

**FACULTY OF AGRICULTURE SCIENCES AND  
ALLIED INDUSTRIES**

## **FARMING SYSTEM AND ENVIRONMENT**

Food security, livelihood security, water security, natural resource conservation and environmental protection have emerged as major issues worldwide. The IFS was first propagated with overall aim of establishing sustainable farming system with reduction in exposure of the environment to pesticides and other agro-chemicals. Adoption of organic farming was naturally expected to prevent short and long term ill effects on the biosphere. Programmes such as linking environment and farming assisted farmers to move towards IFS. The IFS is targeted to bring a commitment to good husbandry and animal welfare along with efficient soil management and appropriate cultivation techniques using crop rotations and improved cultivars, reducing use of crop protection chemicals and fertilisers with the aim to maintain the landscape, rural communities and wildlife habitats.

However, now there exists two schools of thoughts, one considering IFS as boon for environment while the other takes it as curse. It appears from the literature that it is the way one takes IFS to perceive its benefits and dangers. Environmental implications of IFS are briefly presented under different heads.

- **Ecosystem**

This category comprises floral and faunal bio-diversity, habitat diversity and landscape conservation. The IFS performs better than conventional farming in respect to floral and faunal diversity. Due to the ban of synthetic pesticides and N-fertilisers, organic farming system provides potential that result in positive effects on wildlife conservation and landscape.

Integrated fish farming seems to favour antimicrobial-resistant bacteria in the pond environment which is attributed to the selective pressure of antimicrobials there and to the introduction of antimicrobial resistant bacteria from animal manure. This change may pose a potential risk of destabilization of natural micro-flora in the ecosystem which is ultimately deleterious to the environment.

- **Soil**

The IFS tends to conserve soil fertility and system stability better than conventional farming system. This is due to mostly higher organic matter contents and higher

biological activity in organically farmed soils than in conventionally managed. Furthermore, IFS has high erosion control potential.

- **Ground and surface water**

The results show that IFS results in lower or similar nitrate leaching rates than integrated or conventional agriculture. Actual leaching rates per hectare are up to 57% lower on IFS than on conventional fields. Organic farming does not pose any risk of ground and surface water pollution from synthetic pesticides.

- **Climate and air**

On per hectare scale, the CO<sub>2</sub> emissions are 40-60% lower in IFS than in conventional ones, whereas on per-unit output scale, the CO<sub>2</sub> emissions tend to be higher in organic farming system. The N<sub>2</sub>O emissions per hectare on organic farms tend to be lower than on conventional farms. The IFS has a lower CH<sub>4</sub> emission potential on a per hectare scale, while CH<sub>4</sub> emissions per kg of milk are estimated to be higher in organic dairy farms than in conventional ones. Calculation of NH<sub>3</sub> emissions in organic and conventional farming system conclude that organic farming bears a lower NH<sub>3</sub> emission potential than conventional farming system. Due to the fact that synthetic pesticides are not permitted in organic farming, significantly lower air contamination is ensured than in conventional farming.

- **Farm input and output**

Nutrient balances of IFS farms in general are close to zero. The N, P and K surpluses of IFS were significantly lower than on conventional farms. Negative balances were found for P and K. most research studies reviewed indicate that energy consumption on organic farms is lower than on conventional farms.

- **Animal health and welfare**

Housing conditions and health status depend highly on farm specific conditions, thus housing conditions seem not to differ significantly between IFS and conventional farms.

IFS dairy cows tend to have a longer average productive life than conventional dairy cows.

- **Quality of food produced**

The risk of contaminating food with pesticides and nitrate can be assumed to be lower in IFS rather than in conventionally produced food. A strong argument exists for the superiority of animal products from organic in comparison to conventional farming.

- **IFS associated health risk**

Increasing health consciousness among the people has led to the increased demand for vegetable products grown in the absence of pesticides and synthetic fertilisers, popularly known as organic foods. Moreover, land available for food production is decreasing day by day. As such, intensive cropping system and intensive livestock system have come to merge into IFS to sustain the ever growing demand for food and feed. Sewage and compost, being common source of zoonotic pathogens, may contaminate soil with the pathogens and the transmission of infection through vegetable produce grown on contaminated soil is not rare.

In the recent past, anthropogenic changes, largely in land use and agriculture, particularly IFS, are implicated in the apparent increased frequency of emergence and reemergence of zoonoses and multiple drug resistant (MDR) infections. Excreta from poultry or livestock suffering from some zoonotic infectious disease may be transmitted to the fish and vegetables which constitute important components of human diet.