



The Economics of Ecosystems and Biodiversity TEEB for Agriculture & Food Global Symposium, February 2019

**Applying the TEEB agrifood framework to wheat in North India
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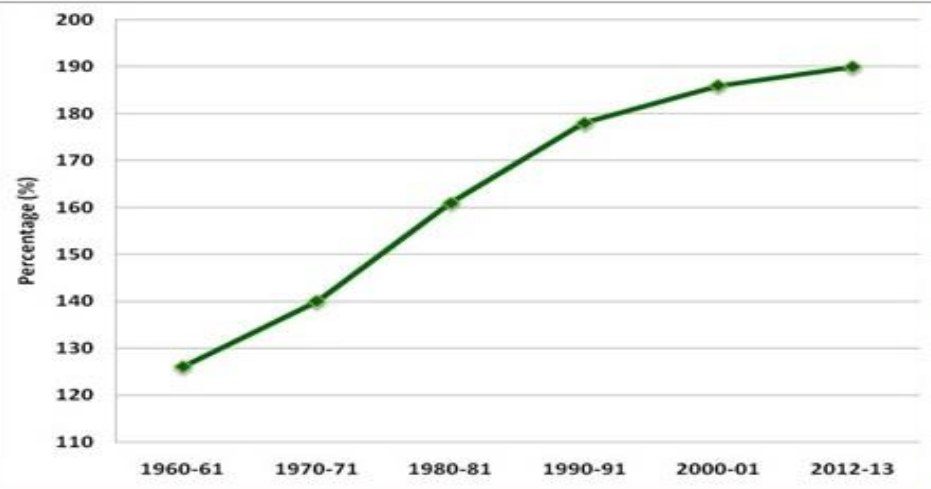
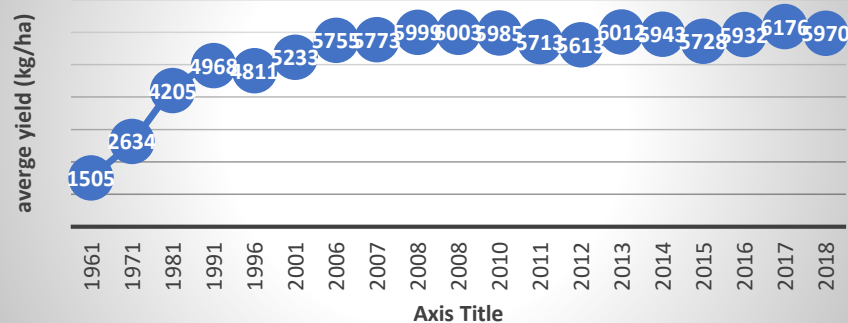
**The Economics
of Ecosystems
& Biodiversity**

based on a decision of the German Bundestag

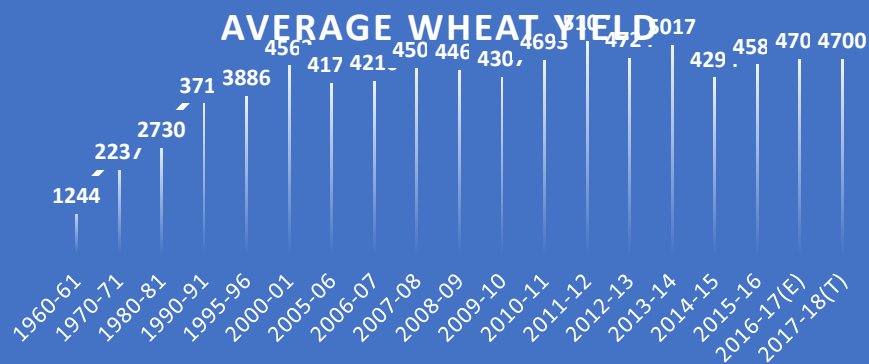
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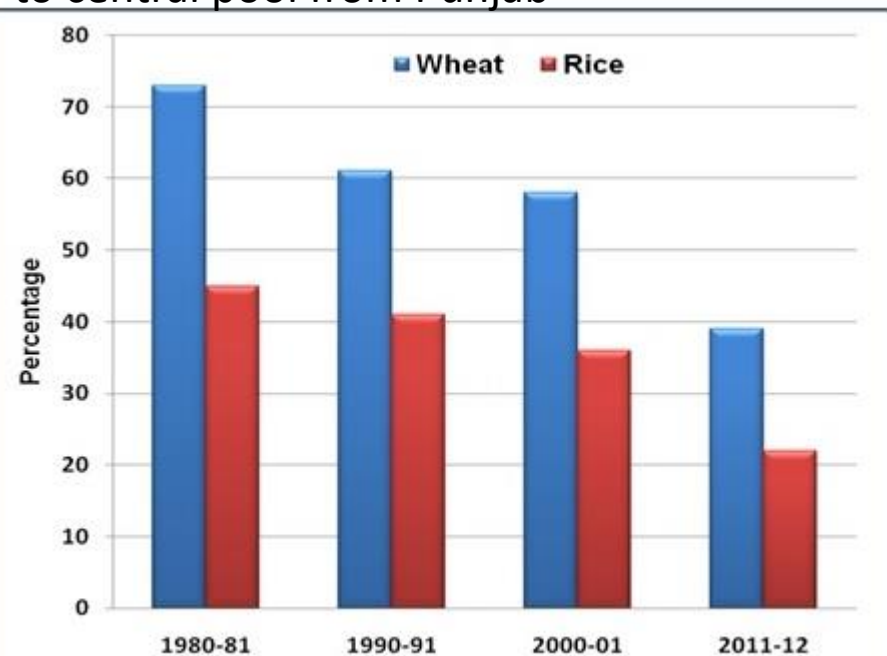
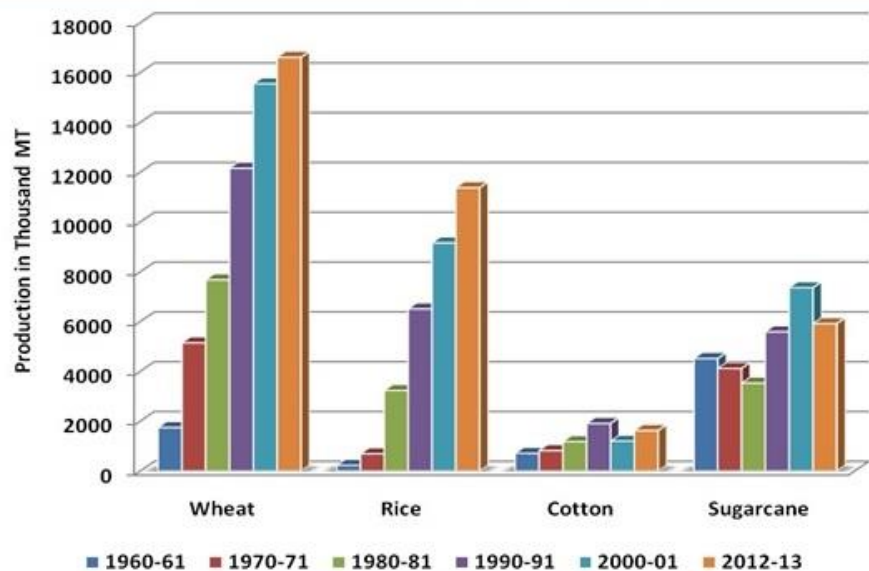
Average Yield of Paddy in Punjab



AVERAGE WHEAT YIELD

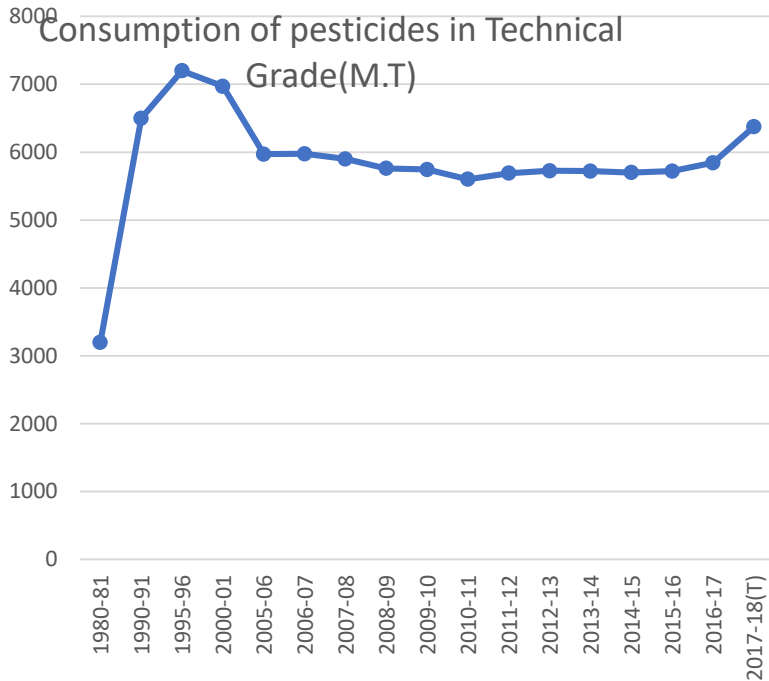


Percentage contribution of wheat and rice to central pool from Punjab

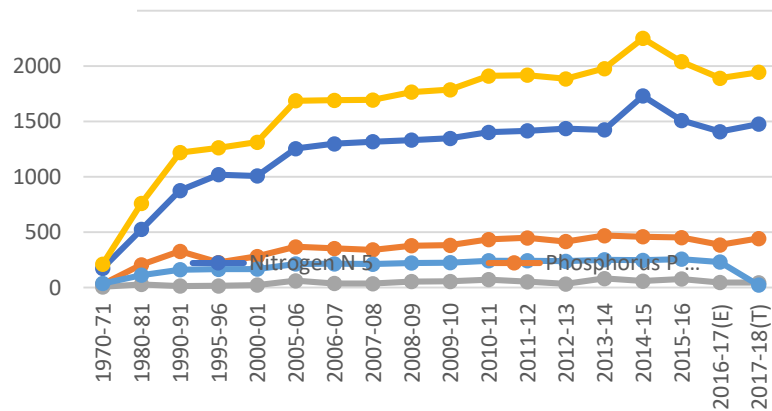




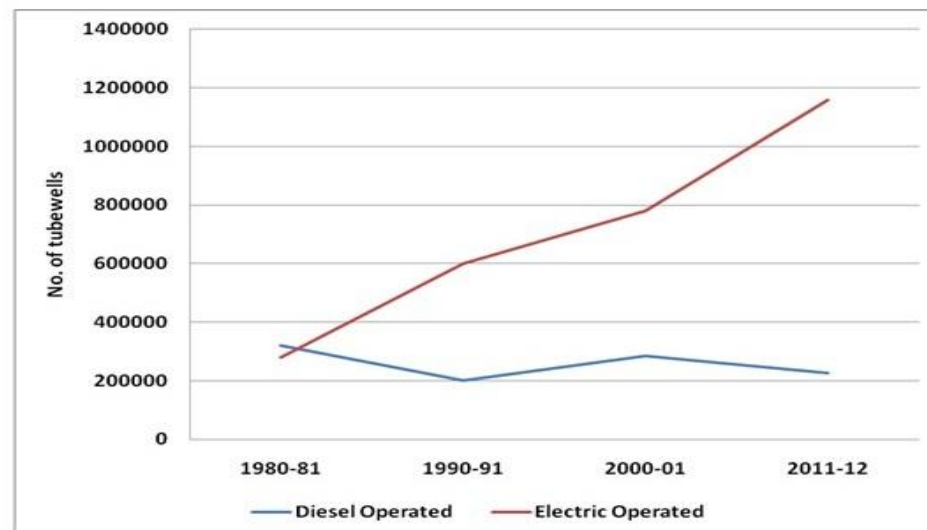
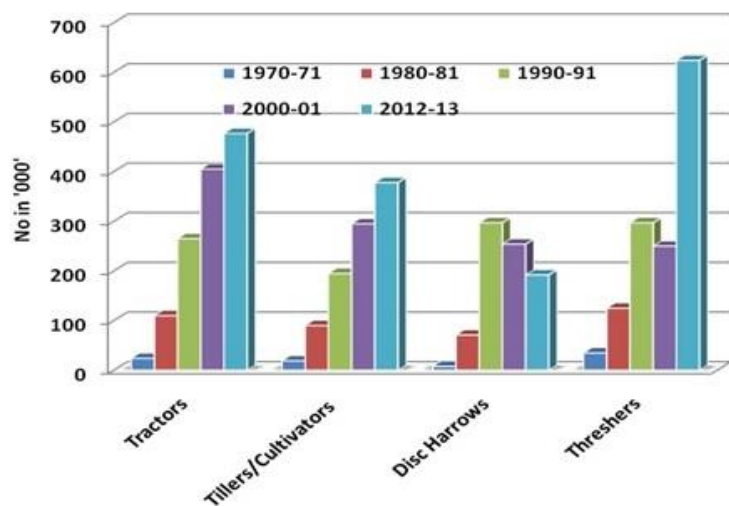
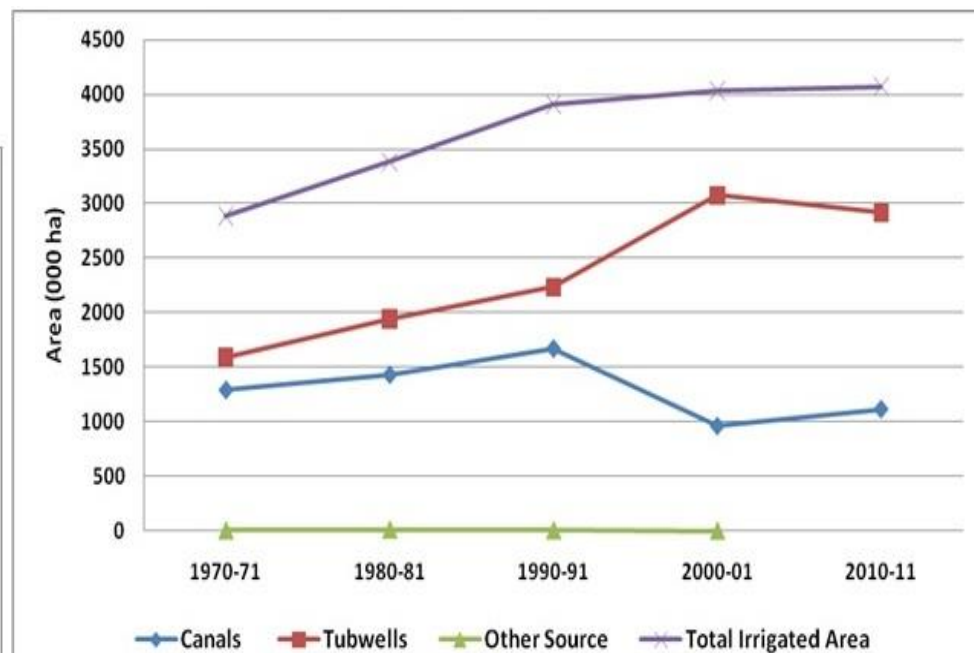
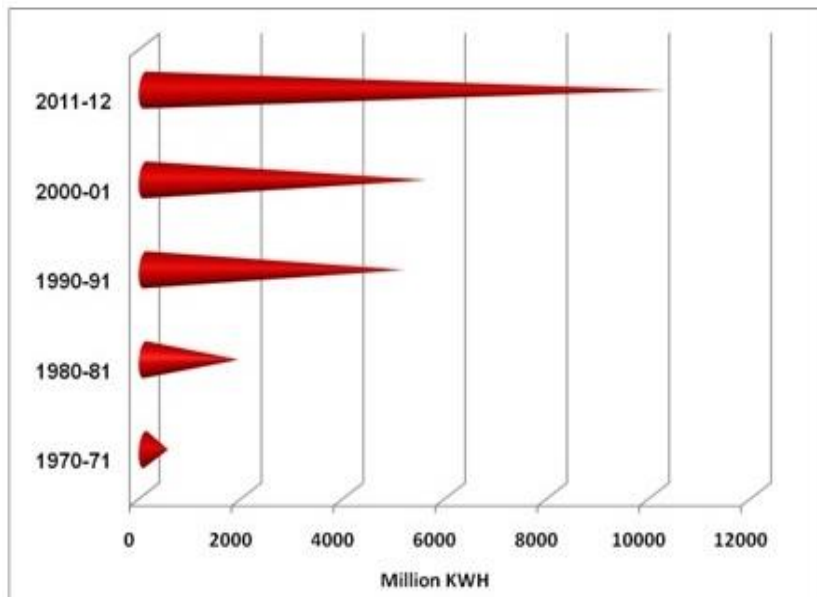
Consumption of pesticides in Technical Grade(M.T)



ption of fertilisers over time in Punjab

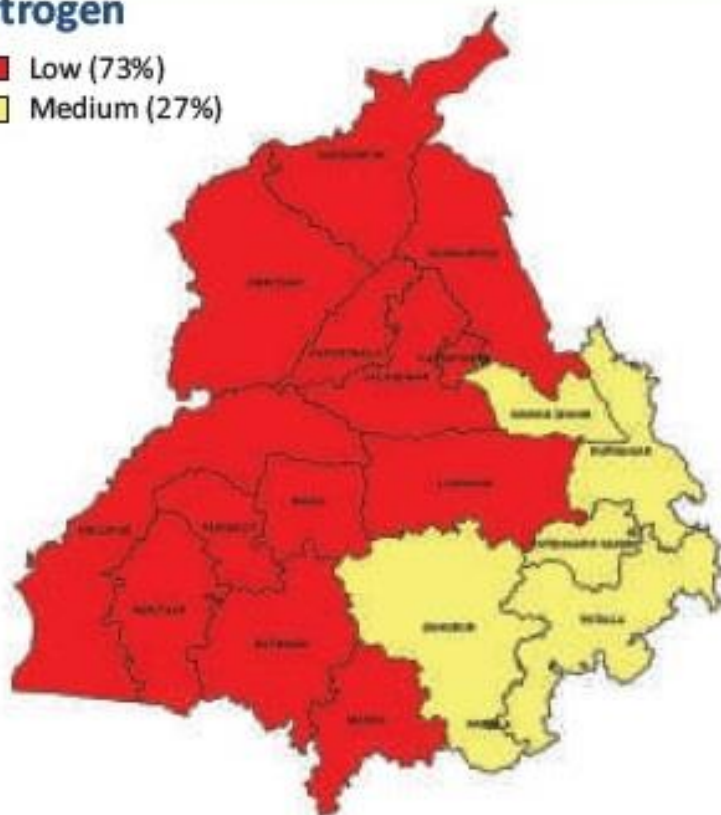


Growth in electricity consumption in Punjab



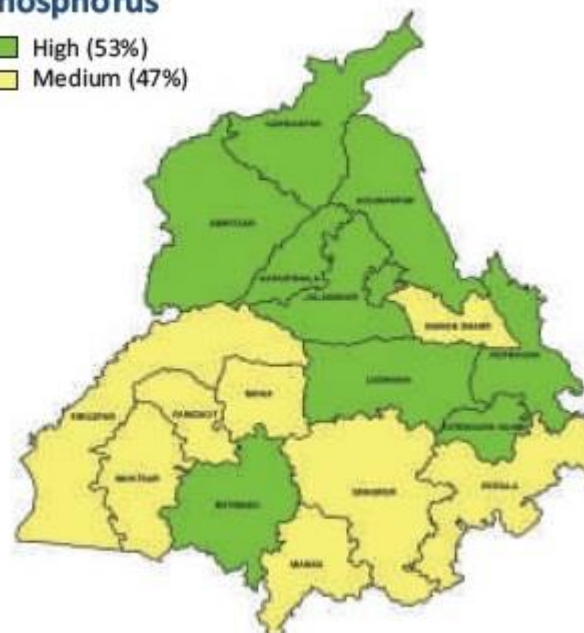
Nitrogen

- Low (73%)
- Medium (27%)



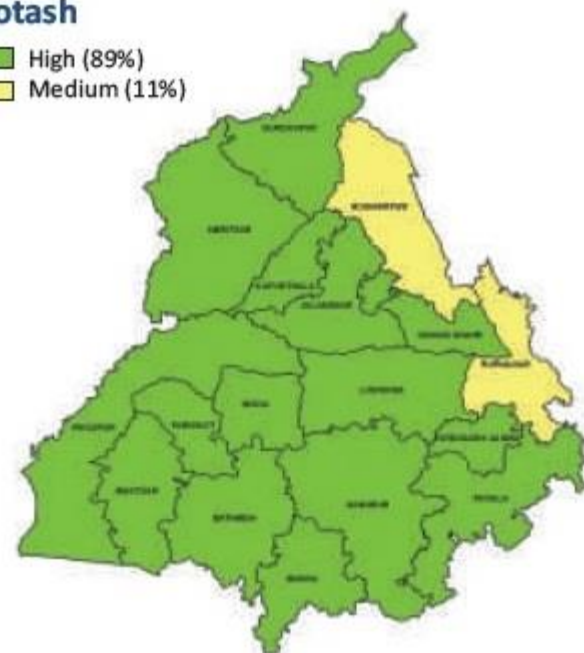
Phosphorus

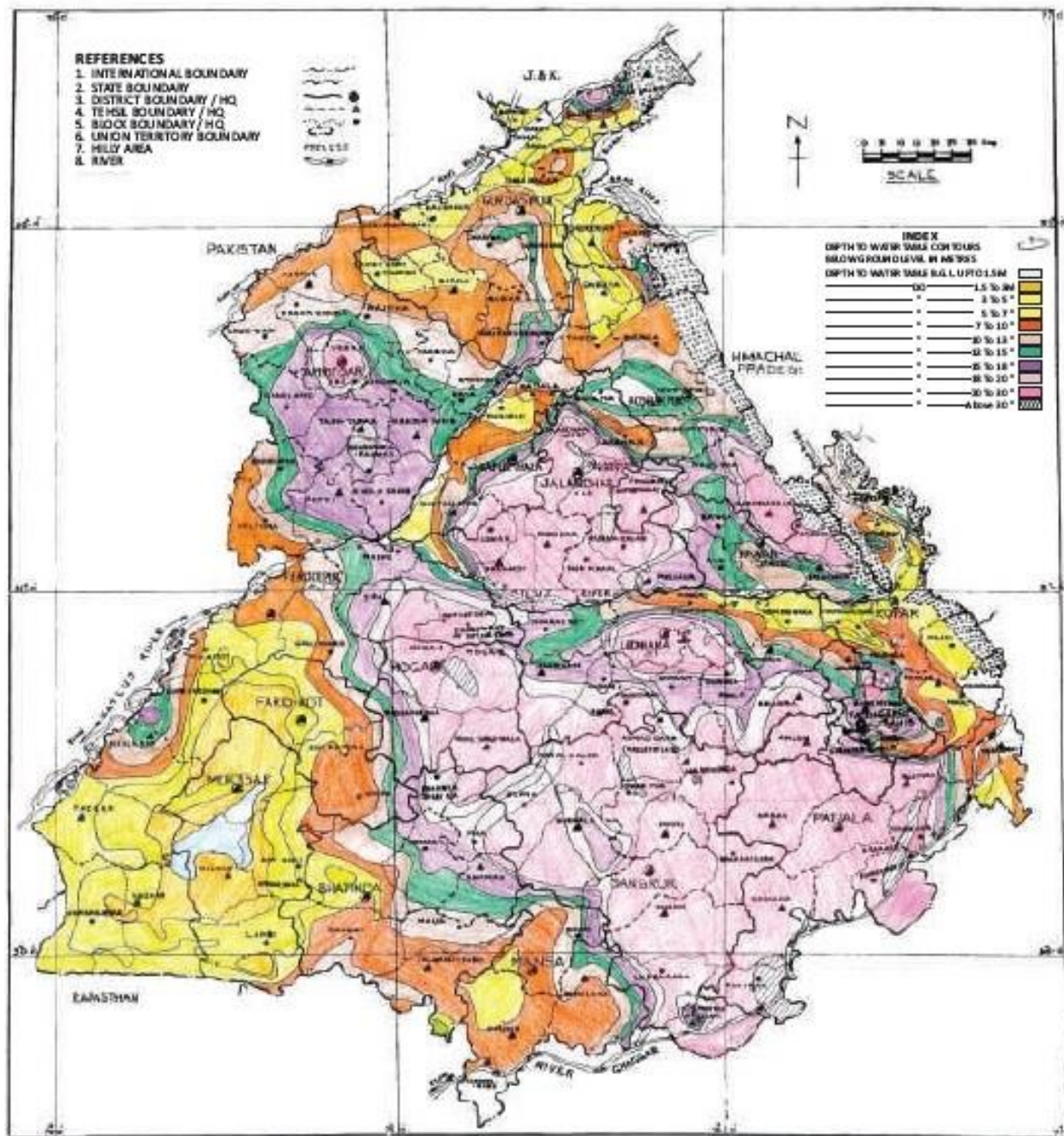
- High (53%)
- Medium (47%)



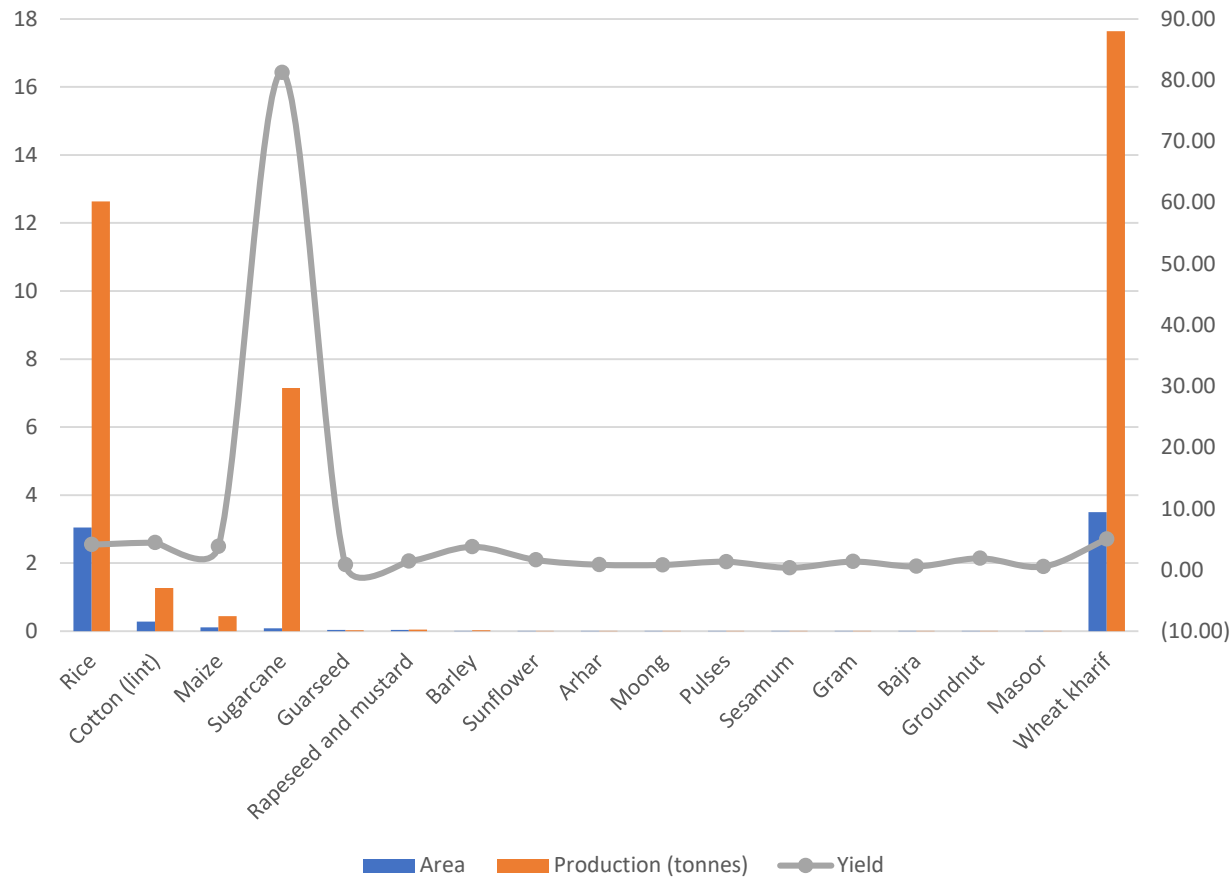
Potash

- High (89%)
- Medium (11%)

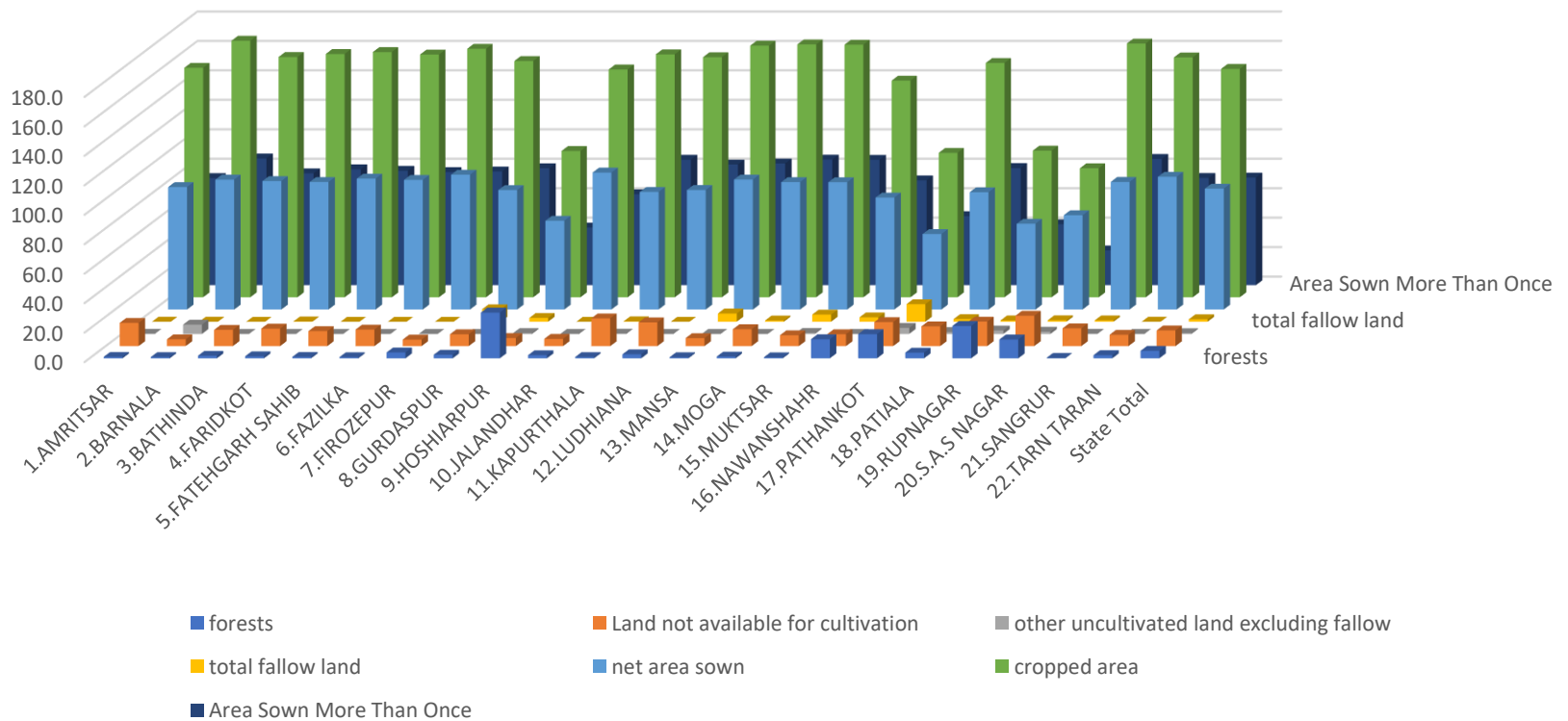




Area, production and yield of various crops in Punjab



Land use classification Punjab

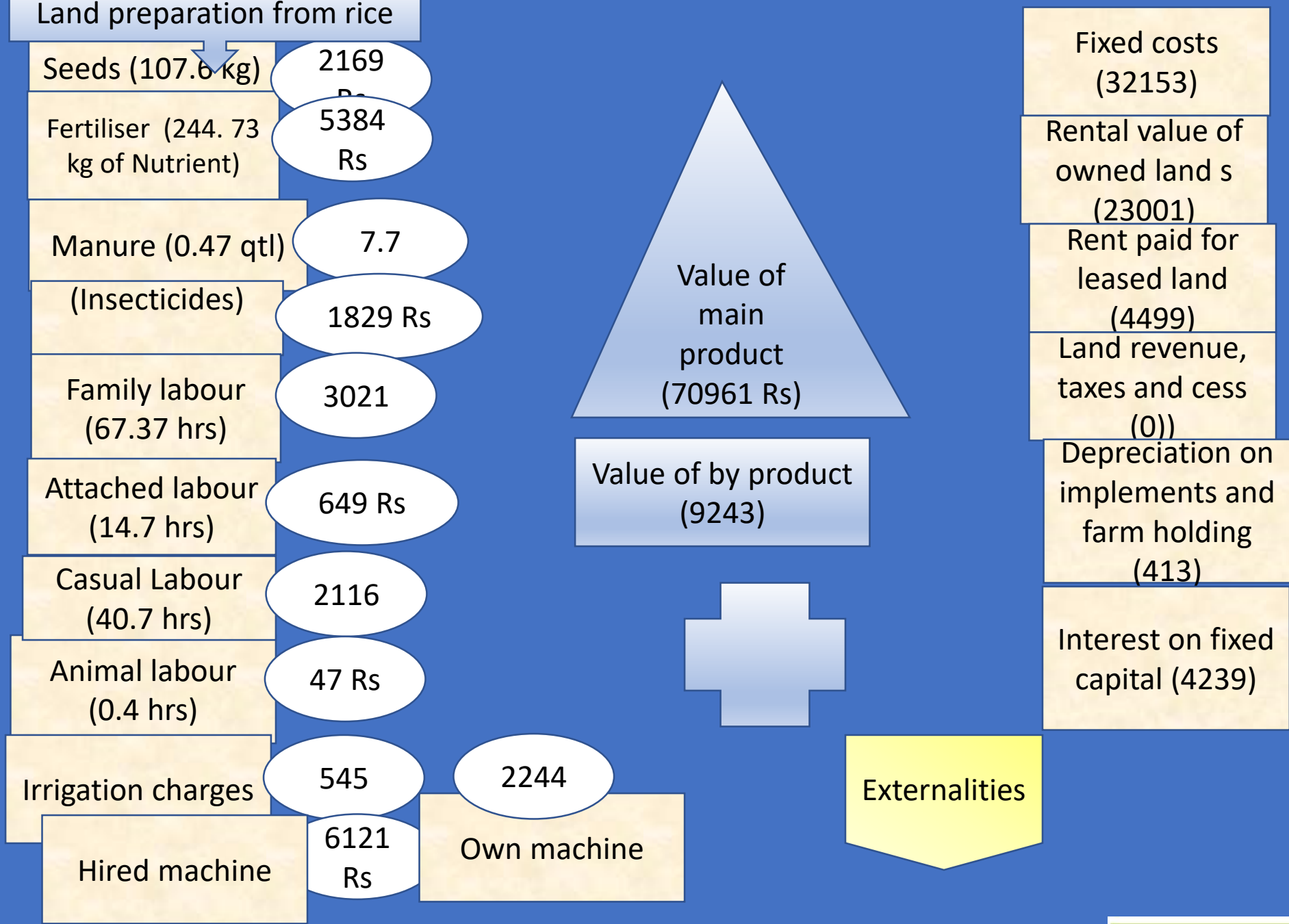


The context and the objectives

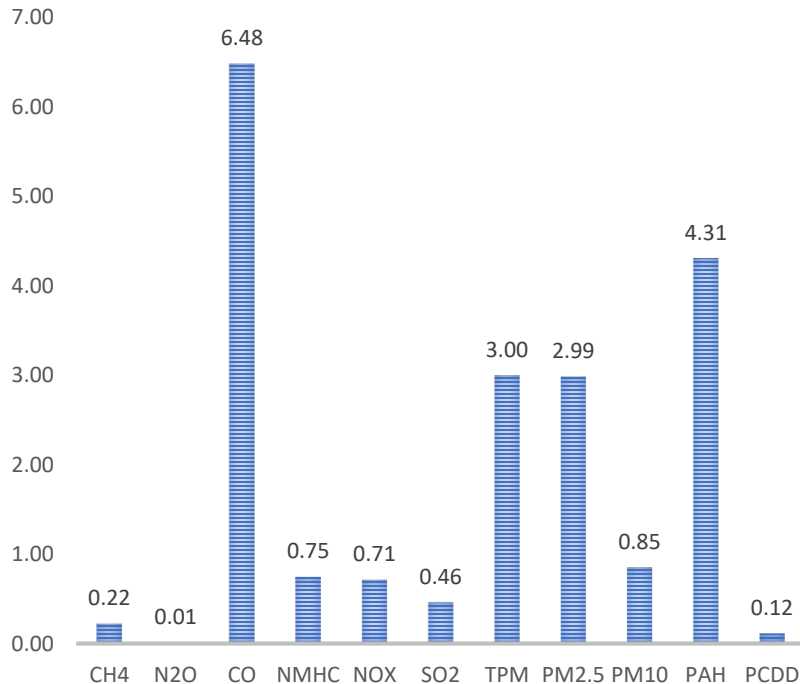


- Test two applications of the TEEBAgriFood Evaluation Framework:
- (a) typology comparison (Rice-wheat farming system with combined harvester resulting in residue burning) and Rice-wheat farming system with Happy seeder (no residue burning)
- (b) alternative policy scenario evaluation (organic vs conventional production of wheat)

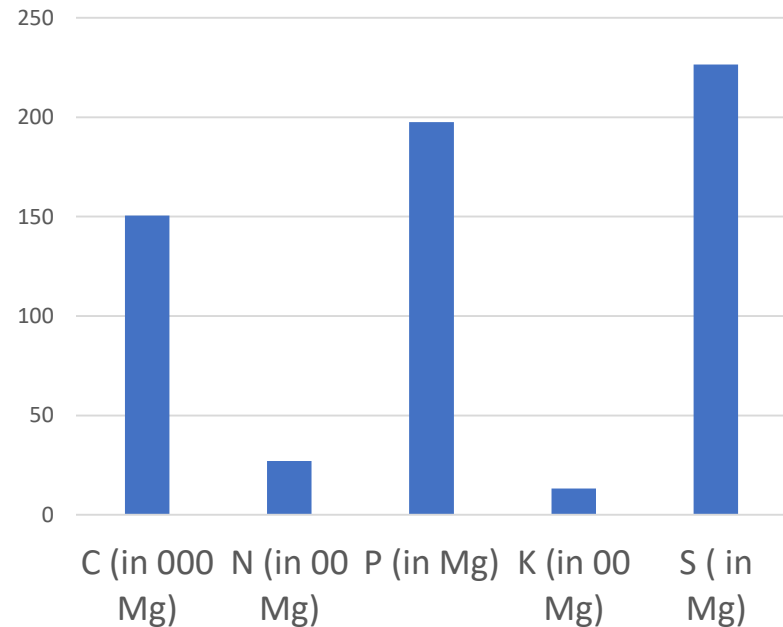




EMISSIONS IN GMS/KG OF RICE PRODUCED DUE TO RICE RESIDUE BURNING



Average annual Soil nutrients lost due to burning (1997-2014)

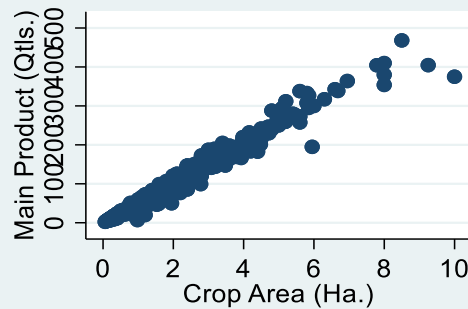
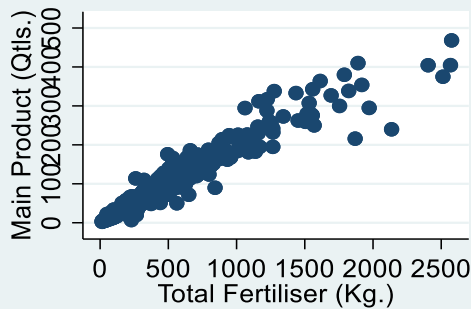
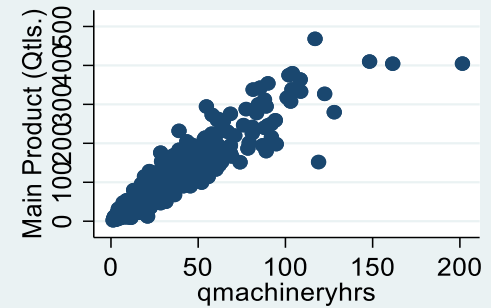
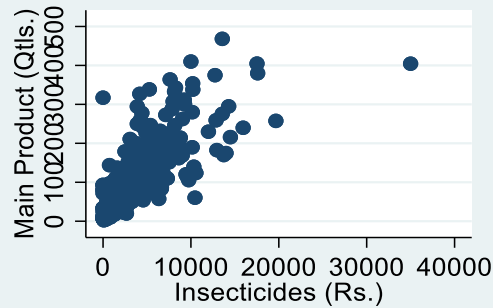
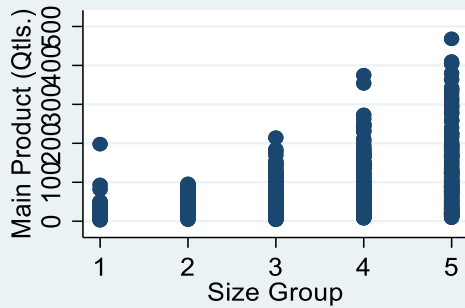
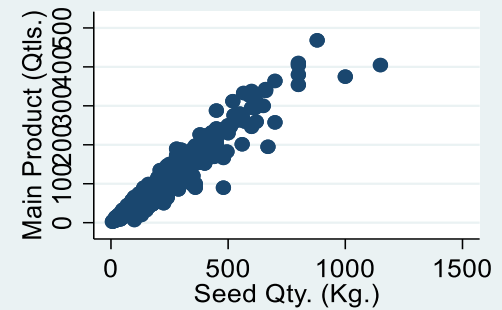
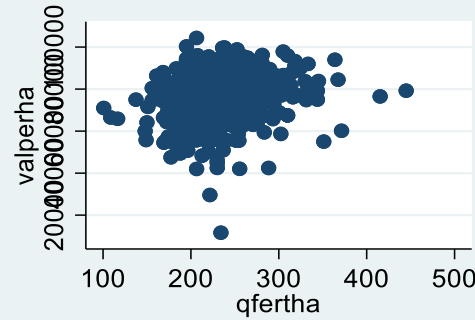
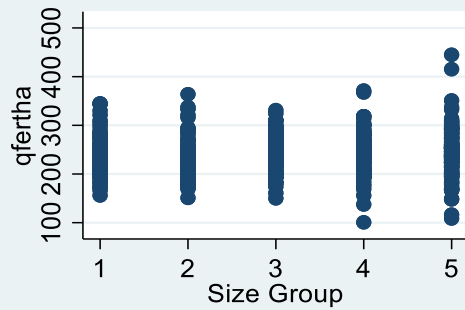


Asthma, bronchial attacks. Potential carcinogens

A 10% increase in asthma cases during the rice straw burning season
60% of the smog days, school closure, flight and train disruptions, poor visibility and accidents

Alternative to residue burning

- Happy seeder technology incorporating stubble into the soil
- Additional fertiliser required can be avoided (average 47 kg/acre)
- Costs = 1.7 Lakhs per machine



Land preparation from rice

Seeds (107.6 kg)

2169

Fertiliser

Rs
1616

Manure

4.6

(plant based
Insecticides)

457

Human labour

8679

Animal labour

47 Rs

Irrigation charges

545

Hired Machinery

6121
Rs

Own machine

2244

Organic wheat production

Value of
main
product
(94378 Rs)

Value of by product
(4622)

Fixed costs
(32153)

Rental value of
owned land s
(23001)

Rent paid for
leased land
(4499)

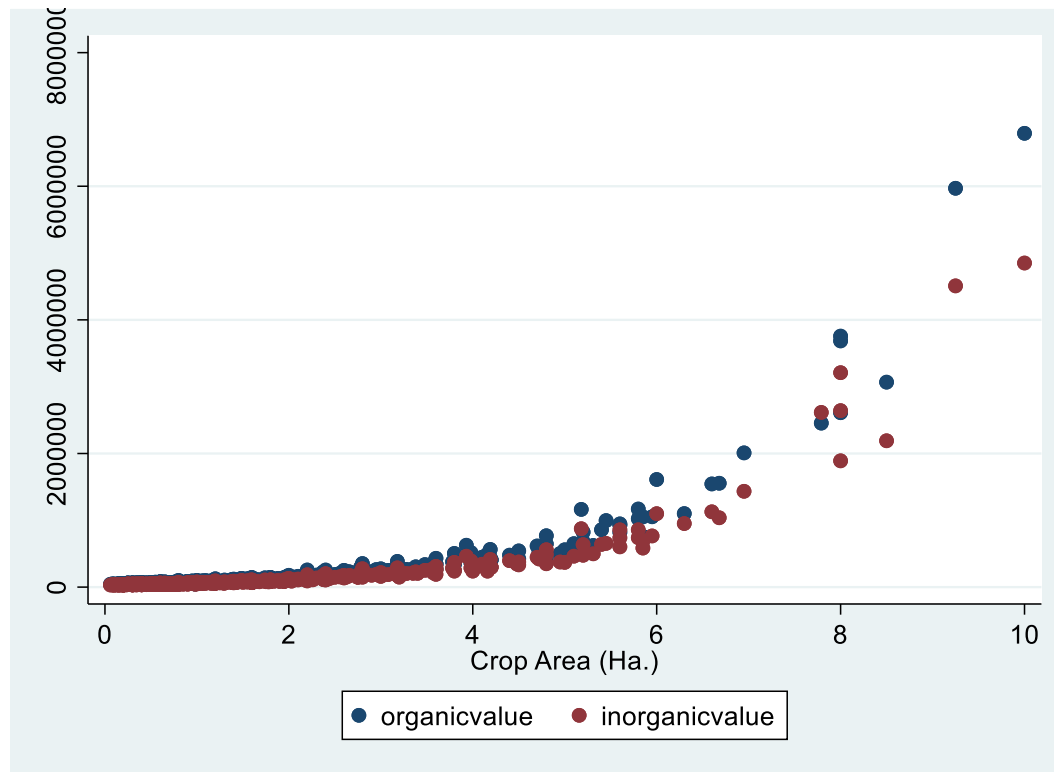
Land revenue,
taxes and cess
(0)

Depreciation on
implements and
farm holding
(413)

Interest on fixed
capital (4239)

Externalities

Comparison between organic and inorganic wheat production



Processing, manufacturing and household

- 90% used for consumption
- 10% used in Bakery, Bread and Milling operations
- (work is in progress)
- Human capital and social capital separately needs to be estimated for wheat
- Health impacts in monetary terms need to be estimated

Thank you