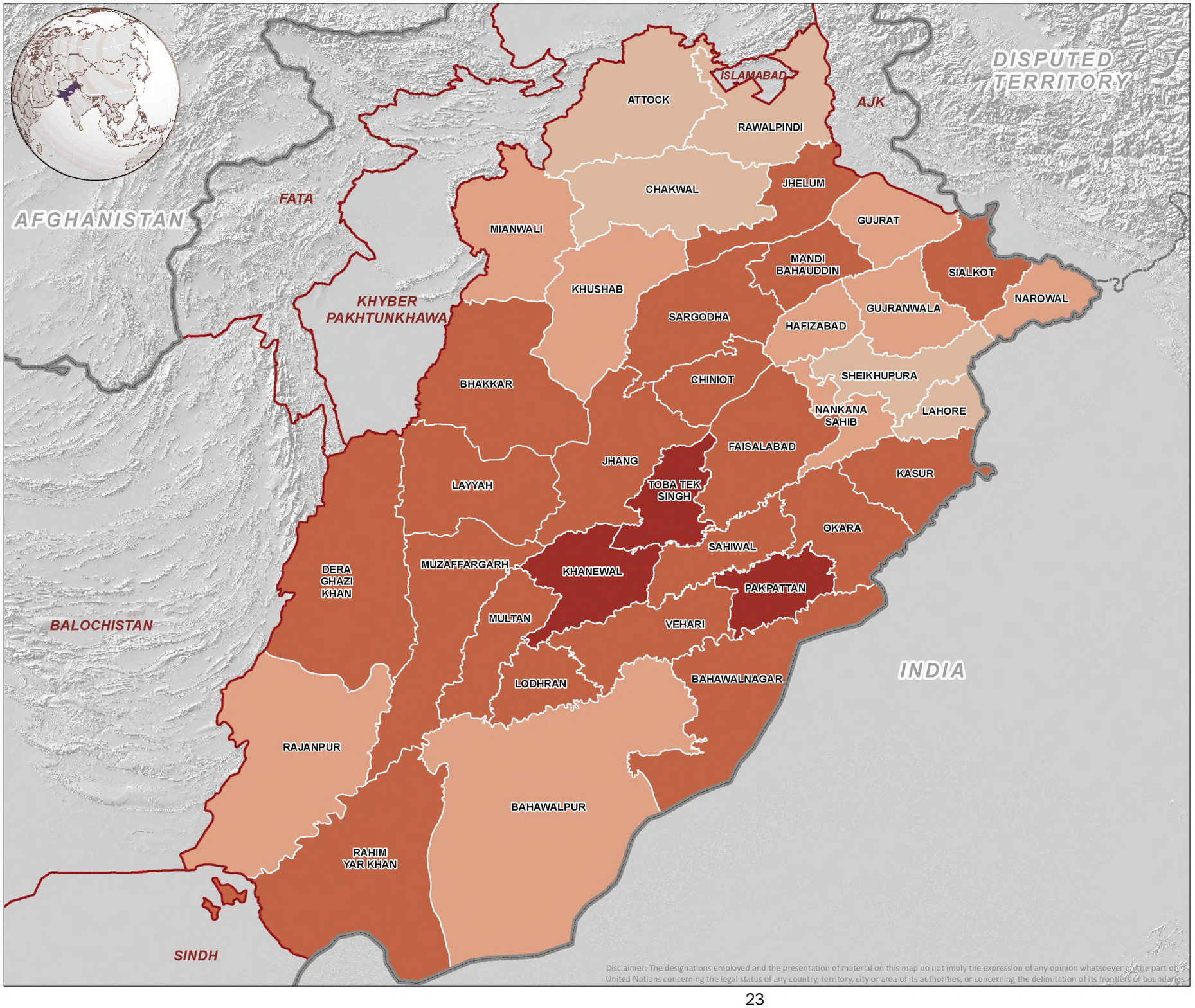

Map Legend

Administrative limits

- Country
- Province
- District

Total use of DAP per district (kg/acre)

- ≤ 125
- 126 - 250
- 251 - 375
- 376 - 500

About Map

This map indicates total use of DAP for all five major crops if grown on a field in same year. However, actual usage will be variable and lesser depending on the crop(s) grown.

Data Sources

FAO, GAUL, Government of the Punjab, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,698,500 at A3

Datum: WGS 84

N

0 50 100 150 200

Kilometers

Date: 24 Feb 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_DAP_4.6_20150327

TOTAL USE OF CALCIUM AMMONIUM NITRATE (CAN) IN PUNJAB

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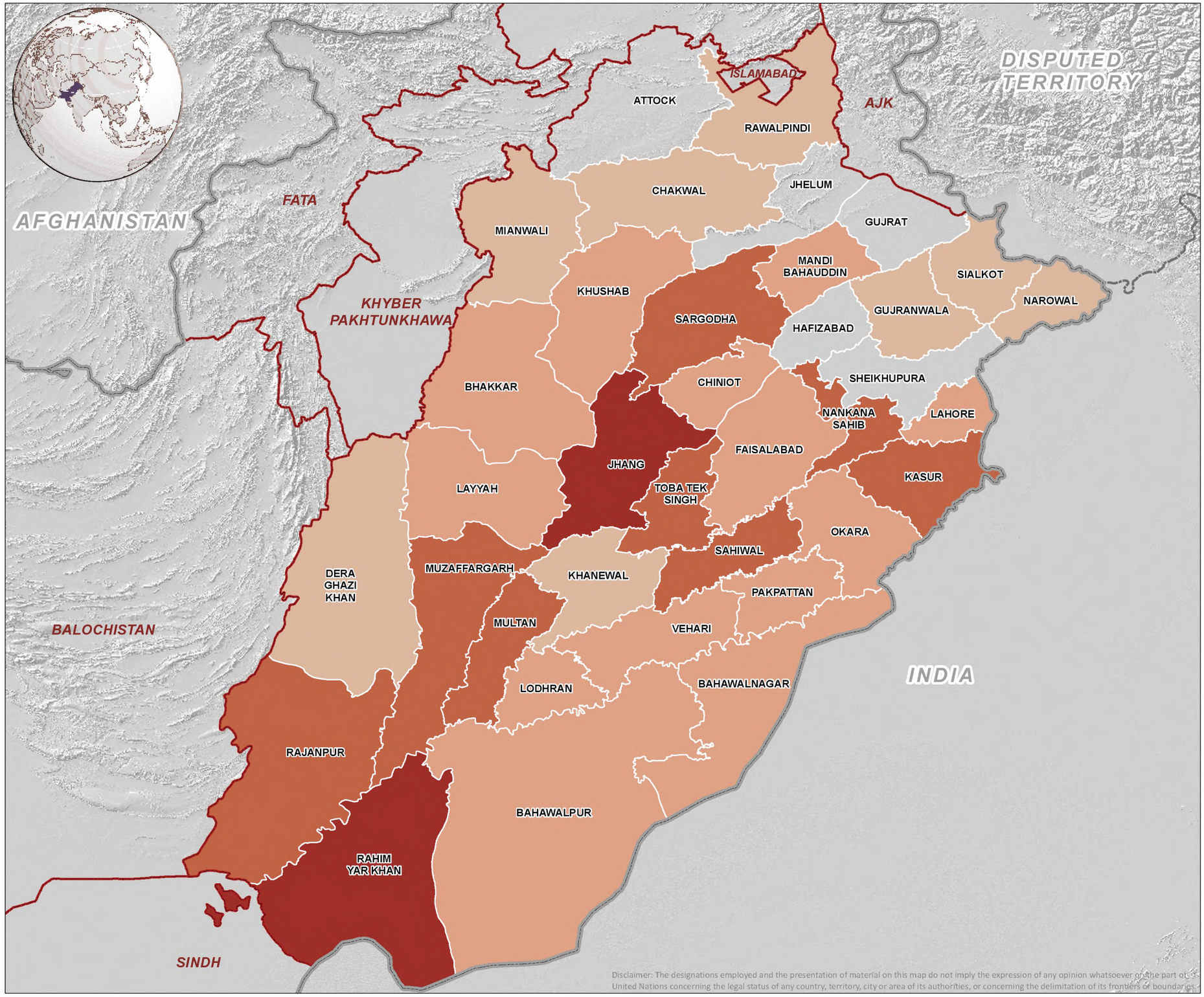

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Map Legend

Administrative limits

- Country
- Province
- District

Total use of CAN per district (kg/acre)

- ≤ 100.0
- 100.1 - 200.0
- 200.1 - 300.0
- 300.1 - 400.0
- No significant data

About Map

This map indicates total use of CAN for all five major crops if grown on a field in same year. However, actual usage will be variable and lesser depending on the crop(s) grown.

Data Sources

FAO, GAUL, Government of the Punjab, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,698,500 at A3

Datum: WGS 84

N

0 50 100 150 200

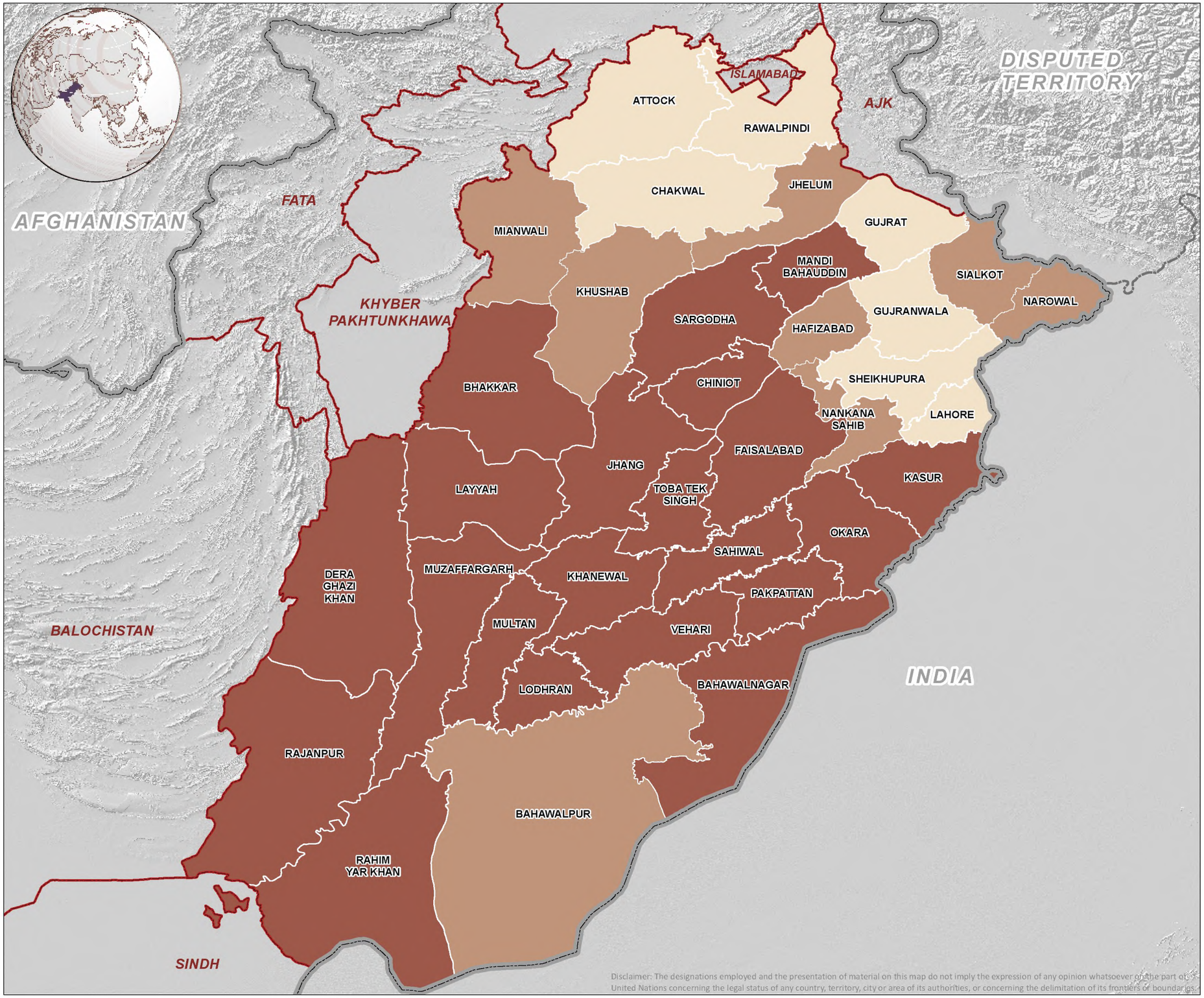
Kilometers

Date: 23 Feb 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_CANt_3.6_20150327

DISTRICT-WISE USE OF NITROGEN



Map Legend

Administrative limits

- Country
- Province
- District

Amount of Nitrogen [N] (Kg/acre)

- ≤ 150.0
- 150.1 - 300.0
- 300.1 - 500.0

About Map

The maps shows use of Nitrogen derived from Urea, DAP and CAN applied in each district. Irrespective of the source, relatively lower N usage is obvious in core rice growing andrainfed areas compared to all other districts of the Punjab.

Data Sources

FAO, GAUL, Government of the Punjab, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,698,500 at A3

Datum: WGS 84

N

0 50 100 150 200

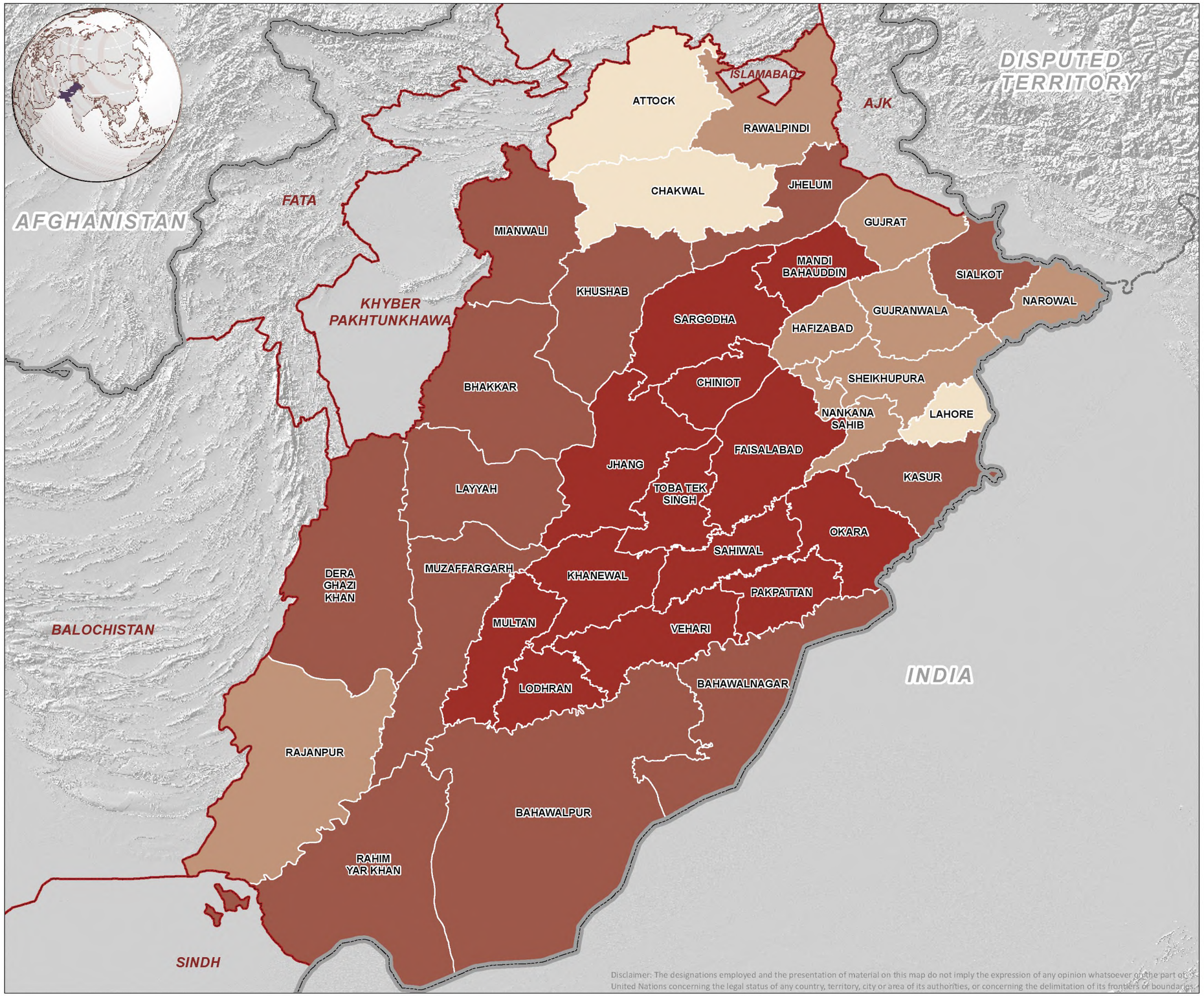
Kilometers

Date: 02 March 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_ N_5.1_20150423

DISTRICT-WISE USE OF PHOSPHORUS



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Map Legend

Administrative limits

- Country
- Province
- District

Amount of Phosphorus P_2O_5 (Kg/acre)

- ≤ 50.0
- 50.1 - 100.0
- 100.1 - 150.0
- 150.1 - 200.0

About Map

The maps shows use of Phosphorus derived from DAP applied in each district. The overall P application is variable with high usage in the entire mixed cropping zone and adjoining districts of cotton growing areas. Lower P use is indicated in most rice growing districts followed by minimum in rainfed districts Attock and Chakwal.

Data Sources

FAO, GAUL, Government of the Punjab, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,698,500 at A3

Datum: WGS 84

N

0 50 100 150 200

Kilometers

Date: 02 March 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_P_5.2_20150910

DISTRICT-WISE USE OF POTASSIUM

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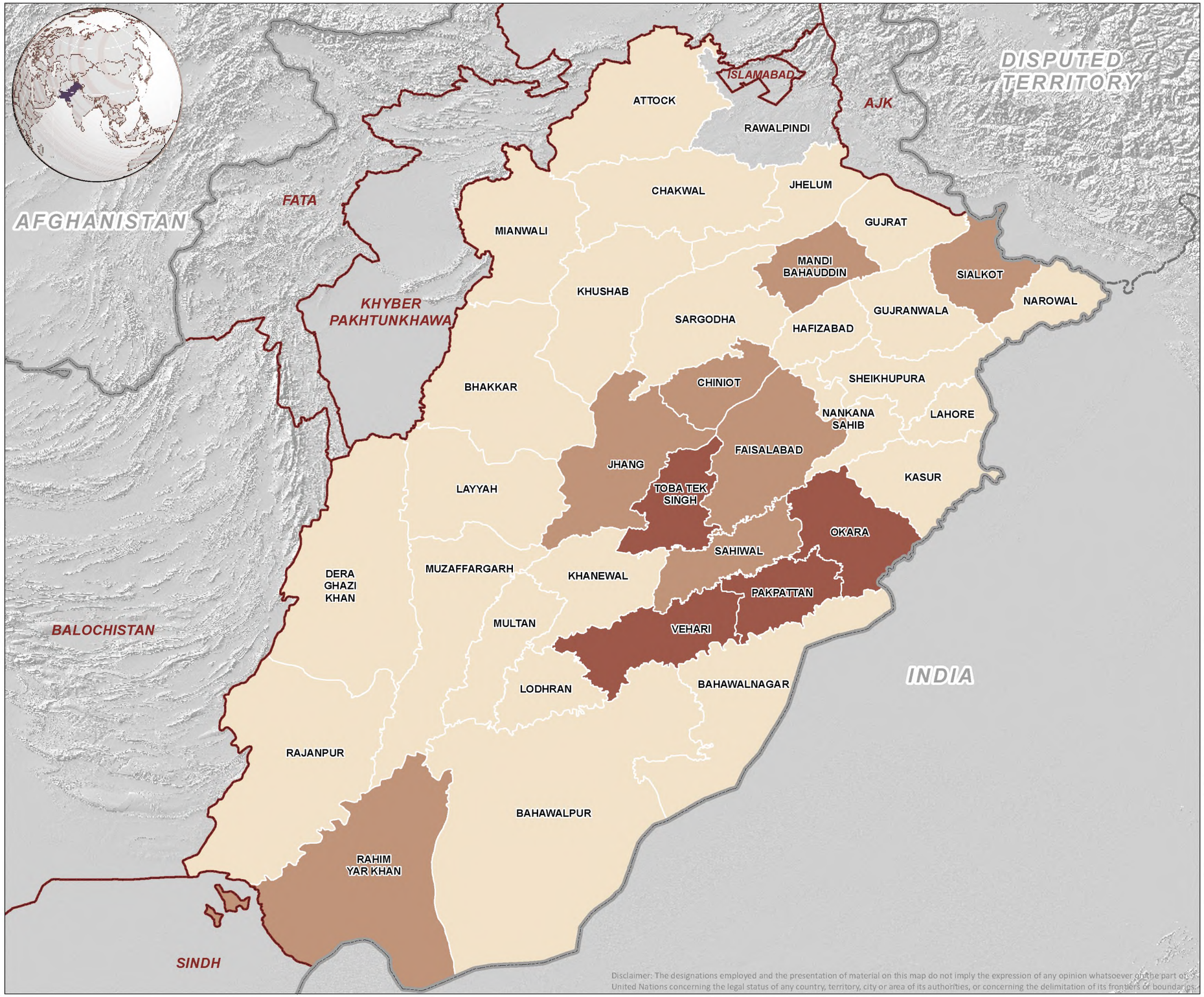

Disclaimer: The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of United Nations concerning the legal status of any country, territory, city or area of its authorities, or concerning the delimitation of its frontiers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

Map Legend

Administrative limits

- Country
- Province
- District

Amount of Potassium K_2O (Kg/acre)

- ≤ 0.23
- 0.24 - 0.45
- 0.46 - 0.68

About Map

The map shows use of Potassium derived from Sulfate of Potash (SOP) and Muriate of Postsh (MOP) applied in each district. Overall, minimal K use is obvious in most districts. Highest K use is in Okara, Pakpattan, Vehari and Toba Tek Singh followed by four districts of mixed cropping zone and two districts in rice area.

Data Sources

FAO, GAUL, Government of the Punjab, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,698,500 at A3

Datum: WGS 84

N

0 50 100 150 200

Kilometers

Date created: 02 March 2016

Created by: IM unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_Kd_5.3_20150423

NPK USAGE RATES IN PUNJAB

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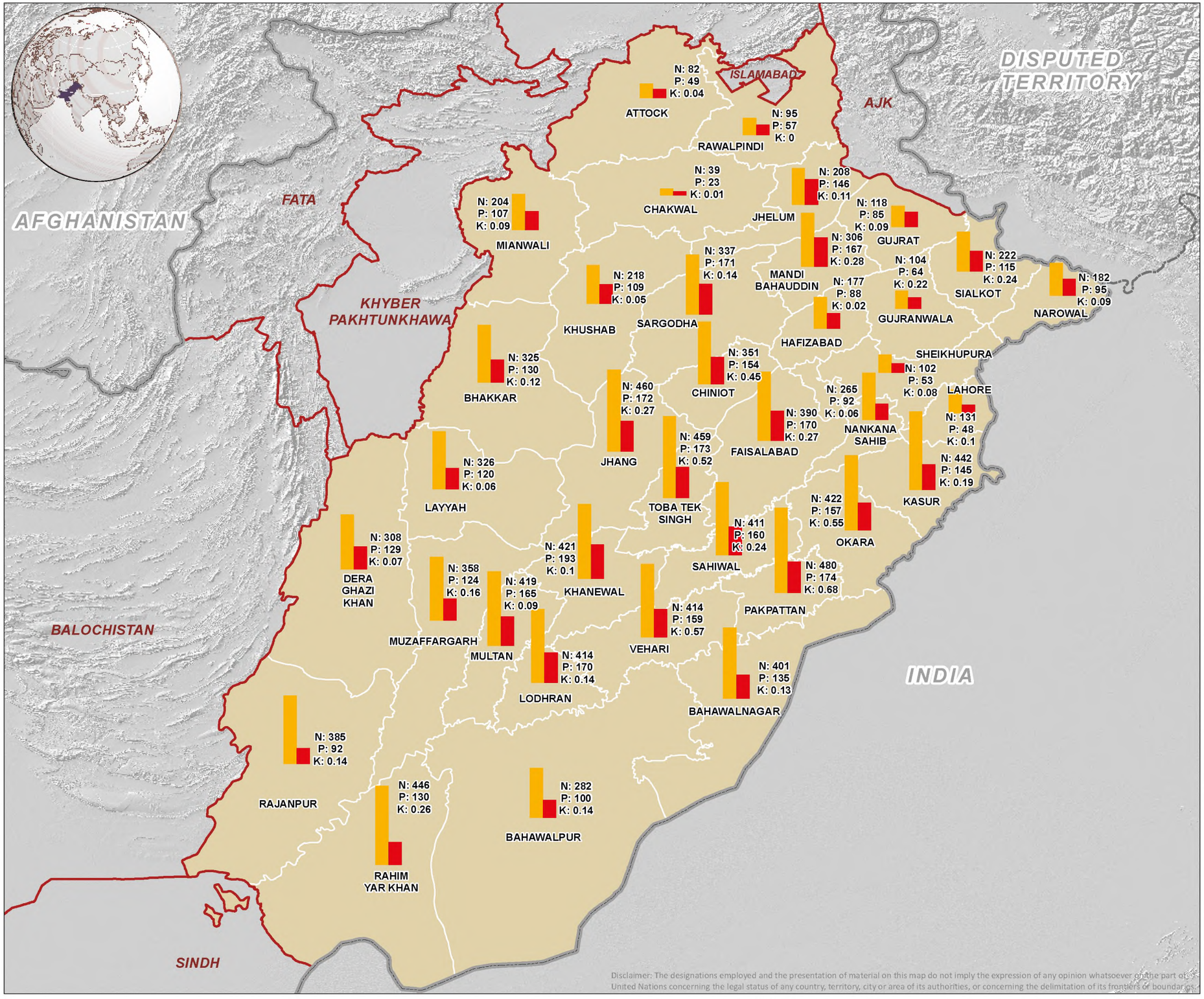

Map Legend

Administrative limits

- Country
- Province
- District

NP rates (kg/acre)

Nitrogen | Phosphorus

About Map

The map shows relative usage of NPK, indicating that invariably all farmers use N and P but with a highly variable N:P ratio. Further, use of K is not common and needs attention. Similar trends regarding K use are evident from NFDC offtake data. Since K use rate is non-significant, so it has not been shown in the map legend.

Data Sources

FAO, GAUL, Government of the Punjab, RFUA (2015)

Map Scale and Datum

Nominal scale: 1:2,698,500 at A3

Datum: WGS 84

N

0 50 100 150 200

Kilometers

Date: 02 March 2016

Created by: IM Unit, FAO Pakistan

Map Number: PAK_Soil Fertility Atlas_Punjab_NPKr_5.4_20150423