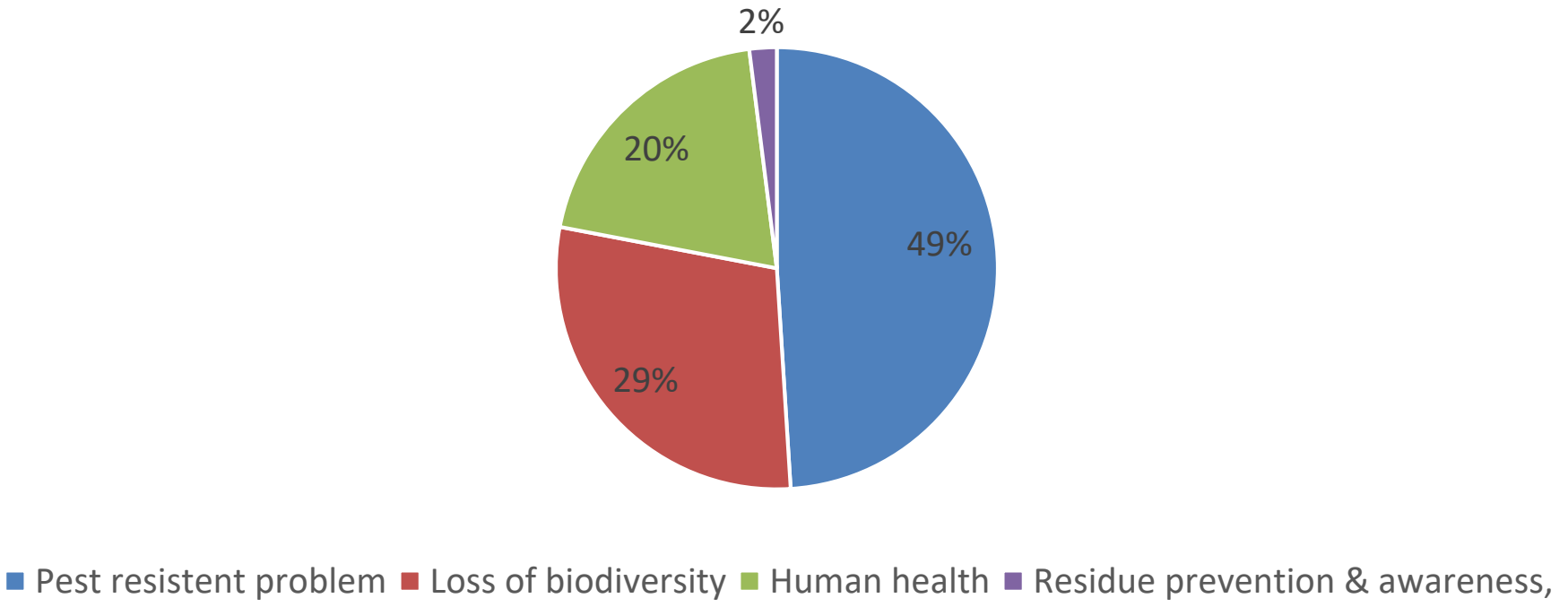
Case Studies in Agroecological Perspective

I. Institutionalization of Farmers Led IPM in Pakistan and Impact of Pesticides Use

Increase in pesticide use: 665 ton (1980) to 71265 ton (2014) + 107 times 14% per annum

Environmental & social cost of pesticide in cotton (9 districts of Punjab): 206 million USD

(PPPP, 2000)



Chemical based control programme in crops resulted in:

1. Increased the pest problems
2. Disturbed the agro-ecosystem
3. Killed the non-target and environment friendly organisms (predators and birds)

Tremendous cost of pesticide use not only **drains the exchequer**, but also presents a growing **threat to the people and environment** of the country

Pesticide policy analysis project and the initial input and suggestion of FAO-EU IPM Programme for Cotton in Asia led to **institutionalization of an IPM programme in Pakistan**

FFS training was a favorable process in **increasing knowledge and skills of cotton growing farmers regarding ecologically sound farming practices** (Siddiqui *et al.,* 2012)

It can be concluded that FFS proves highly beneficial to the farming community due to its **capacity building** functions

II. Precision Agriculture (Land Laser Levelers & Other Water Saving Technologies)

Precision agriculture permits use of advanced machinery to reduce inputs

Laser land leveling in rice-wheat systems of the Indo-Gangetic Plains:

Irrigation water saving: 10-30% + saving in labour cost for irrigation application

Effective increase in farming area: 3-6%

Fertilizer use efficiency: 6-7%

Increase in yield: 3-19% (Jat et al. 2009; Ren et al. 2003)

Reduction in labour use for weeding: 75% (Bhatt and Sharma, 2009)

Use of technology resulted into **higher yield of major crops to the extent of 10.0 to 18.4%** in rice-wheat and mixed cropping zones of Punjab-Pakistan (Hussain et al., 2018)

Use of the technology is increasing with the passage of time

Farmers' land laser levelers ownership:

Rice-Wheat zone: 21%

Mixed Cropping zone: 15%

Higher benefit-cost ratios over conventional land preparation/leveling by 0.08 to 0.17

Other water saving technologies

- Drip/ sprinkler irrigation,
- Roof top rain water harvesting in humid regions,
- Moisture conservation through micro-catchments in rain-fed areas,
- Gypsum application for moisture conservation in rain-fed areas,
- Ridge and bed planting of crops in irrigated areas,
- Gully plugging/ check dam and spillways technologies in erosion prone area

III. Soil Testing Kits and Fertilizer Prediction Models

Low, over and **imbalance use of fertilizers** results into **low crop productivity**

Use of soil testing kits and fertilizer prediction models provide farming community **information about inputs requirements and latest production practices**

Advantage over traditional agricultural extension service methods, as information is provided to the farmers through **SMS, call centers and webs** in order to increase the productivity and solve their problems

Distribution of soil testing kits and development of a cadre of service providers in far flung rural areas can help farmers obtain reports about fertility status of their soil and help them adopt balanced use of fertilizers and other inputs

Website (fertilizeruaf.pk) had been set up guiding the framers about the balanced use of fertilizers

Farmers can use these prediction models to determine the actual amount of nitrogen and phosphorus for desired yield of wheat, cotton, sugarcane, rice and maize crops

Keeping in view depressed commodity prices in the world markets and low crop productivity, balanced use of inputs is vital for agricultural development and prosperity of farming community.

Farmers can invest according to their financial resources . . . can earn profit
up to 1830 USD per hectare (PKR 0.247 million) from arable cropping
2200 to 3000 USD per hectare (PKR 0.74 to 1.0 million) from high value farming
by using the e-solutions from the website