

FERTILIZER BEST MANAGEMENT PRACTICES CASE STUDY – PAKISTAN

Nisar Ahmad

IFA Workshop on

Fertilizer Best Management Practices

7-9 March 2007, Brussels, Belgium



Socio-Economic Context

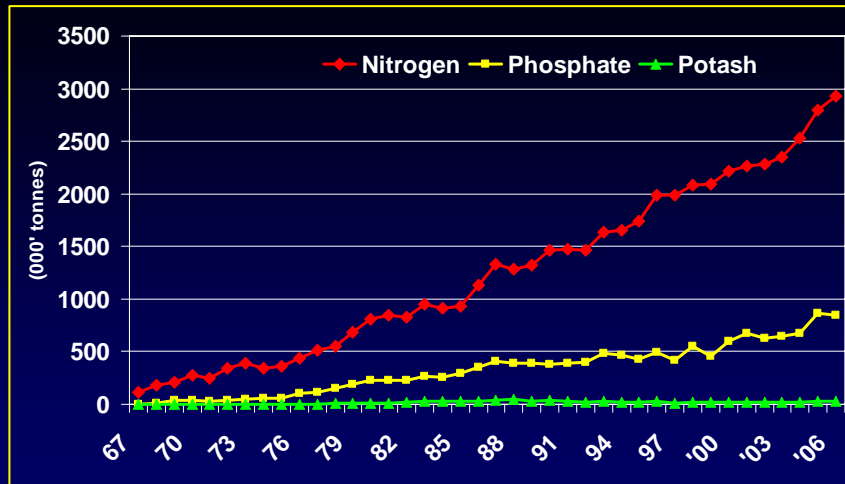
- ❖ Population: 155 million
- ❖ Geographical Area: 80 million ha.
- ❖ Cropped Area: 22.5 million ha.
- ❖ Share of Agriculture in GDP: 22%
- ❖ Per Capita Income: \$ 847
- ❖ Rural Population: 65.9%
- ❖ Farms: 6.62 million
- ❖ Average Farm Size: 3.1 ha

Area and Yield of Major Crops

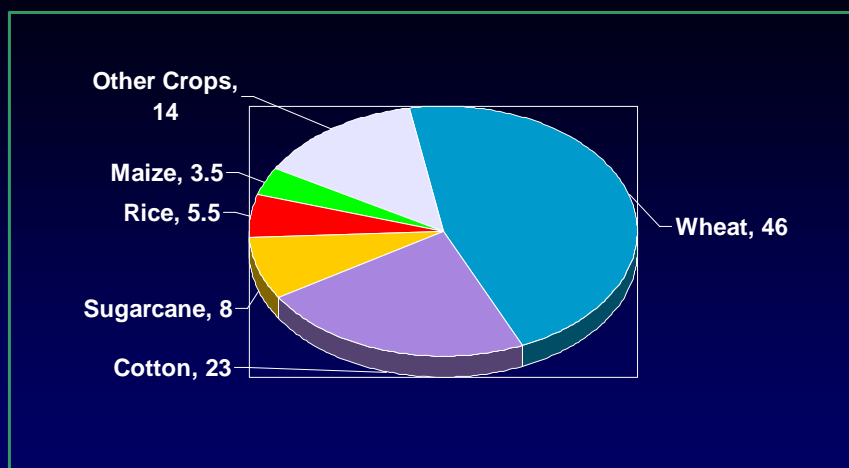
CROP	Area (000 ha)		Growth	Yield kg/ha		Growth
	1992-93	2004-05	%	1992-93	2004-05	%
Wheat	8300	8358	-	1947	2586	2.38
Rice	1973	2519	2.06	1622	1994	1.74
Maize	867	981	1.03	1364	2894	6.47
Cotton	2836	3192	0.99	543	760	2.84

Source: Agri. Statistics of Pakistan 2004-2005

Fertilizer Consumption

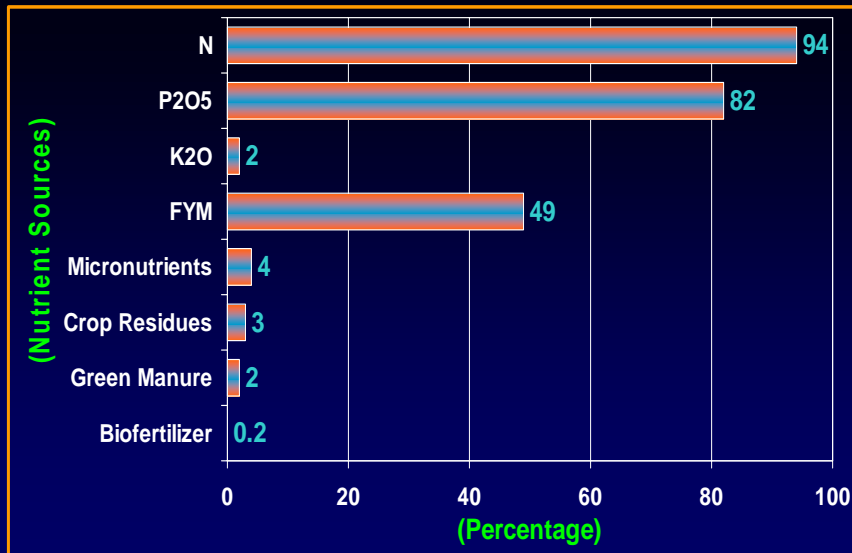


Fertilizer Use By Crops (%age)

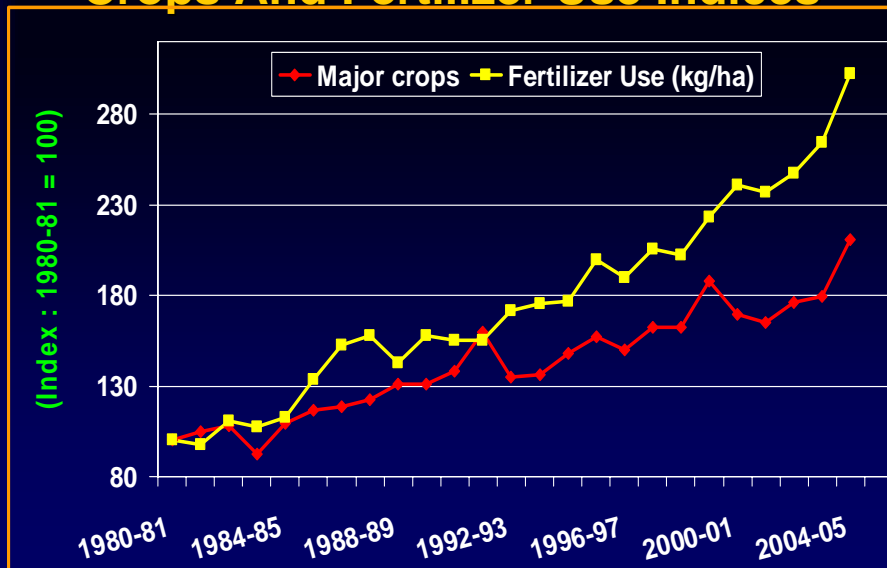


Source : NFDC Fertilizer Use Surveys

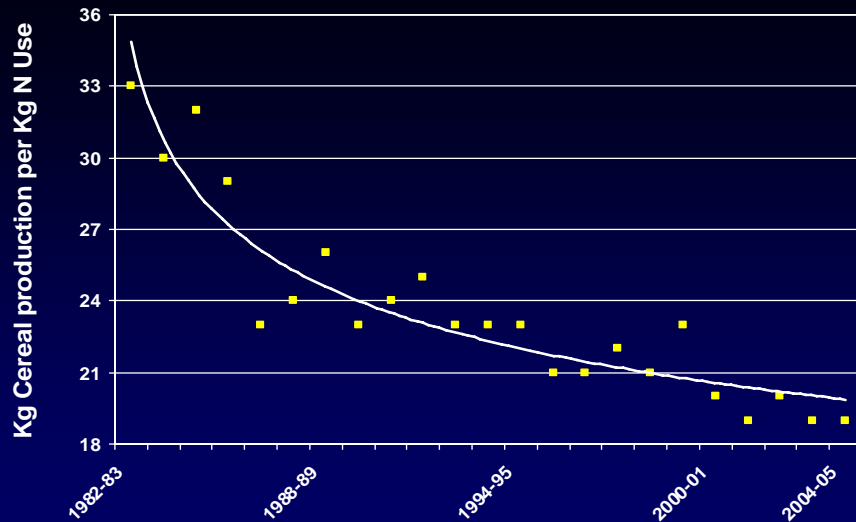
Adoption By Farmers



Crops And Fertilizer Use Indices



Fertilizer Use Efficiency- N



Principles of FBMPs

- ❖ Create awareness among farmers to use optimum and balanced fertilizer
- ❖ Educate policy makers about role of fertilizer in sustainable crop production and poverty alleviation
- ❖ Promote integrated use of plant nutrients for sustainable agricultural growth and environmental protection
- ❖ Restore and enhance soil fertility, and minimize losses of applied nutrients.

Fertilizer Best Management Practices

- ❖ **Balanced Fertilizer Use: Key to Improve Efficiency and Productivity**
- ❖ **Rate of Fertilizer Application – Economic Opt.**
- ❖ **Method and Time of Fertilizer Application**
 - Nitrogen
 - Phosphorus
 - Potash
 - Micronutrients
 - Integrated Plant Nutrient Supply – The Best Mix
 - Foliar Application of Nutrients

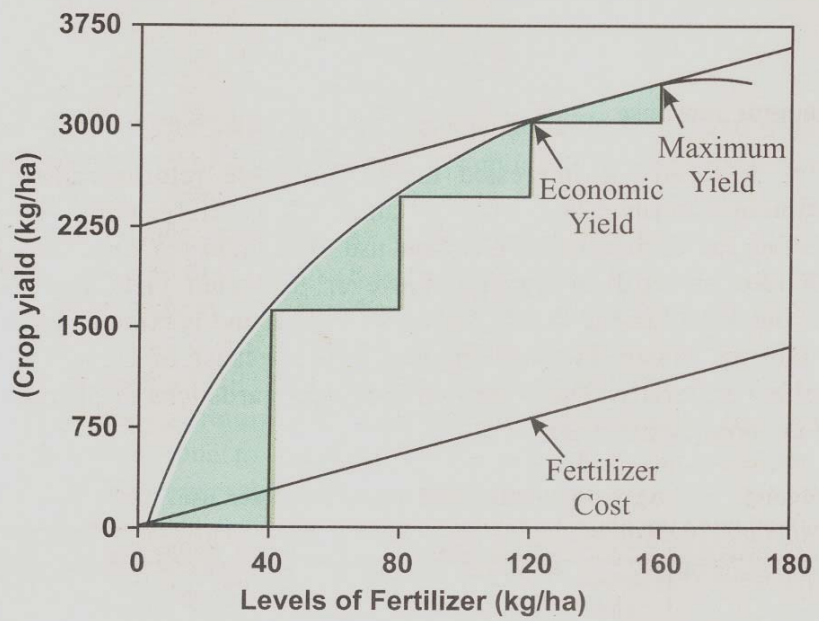
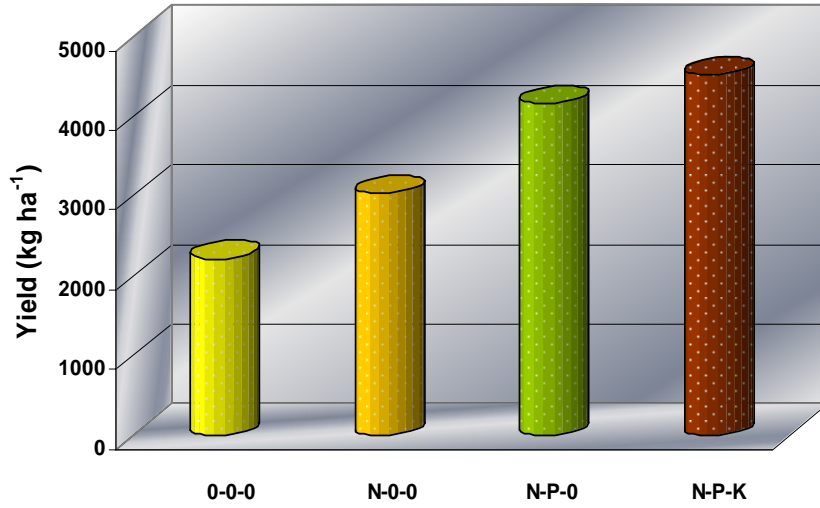
Impact of Balanced Use

kg/ha

CROP	Yield with N only	Yield With NPK	% increase in Yield
Wheat	2521	4120	63
Paddy (Basmati)	2800	4494	60
Maize	2110	5084	140
Sugarcane	56515	126334	123

Source: IMPHOS/FAO/NFDC

NPK Fertilization: Cereal Crops



Method and Time of Fertilizer Application

❖ Nitrogen

- ❖ Realistic yield goal to avoid over use of N. Optimum rate in relation to type of soil, crop and source of irrigation.
- ❖ Apply N as 2 to 3 splits for all the major crops depending upon soil and physiological stage of crop growth.
- ❖ Three splits for light textured soils and long duration crops/varieties.
- ❖ At seeding, N should be banded; top dressed at second and third splits be irrigated immediately to minimize volatilization losses.
- ❖ In rice, half of nitrogen to be incorporated into mud wet soil followed by flooding to check volatilization. Remaining half at panicle initiation

Cont.....

- ❖ For cotton 1/3 N to be applied at sowing by band, remaining 2 splits at first irrigation and pre flowering.
- ❖ For other crops apply N in two to three splits, preferably first application as banding.
- ❖ Smaller splits or omit top dressing in case of severe disease incidence.
- ❖ Crops followed by legumes, nitrogen rates can be reduced from 20 to 40 kg/ha depending upon the biomass.

❖ Phosphorus

- ❖ 1/3 of P fertilizers mix with two parts of well rotten and moist FYM for 12 hours before application to soils.
- ❖ Apply P through banding on side of seed.
- ❖ P fertilizer dissolved in water and applied with first irrigation improves efficiency by 20 to 30%.
- ❖ In case Rabi (winter) crop is fully fertilized with P and soil test value higher than 15 mg/kg, reduce P application to succeeding crop.

❖ Potash

- Band with P at sowing.
- Two splits in light textured soils.

❖ Micronutrients

- Boron and zinc to be applied as band with major nutrients or broadcast after mixing with five times of well pulverized soil.
- Micronutrients to cotton can also be applied through foliar spray of 0.1% after 45, 60 and 90 days of sowing.

❖ Integrated Plant Nutrient Supply – The Best Mix

- Farmers are motivated to use all other sources of plant nutrients, such as organic and bio to complement and supplement chemical fertilizers.

❖ Foliar Application of Nutrients

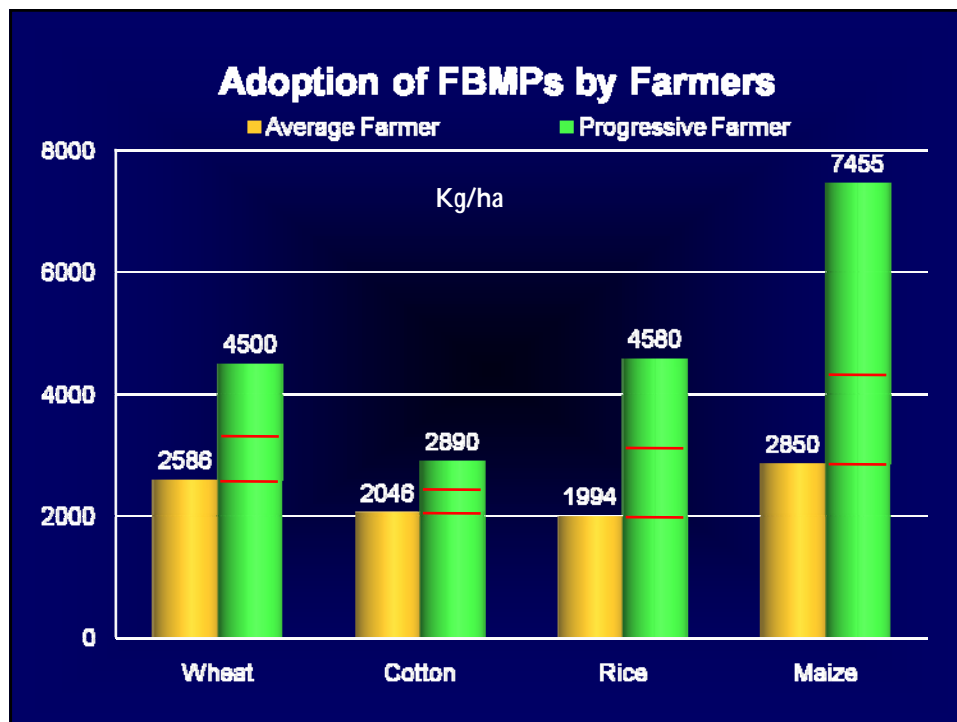
- For micronutrients, and growth regulators etc.

Crop Husbandry Practices Impacting Efficiency

- ❖ **Poor Seed Bed Preparation**
- ❖ **Poor Quality Seed**
- ❖ **Improper Seeding**
- ❖ **Delayed Sowing**
- ❖ **Unsuitable Crop Variety**
- ❖ **Inadequate Irrigation**
- ❖ **Salinity/ Drainage**
- ❖ **Weed Infestation**
- ❖ **Pest and Diseases**

Role Of Fertilizer Industry

- ❖ **Availability of the Products**
- ❖ **Farmers Education / Training**
 - **Crop Demonstrations**
 - **Extension Activities**
 - **Publication of Fertilizer/Crop Literature**
 - **Telecast of Crop Documentaries on TV**
- ❖ **Setup of Soil & Water Testing Labs**
- ❖ **Collaboration with Research/Extension**
- ❖ **Promotion of Balanced Use**



Future Strategies

- ❖ Regulatory/ Legislative System to Rationalize Fertilizer Use at Farm Level
- ❖ Fine Tune FBMPs Adoptable by Farmers
- ❖ Balanced Fertilizer: Beyond NPK
- ❖ Complex Fertilizers Specific to Crop
- ❖ Fertilizer Industry
 - Ensure timely availability of all types of fertilizers
 - Participation in collaborative Research at National Level
 - Intensive contribution towards extension/ farmer education

Cont....

- ❖ Slow and Controlled Release Fertilizers
- ❖ Precision Farming
- ❖ Site Specific Nutrient Management
- ❖ Conservation Agronomy
- ❖ Role of Biotechnology

THANKS