

INTRODUCTION

The Bagmati Zone covers eight hilly districts in the Central Development Region of Nepal. This zone borders the Tibetan Autonomous Region of the People's Republic of China in the north and the Narayani Zone in the south. The Janakpur and Gandaki zones lie in the east and west respectively (Map 1).

The Bagmati Zone is climatically well suited to agriculture. The valleys are fertile, the temperature regime warm temperate, and the precipitation adequate for summer crops. Winter crops also receive precipitation from the west monsoon but in a much reduced quantity.

In the rural areas, agriculture is the way of life. The valley farmers have developed and are still developing commercially viable, intensive farming, directed towards a growing market, whereas the hill farmers follow an intricate cropping pattern that involves sequence cropping, mixed cropping, and relay cropping with a wide array of different crops to meet their subsistence needs. This is further characterised by small farm holdings, intensive cultivation, variable microclimates, and a strong dependence on forests to support livestock and maintain soil fertility. With forests receding across the hills, traditional methods of fertility management have been severely constrained and agricultural productivity is mostly declining. In addition, the rapid population growth has intensified pressure on agricultural lands. Consequently, as more rural areas become accessible, hill farmers are quickly switching over to chemical fertilisers and pesticides to sustain agricultural productivity.

Chemical fertiliser was introduced into Nepal around the early sixties. Efforts to supply fertiliser commenced in 1966 with the establishment of the Agricultural Supply Corporation which was later renamed the Agricultural Inputs' Corporation (AIC). Today fertiliser use is very popular among Nepali farmers and supply falls short of demand. Kathmandu Valley farmers use about 15 per cent of the total fertiliser consumption of the country. High nutrient fertilisers, such as urea (46%), complex (20:20:20), MOP (60%), and TSP (46%), are being used. It has been estimated that the present level of fertiliser use (20kg/cropped hectare per annum) has to be raised (to 77kg/cropped hectare per annum) in order to maintain adequate food production for the increased population by the end of this century.

The present level of fertiliser use does not pose any serious environmental threat, although instances of misuse have been observed in different places. Increase in the nitrate contents of groundwater in other countries has been due to intensive use of fertiliser. Such problems have not been reported in the Bagmati Zone.

A possible environmental problem, which may occur in future in the Bagmati Zone, is the eutrophication of inland water bodies such as the Nagdah, Taudah, etc. Eutrophication is brought about by excessive algal growth which results from the raised phosphatic content of water.

Fertiliser use, to be environmentally sustainable, should be directed towards balancing various nutrient components and their retention for use by crops. Excessive weed growth, resulting from fertiliser use, must be minimised. Another area of concern relates to the mushrooming growth of micro-nutrient fertilisers in the market. This has to be regulated to prevent farmers from being exploited by irresponsible elements selling various products under the guise of micro-nutrients and passing them off as "wonder chemicals".

BAGMATI ZONE, NEPAL



OVERVIEW

Narayani

- Bitumen Road
 - Gravel & Earth Road
 - Road Under Construction
 - Main Trail
 - Local Trail
 - River
 - District Boundary
- Elevation Zones
- < 2000
 - 2000-4000
 - 4000-6000
 - > 6000 Meters above Sea-level

Projection: UTM, Central Meridian: 87° E

Scale: 0 5 10 15 20 km

UNEP/ICIMOD 1990

Sources: District Maps. 1:125,000 (Boundaries, Rivers, Elevation) Topographical Survey Branch, Survey Department H. M. G. Nepal, 1985
Main Trail Map 1:125,000 (Roads, Trails, Villages), Suspension Bridge Division, 1989

Pesticides were introduced at about the same time as macro-nutrient fertilisers, but their use has increased rapidly only in recent times. Judicious and prudent use of pesticides goes a long way towards improving crop yields. Pesticides act as catalysts for generating agro-based industries. In addition, the role of pesticides in controlling vector-borne human diseases is also quite critical. Without pesticides to control malaria-transmitting mosquitoes, one cannot imagine how the settlements of low-lying fertile river belts could have taken place. Indeed, the role of pesticides in maintaining health is like a two-edged sword. They can be used with skill to increase crop yields and help prevent malnutrition; or they can be used carelessly leading to illness and death by adding the insult of pesticide toxicity to the injury of malnutrition.

Pesticides by their very nature are designed to kill or control living organisms. The success of insecticides, such as organo-chlorine and organo-phosphates, rests on their effective control of a wide range of insects and, in the case of organo-chlorine, on long persistence in the soil. Unfortunately, these same properties can result in environmental damage through injury to wild life; through damage to beneficial insects such as bees and parasites; and also through contamination of water, soil, and air. These environmental effects depend upon a number of attributes of pesticides such as toxicity, quantity, formulation, timing of application, and the chemical properties of the compound.

Environmental contamination occurs in two ways; firstly contamination occurs through the accidental release of a high concentration of pesticides usually caused by spillage or leakage during transport, storage, or when mixing pesticides, including the careless disposal of unwanted pesticides. Such disposal might contaminate a small area of land only, but it will have long lasting effects to the soil and to nearby water supplies. The second way in which environmental contamination can occur is through careless and excessive use of pesticides. One example of this is the drift of spray or dust on the trees and into streams and other areas where fish, birds, wildlife, and pollinating bees live. It could also get into nearby areas of human habitation. Repeated use of persistent pesticides, such as organo-chlorine and some herbicides, builds up residue in the soil and can be washed into rivers and streams; contaminating ponds and wells used for drinking by humans and livestock.

Residues of pesticides in food, such as fresh vegetables, ripe fruits, stored grain, or their products, pollute not only the immediate environment but also poison the food. Regulation, registration, and use of pesticide, together with training for the concerned people, and creating mass awareness in others will go a long way towards making pesticides a safer input for progressive development. The present paper is an in depth study of these issues regarding pesticides and their use in the Bagmati Zone in the Central Development Region of Nepal.