

## INDICATORS : Agricultural development and health

### Introduction

Despite its obvious benefits, agricultural development may sometimes impact negatively on human health. This may occur through :

- \*water resource development schemes
- \*irrigation schemes
- \*indiscriminate use of fertilizers and pesticides
- \*land and resettlement policies (WHO 1990).

The construction of water impoundments for agriculture has for instance been well documented to accelerate transmission of schistosomiasis in endemic areas, as well as that of diseases such as malaria, filarial diseases, and dracunculiasis (in Ghana for example).

Small impoundments may be used by local populations for fishing, water supply, animal watering, irrigation and flood control, and may cause people to become exposed to health hazards.

Irrigation systems situated in the tropics in particular, may cause a number of vector-borne or water-related diseases to be introduced, or their transmission increased.

**More than 30 diseases have been linked to irrigation**, the major vector-borne diseases including schistosomiasis, malaria, onchocerciasis and Japanese encephalitis.

A number of changes in the state of the environment can occur, causing vector breeding to increase. These include simplification of the habitat, an increase in the area of surface water, a rise in the water table, changes in the rate of water flow, and changes in the microclimate. The absence of proper drainage systems in irrigation schemes is one of the most important factors contributing to the spread of vector-borne

disease.

Agricultural projects in forested ecosystems carry particular risks. For example leishmaniasis has increased in countries such as Brazil and the southern parts of the former USSR, and the opening up of the Amazon area in Brazil to farming and ranching has resulted in a resurgence in malaria, particularly in settlements, mining areas, and peri - urban areas ( WHO 1992).

Deforestation itself carries many indirect risks - for example people may have difficulty obtaining fuelwood. Also, rainwater may become erratic and irrigation schemes threatened. Farming may also impact on health through contamination of groundwater, aquifers, and surface waters by fertilizers, and animal wastes for example. Drainage water with high salinity and excess nutrients also contributes to contamination of water supplies.

### Assessing agricultural development impacts and their causes

In devising appropriate actions in order to minimise agriculture-associated risks, a situational analysis of possible impacts and their determinants might be conducted in which information on the following aspects could be useful for planners and decision-makers.

### Factors indicative of pressures

- \* Deforestation/reforestation rate
- \* Agricultural land conversion rate
- \* Fraction of arable land with resource development schemes, irrigation schemes
- \* Fraction of arable land with drainage systems
- \* Amount of pesticides used annually
- \* Amount of organic wastes per unit of product
- \* Amount of nitrogen and phosphorous

- fertilizers used annually
- \* Amount of agricultural chemicals used annually
  - \* Land and resettlement policies

**Factors indicative of impacts on environmental systems**

- \* Desertification rate/index
- \* Threatened ecosystems by area
- \* Extent of land degradation
- \* Changes in water flow rate
- \* Increase in surface water rate
- \* Exceedances of standards, guidelines in relation to drinking water, recreational water, irrigation water
- \* Fraction of soil contaminated with chemicals, residual pesticides
- \* Pesticide residue levels in drinking water
- \* Levels of nitrates, nitrites, phosphates in drinking water
- \* Levels of contamination of groundwater, aquifers, surface waters
- \* Salinity and nutrient levels in drainage water

**Factors indicative of potential health impacts**

- \* Proportion of population whose drinking water supplies meet health standards
- \* Fraction of workers lacking protective equipment
- \* Fraction of population using impoundments for fishing, water supply, irrigation
- \* Proportion of population exposed to disease vectors (mosquitoes, snails etc)

**Factors indicative of actual health impacts**

- \* Agriculture-related morbidity/mortality levels in respect of:
- \* Schistosomiasis, malaria, onchocerciasis,

- typhoid, cholera, shigella, diarrhoea, leishmaniasis etc
- \* Acute poisonings due to specific causes
  - \* Malnutrition in children

**Taking Action**

Many actions can be taken to limit the negative impacts that agriculture may have on human health. These might include better formulation of fertilizers and avoidance of their excessive use, crop rotation and modifications to other crop husbandry practices, appropriate and integrated pest control measures (for example the combination of traditional environmental, biological and chemical pest control methods).

Other actions might include development of biotechnology methods to reduce dependence on agrochemicals, and application of water conserving technologies.

Accident prevention measures, and immunization programmes are also important. Other measures include literacy programmes and programmes for income generation, land tenure changes, urban agriculture programmes, as well as sound food and nutrition policies.

Reallocation of land unused, or underused by large landowners to small farms could result in significant increases in incomes for many, as well as an increase in food supply, as was demonstrated in a case study in North-East Brazil (WHO 1992).

**Factors indicative of actions taken**

- \* Reduction in use of fertilizers
- \* Reformulation of fertilizers
- \* Use of crop rotation measures
- \* Existence of improved crop husbandry measures
- \* Use of integrated pest control measures

- \* Application of water-saving technologies
- \* Existence of adequate accident prevention measures
  
- \* Existence of immunisation programmes
- \* Existence of sound food and nutrition policies
- \* Existence of worker protection measures eg protective clothing
- \* Existence of improved land tenure practices

Further reading: WHO 1990, 1992, 1997, WRI 1998