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This article focuses on the discussion from the UPA Health and Environment session of the E-conference. The effects of UPA on the environment were also discussed but will not be included here.

Mitigating the Health Risks

Results of the E-conference 'Urban and Periurban Agriculture on the Policy Agenda'

Associated with Urban and Periurban Agriculture

Like rural agriculture, urban and periurban agriculture (UPA) entails risks to health of the urban population if not managed and carried out properly. City authorities have often been reluctant to accept urban agriculture because of perceived health risks. Rather than general laws prohibiting urban agriculture, which are largely ineffective, policies are needed that actively manage the health risks related to urban agriculture.

To formulate urban agricultural policies that improve the health of the urban population, it is important to have a good overview based on research and practical experience. We provide an overview of the main health risks associated with UPA (see table) and the main mitigating measures that have been proposed during the recent E-conference or from the literature.

OVERVIEW OF THE MAJOR HEALTH RISKS ASSOCIATED WITH UPA

A review of the available literature and the discussion in the Health and Environment discussion group indicates that, although insight into the

potential health risks of urban and periurban agriculture is growing, detailed information on the actual health impacts of UPA is scant. Many of the health risks indicated in the table on page 8 are not specific to UPA and much of it is taken from agricultural literature.

MITIGATING HEALTH RISKS

In order to develop effective policies to mitigate the health risks of UPA, it is necessary to develop a good insight into:

- the environmental conditions under which the health risks associated with UPA occur (including physical geography

Introduction

A virtual conference on 'Urban and periurban agriculture on the policy agenda' was jointly organised by FAO and ETC-RUAF, from August 21 - September 30, 2000. The conference was divided into three main themes: Household Food Security & Nutrition; UPA, Health & Environment; and UPA and Urban Planning. The first two of these directly discussed the population health effects of UPA. The session on household food security focused on the improvements that UPA can make to diet and nutrition. The session on UPA, Health & Environment mainly focused on the health risks of UPA and discussed policies at city and national levels that prevent or mitigate such risks.

The conference attracted 720 participants from 45 countries. The food security and nutrition discussion had a total of 290 participants, while the health and environment group had about 210. In addition to a large overall number of participants, there was very active exchange between South and North, as well as evident South-South dialogue. In addition to sharing their own experiences and responding to questions posed by the moderators, these participants learned directly from each other's experiences.

The introductory and final papers, and the discussion of the E-conference can be found on the RUAF website: www.RUAF.org and the FAO website: www.FAO.org/urbanag.

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- and climate, farm management practices, marketing chains);
- b. the biological and epidemiological aspects of the health risks that have been identified;
 - c. the factors that currently restrict the urban poor from engaging in safer agricultural and food practices; and
 - d. the capacity and willingness of city authorities to implement certain policy measures taking into account restricted financial and human resources and the actual socio-political conditions.

The range of measures proposed is summarised below.

Diseases associated with re-use of urban wastes and wastewater:

- ❖ adoption of waste re-use policies for urban agriculture which are based on health criteria;
- ❖ identification of quality standards for municipal wastes and composts produced from them;
- ❖ cropping restriction in areas where wastewater is used but water quality

Design of effective measures requires collaboration

- cannot be guaranteed; certification of safe production areas;
- ❖ improved composting facilities and methods; prevention of mixing household waste with that of hospitals and non-agroindustries; promotion of adequate composting methods (temperature, duration) to ensure the killing of pathogens;
 - ❖ application of wastewater-treatment technologies that effectively remove pathogens but maintain the nutrients dissolved in the water (e.g. waste-stabilisation pond systems rather than sludge-treatment plants) and have low maintenance costs;
 - ❖ farmer education on management of health risks (for workers and consumers) associated with re-use of waste in agriculture, including crop selection, irrigation and reducing occupational risks; and
 - ❖ consumer education (washing of fresh salads; eating only well-cooked vegetables, meat and fish from wastewater-fed crops, animals and ponds).

Vector-borne diseases:

- ❖ control programmes for vector-borne disease based on environmental management should involve co-operation

between the health, agriculture, irrigation and waste sectors;

- ❖ reduction of malaria risk in African cities by:
 - a. suitable selection of crops (rice, sweet potatoes, cassava and yams are high risk); and
 - b. good drainage of surface water; adequate design of water tanks and irrigation systems (especially in periurban areas).

Diseases associated with use of agrochemicals:

- ❖ promotion of ecological farming practices and replacement of chemical pest and disease control by Integrated Pest and Disease Management (IPM);
- ❖ farmer education on the proper application and handling of agrochemicals;
- ❖ introduction of cheap protective clothing and equipment;
- ❖ better control of banned pesticides; and
- ❖ better monitoring of the effects of agrochemical accumulation in water and soils.

Diseases associated with soil and water contamination with heavy metals:

- ❖ monitoring of agricultural soils and irrigation water for heavy metals;
- ❖ crop restrictions according to type and level of contamination of agricultural soils and water;
- ❖ treatment of contaminated soils with farmyard manure, lime, red mud or iron oxide and zeolites for immobilisation of (certain) heavy metals;
- ❖ use of plants like Indian grass (*Brassica juncea*) for biological remediation of polluted soils or streams and
- ❖ washing and processing of contaminated crops, which may effectively reduce heavy metal content.

Zoonotic diseases:

- ❖ restriction of uncontrolled movement of livestock in urban areas (e.g. by promotion of stall feeding) and/or improvement of the urban waste-collection system;
- ❖ composting of manure before application;
- ❖ consumer education regarding thermal treatment of all dairy products and proper cooking or freezing of meat products; and
- ❖ strict slaughterhouse regulations.

The health risks and mitigating measures suggested during the E-conference should be seen as working hypotheses that need further research. There is no directly comparable information about the burden

of disease for each of these categories of health risks. We can only estimate the relative importance for human health. Longer term monitoring of the health impacts of the various types of UPA under diverse environmental conditions, and the success of the suggested mitigating measures is needed.

The participants to the E-conference discussion group on UPA, Health and Environment stressed that the design of effective measures requires close co-operation between the health authorities, agriculturists, land-use planners and municipal authorities. A multidisciplinary and participatory approach in the planning and implementation of solutions to the problems is advocated.

Urban planners need to involve UPA practitioners in designating agricultural land



Schilder and Kusiaku

Market in Lomé

use that takes into account the health and environmental risks of each type of farming and the local environmental conditions.

Local government authorities and decentralised agencies have a role in monitoring the quality of soils and irrigation water used in UPA; collaboration with malaria-control programmes; and co-operation with agricultural extension programmes to educate farmers.

Summary overview of major health risks UPA

Communicable diseases

Crop production

1. Crops irrigated with untreated (or inadequately treated) domestic wastewater or fertilised with improperly produced compost may be infected with bacteria (shigella, typhoid, cholera), worms (like tape- and hookworms), protozoa, enteric viruses or helminths (ascaris, trichuris).
2. In Africa, mosquitoes that are the vector for malaria may breed in clean, shallow irrigation water and crop land with serious waterlogging. Incidence of malaria mainly relates to wet rice and ridge cultivation of yams and sweet potatoes.
3. Mosquitoes that are the vector for filariasis may breed in standing water heavily polluted with organic materials (drains blocked by organic refuse, latrines, septic tanks).
4. Mosquitoes that are the vector for dengue breed in water containers that include much solid waste, like coconut husks, rubber tyres, water storage jars, buckets and water-butts.
5. Food may be contaminated with bacteria due to poor hygienic conditions in informal food preparation and marketing, causing diseases such as salmonella and E-coli.

Animal husbandry

1. Closeness of animals and humans may lead to occurrence of zoonotic diseases like bovine tuberculosis (cattle) and tapeworms especially when animals are scavenging waste tips.
2. Drinking water may get contaminated with pathogens by application of animal waste (e.g. slurries) to land.
3. Animal products can become contaminated with pathogens due to contamination of animal feed with infected faeces (salmonella, campylobacter).

Aquaculture

1. If fish (especially shellfish) are fed with wastewater and/or human and animal excreta, there are potential risks of:
 - a. passive transfer of pathogens (hepatitis A) by fish and aquatic macrophytes; and
 - b. transmission of trematodes whose life cycles involve fish and aquatic macrophytes. This is only a problem where trematodes are endemic and fish is consumed raw.
2. Contamination of fish with human or animal faecal bacteria may occur during post-harvest operations (e.g. salmonella).
3. Poorly managed fish ponds may become a breeding ground for malaria mosquitoes.
4. Use of antibiotics in fish feed may lead to development of antibiotic-resistant bacteria in the food chain.

Non-communicable diseases

1. Crops may take up heavy metals and other hazardous chemicals from soils, irrigation water or sewage sludge polluted by industry.
2. Crops grown close to main roads or industry, and food purchased from street vendors may be contaminated by air-borne lead and cadmium.
3. Residues of agrochemicals may contaminate crops or drinking water (pesticides, nitrates).
4. If waste materials are not separated at source, the resulting compost may contain heavy metals, which can be taken up by crops.
5. Occupational injury of agricultural workers is an important source of disability including musculo-skeletal disorders or poisoning by agrochemicals.

1. Animal products (like red meat, poultry meat and eggs) may be contaminated with pesticides (especially organo-phosphates) and/or antibiotics, if animals are kept intensively.
2. Freely wandering animals can injure people and may cause traffic accidents.
3. Allergens from livestock wastes/dust (esp. poultry) can cause occupational diseases in farm workers (asthma, allergic pneumosis).
4. Tanneries may discharge hazardous chemicals in their wastes (tannum, chromium, aluminium).

1. Fish products may be contaminated with heavy metals if fed with wastewater or organic wastes contaminated by industry.
2. Fish products may be contaminated with agrochemicals, if produced in an input-intensive way.