

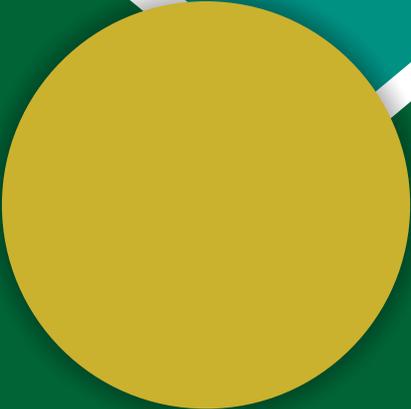
Fertilizer Prediction Models



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The soil fertility status of our soils is declining with the passage of time. Fertilizers are being used to meet the requirements of deficient nutrients but the fertilizer use in the country is highly imbalanced. The fertilizers have become very expensive input therefore; the general recommendations are not paying in relation to the investment made. It is therefore time now that nutrients are to be used in the amount and proportion in which these are required by specific crop in a specific soil for the specific yield. Soil testing laboratories are available

in every district of the province but no data based models were available in the country which could have been used to predict the actual requirement of nutrients to produce desired yields. Keeping in view this deficiency at the national scene, a team of soil scientists and IT experts implemented an Endowment Fund sponsored project to develop soil test based fertilizer prediction models to predict the requirement of nutrients for each major crop, district wise, on the basis of 10 years data of fertilizer trials generated by Soil Fertility Research Institute, Punjab/ any other organization conducting fertilizer trials in Punjab.

The last 10 years data of fertilizer trials conducted by Soil Fertility Research Institute in all the districts of Punjab were collected and processed by the team of soil scientists, crop wise and district wise and then handed over to the IT team of the project for further processing and developing the models. The team worked on these data, integrated it and developed the fertilizer prediction models using the state of the Art software Engineering Principles and 24/7 data management practices followed by computer simulation and finally made them available on website: www.fertilizeruaf.pk. In the process of model development all the stakeholders such as Fertilizer Industry, Agri. Extension, Agri. Research, Agriculture Universities and farmers were involved through consultations, meetings, and conferences.

The models have been developed for wheat, rice, maize, sugarcane, cotton, potato, tomato, carrot, cabbage, garlic and sunflower for the relevant districts depending on the availability of fertilizer trial data.

Validation of Fertilizer Prediction Models

No doubt, the models were developed on the basis of data of fertilizer trials conducted in the field, but still it was considered appropriate to validate the prediction of these models right in field. The funds were provided by USAID through ICARDA and the project was implemented by University of Agriculture, Faisalabad in collaboration with Soil Fertility Research Institute, Lahore. The soil samples of the selected fields were collected and analysed by the team of Soil Fertility Research Institute. The plan was developed by UAF team on the basis of nutrients requirement for the desired yields of crop determined by the fertilizer prediction models on the basis of soil analysis. The trials were conducted by scientists of Soil Fertility in various districts of Punjab. The results of validation trials in brief, are presented in the following table-1

Table 1. Results of validation trials conducted in the years 2014-15 and 2015-16

Crop	districts	Total Observations	%age of the pred. Yield	No of Obs.
Wheat	Faisalabad, T.T.Singh, Lahore Sialkot, N.Sahib, Kasur, Chiniot, M.B.Din, Mianwali, Bhakhar, Khushab, Sargodha, Pakpattan, D.G.Khan, Layyah	90	1. >100	31
			2. 91-100	36
			3. 80-90	12
			4. < 80	11
Cotton	Multan, Khanewal. Bahawalpur, Bahawalnagar, R.Y.Khan,T.T.singh, Jhang, Sahiwal, Muzaffargarh, Mianwali,	60	1. >100	7
			2. 91-100	13
			3. 80-90	10
			4. < 80	30
Rice	Gujrat, Sheikhpura, Gujranwala, Sialkot, Narowal	30	1. >100	18
			2. 91-100	10
			3. 80-90	2
			4. < 80	-
Sugarcane	Sargodha, Faisalabad, Jhang	18	1. >100	13
			2. 91-100	5

It could be easily inferred from the results presented in the table that the yield of wheat, rice and sugarcane was 90 % or better of the yield predicted by the models. In case of cotton, due to heavy rains in 2015, the overall yield of this crop was badly affected. However in the year, 2014, the situation in cotton was also like the other crops. The models are therefore highly reliable to predict the amount of N and P for the desired yield.

Various efforts were made to transfer the knowledge of N and P prediction models to various stakeholders and farming community through all possible means. The educationists, researchers, extensionists, fertilizer industry were given awareness through conferences, seminars, workshops and meetings at various places. The staff of Soil Fertility and Agriculture Extension was imparted training for use of prediction models. Farmers were given awareness through advertisements in electronic and print media, TV programs, social media, farmers field days and distribution of brochures etc.