

ENVIRONMENT

Failure to move conservation policies towards a more sustainable development has manifested itself in a range of environmental problems, particularly in agriculture sector in Pakistan. In addition to deforestation and desertification issues across much of country's territory, agro-chemical contamination, particularly by irrational use of hazardous pesticides has raised the problems of food chain, human and environmental health. Therefore, research based protection and conservation of environment including land, water, air and diversity of fauna and flora are crucial for sustenance of society and sustainable development. Research at PARC is focused on pesticide residue problems and fertilizer loading and fate in agricultural land, water, food chain and their effect on human health.

Environment research focused on pesticide residues and persistence surface and ground water and soil as well as agrochemical loading and fate in soil.

Ecotoxicology

- Four pesticides exceeding many-fold from EEC limits of drinking water were found in pesticide residues analysis of Rawal Lake and its tributaries.
- Water samples (29) from surface/ground water of cotton growing areas of Sindh were tested for pesticide residues. Based on retention time of standard pesticides (chlorpyrifos, malathion, profenofos, bifenthrin, fenvalerate, dimethoate, cyhalothrin, cypermethrin, endosulfan and monocrotophos) 22 (75.8%) water samples were found contaminated with detectable level of 5 pesticides (range of 0.0005-0.054 µg/l).
- Chlorpyrifos an organophosphate insecticide used in agricultural crops was tested for persistence in soil. Its persistence was observed alone at 100 ppm and 1000 ppm as well as with all fertilizers (at the rate of 1% viz: DAP, SOP and urea) with tap/hard water. The study showed 100% persistence of Chlorpyrifos in soil under laboratory conditions.
- Analysis of persistent organic pollutants (POPs) from environmental samples in Lahore and Gujranwala found significant biomagnification phenomenon with respect to aldrin, dieldrin, heptachlor, DDTs, and cyclodienes.

Nutrient Loss from Soil

- Nutrient (P&NO₃) leaching out of root-zone in undisturbed soils made twin way and preferential flow paths.
- The solute transport velocity, dispersion, mobile water fraction and P-retardation coefficient for the soil columns were different for structured and non structured soils. The study highlights role of soil structure variability in loss of applied fertilizer from field soils.

