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 fulfill 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 Diammonium 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

![Wheat](98%)
![Rice](53%)
![Cotton](35%)
![Sugarcane](20%)
![Maize](15%)

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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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.
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

Date: 19 Feb 2016
Created by: IM Unit, FAO Pakistan
Map Number: PAK_Soil Fertility Atlas_Punjab_UreaWheat_2.1_20150910

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APPLICATION OF UREA TO RICE/PADDY IN PUNJAB

Map Legend
- Administrative limits
- Country
- Province
- District
- Application of Urea (kg/ha)
  - ≤ 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, Haifizabad, 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, RIFIA (2015)

Map Scale and Datum
Nominal scale: 1:2,698,500 at A3
Datum: WGS 84
Date: 19 Feb 2016
Created by: IM Unit, FAO Pakistan
Map Number: PAK_Soil Fertility Atlas_Punjab_UreaRi_2.2_20150509

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APPLICATION OF UREA TO MAIZE IN PUNJAB

Map Legend

Administrative limits
- Country
- Province
- District

Application of Urea (kg/acre)
- 5 - 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 (Chinot, 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, GAU, Government of the Punjab, RFUA (2015)

Map Scale and Datum

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

Date: 22 Feb 2016
Created by: IM Unit, FAO Pakistan
Map Number: PAK_Soil Fertility Atlas_Punjab_UreaMaize_2_3_20150911

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

Map Legend
Administrative limits
- Country
- Province
- District
Application of DAP
- ≤ 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
Date: 24 Feb 2016
Created by: IM Unit, FAO Pakistan
Map Number: PAC_Soil Fertility Atlas_Punjab_DAP_4.1_20150325
APPLICATION OF DI-AMMONIUM PHOSPHATE (DAP) TO MAIZE IN PUNJAB

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, GSIU, Government of the Punjab, RFUA (2015)

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

Date: 24 Feb 2016
Created by: IM Unit, FAO Pakistan
Map Number: PAK_Soil Fertility Atlas_Punjab_DAPMaize_4_3_20150325

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 the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.
APPLICATION OF DI-AMMONIUM PHOSPHATE (DAP) TO SUGARCANE IN PUNJAB

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, RFU (2015)

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

Date: 24 Feb 2016
Created by: JM Unit, FAO Pakistan
Map Number: PK_Soil Fertility Atlas_Punjab_DAPsug_4.5_20150910

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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 show the 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 undrainfed areas compared to all other districts of the Punjab.

Data Sources
FAO, GAUL, Government of the Punjab, RFUAR (2015)

Map Scale and Datum
- Nominal scale: 1:2,698,500 at A3
- Datum: WGS 84
- Date: 02 March 2016
- Created by: IM Unit, FAO Pakistan

Map Number: PAK_SoilFertilityAtlas_Punjab_N_5.1_20150423

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DISTRIBUTIVE USE OF PHOSPHORUS

Map Legend
- Administrative limits
  - Country
  - Province
  - District
- Amount of Phosphorus
  - P Kgs/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

Date: 02 March 2016
Created by: IM Unit, FAO Pakistan
Map Number: PAK_Soil Fertility Atlas_Punjab_C_ P_2-2_20150910

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 the United Nations concerning the legal status of any country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries.
The map shows use of Potassium derived from Sulfate of Potash (SOP) and Muriate of Potash (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.