Christian Ulrichs

Manila typifies the best and the worst of Asian cities. Affluent residential areas with functional sewerage and regular waste collection border squalid areas of cardboard shacks with no amenities. High-rise office and apartment buildings in the municipality of Makati stand in contrast to the squatter areas in Taguig, Muntinlupa, and Mandaluyong.The collapse of the Payatas garbage dump in August 2000 and the deaths of at least 220 squatters who lived at the dump site to scavenge discarded refuse are symptomatic of urban blight and poverty which threaten civility, governance and life itself.

Supporting Farmers towards Safe Year-round vegetables in Manila

This article focuses on part of the work of the project "Development of periurban vegetable production systems for sustainable year-round supplies to tropical Asian cities". The project aims to design, test and implement production systems for sustainable year-round supplies of vegetables to markets in Metro Manila - and by model verification, to other tropical Asian cities as well.

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Population growth in Manila with its attendant problems of waste disposal and competition for finite resources exacerbates environmental degradation and threatens fragile political systems with the potential for economic chaos. During the period 1990-1995, the population of Manila grew at a rate of 3.3% per year and was expected to reach 10.7 million in 1998. The population was 9.454 million or 1.998 million households in 1995, the last year for which data are published. Of those households, 432,450 or 21.6% were squatters living in 276 slum colonies located at about 70 sites in Metro Manila (17 municipalities).

THE PROBLEM OF FOOD SUPPLY IN MANILA

Manila residents, particularly the urban poor, rely on rice and meat as their principal sources of nutrition. Mean per capita food consumption was 828 g/day in 1993, with 293 g from cereals, and 267 g from meat, fish and milk (FNRI survey data from 1993 as cited by Ali and Porciuncula 1999). The poor generally eschew vegetables as they are often more expensive than meat. Mean vegetable consumption in Manila was 87 g/person/day. Based on these figures, simple extrapolation show that urban agriculture only produces about 0.5 % of the annual vegetable needs for Manila.

Per capita food consumption in Manila declined from 930 g/day in 1982 to 828 g/day in 1993. During the same period average per capita vegetable consumption declined from 120 to 87 g/day (Ali and Porciuncula 1999). Extrapolation of this trend suggests that consumption patterns by Manila residents, therefore, do not provide adequate nutrition or energy intake, particularly among the poor. Intake of calcium, iron, thiamine, riboflavin, niacin, vitamin C and particularly vitamin A was also deficient and deficiencies were most severe among residents who made PHP 10,000 per year or less (= USD 208 at PHP 48: USD 1). These nutrient deficiencies due to inadequate diet affect, human health, particularly the health of children and other vulnerable groups.

Some of these nutrient deficiencies can be improved through increased vegetable consumption. Several problems currently limit the year-round supply of vegetables including damage from insect pests and disease.

VEGETABLE FARMING IN PERIURBAN AREAS

In 1998-99, the periurban research team conducted an interview survey of 119 farmers working in two periurban areas of Manila. The survey was designed to characterise the social mores of farmers, the economic landscape affecting farming activities, and agricultural practices including pesticide use and attitudes to introduced technologies. The target area was 90 km from the centre of Manila in the municipality of San Leonardo, province Nueva Ecija, Central Luzon. Within San Leonardo we focused on two districts where vegetable farming is a year-round enterprise: 1) the current area of periurban farming activity (barangay Castellano); and 2) a neighbouring area (barangay Nieves) considered as a future site for technology transfer. In those barangays, farmers commonly follow a cropping sequence of three successive crops of pak-choi, followed by a single crop of radish and of onion, to be shipped to Manila markets. Although specific data per baran-

Yield was increased by 247 percent

gay are not available the province of Nueva Ecija supplies 13% of pak-choi, and 17% of all vegetables sold in Manila (Ali and Porciuncila 1999).
Findings of the survey suggest that farmers in San Leonardo possess the education and experience needed to assess the merits of new technologies offered. In contrast to conventional wisdom, gross income suggests that San Leonardo vegetable farmers are not poor and therefore have the means to invest in new technologies. Formal borrowing is minimal among vegetable farmers. Because only 3% of farmers own a vehicle to transport produce to markets and because informal borrowing is in the form of seed and fertiliser supplied by local assemblers, farmers are tied to a marketing system dictated by vegetable distributors.

KNOWLEDGE AND USE OF AGROCHEMICALS

All farmers interviewed reported to use chemicals to control pests and diseases. In fact, use of pesticides was seen as synonymous with pest management. The vast majority (85%) of farmers interviewed did not believe that insecticides were a panacea, but were necessary to curb pest attack. Only 20% of interviewees had knowledge of natural enemies, but all knew that pest infestations would increase if predators were killed by insecticides.

Safe handling and safe storage of pesticides are not common practices among farmers. Most (82%) apply pesticides while walking into the wind. Many (93%) wear clothing that might provide partial protection from spray drift (e.g. long pants, short or long-sleeved shirts), but only 3% wear masks and gloves. Clearly farmers are exposed to pesticide drift and that may explain why many respondents reported episodes of headache (77%), weakness (65%), dizziness (49%), vomiting (45%), and stomach pain (26%) following application. In spite of these startling figures, farmers persist in using unsafe practices. They know safe practices, yet chose to ignore them. Perhaps no greater contribution can be made other than to persuade farmers that their current practices place themselves and their families at risk. If we are to change pesticide-handling practices among farmers, we must first understand the reasons for their laissez-faire attitude.

Pests and disease problems of pak-choi are often intractable and yields are low in spite of frequent use of pesticides. Farmers therefore approach pak-choi production with a certain resignation that their best efforts at management might be thwarted by pests, whereas the same effort given to pest management in onion and radish generally leads to a successful harvest. Nevertheless, practices shown to improve pak-choi productivity and/or to decrease production expenses should be marketable among farmers in San Leonardo.

The pesticide quantities can be reduced

ATTITUDES TO INTEGRATED PEST MANAGEMENT

Farmers' opinions of new technologies including IPM practices, raised beds, rain shelters, and organic fertiliser for pak-choi management changed between years 1 and 2 of the periurban project as a result of on-farm activities of the project in San Leonardo. Initially perceived as having "low sustainability," farmers at the end of year 2 rated those practices as having "moderate sustainability." Here, sustainability refers to the farmers' perception of their capacity to dedicate resources to implement new practices. About 90% of farmers interviewed perceived IPM to require moderate labour inputs and time, yet 82% consider implementation of IPM practices to be complicated and therefore not adaptable to their enterprise. Even farmer co-operators, those intimately associated with IPM activities, want "a silver bullet" (a potent pesticide) to solve pest problems. They do not yet grasp that management requires knowledge of the interrelationships of pest intensity, crop damage, and economic environment. Farmer perception makes it imperative that training documents and training exercises address these interrelationships and therefore the complexity of IPM, in a language and form understandable by farmers. The potential "pay-off" from implementation of IPM practices among farmers would lead to reduced pesticide use and therefore reduced pesticide residue on farm produce, and to decreased exposure.

There is a need to persuade farmers that by monitoring pests prior to pesticide application, by using screen structures to reduce insect damage, and by reducing fertiliser cost, expenses will be reduced and income increased, thereby reducing the capital/output ratio. Economic analysis of standard farmer practice for pak-choi in contrast to use of a technology package showed that yield was increased by 247% and the cost differential was 103%.

The project has been able to demonstrate among farmers that their practice of pest management in leafy vegetables can be improved. That is, the number of pesticide treatments they make and the pesticide quantities they apply can be reduced by first assessing pest intensity and then applying pesticides only if numbers reach action thresholds specific to each pest and disease. Participating farmers are given a copy of a large poster with photographs of insect pests and disease symptoms to facilitate pest identification and to indicate the timing for pest assessments relative to date of planting and crop phenology.
The poster is used in conjunction with a booklet in which farmers record pest numbers. By use of the poster and the action book, pesticide use is linked to actual not imagined, pest intensities. Nevertheless, there are occasions when numbers of insect pests overwhelm any management strategy based on intervention with registered pesticides. Experience has demonstrated that farmers and researchers fail to prevent crop loss when rate of pest development exceeds the capacity of pesticides to maintain populations below a damage threshold.

Increased use of IPM has the potential to improve the health of farmers by reducing the risks of pesticide exposure. Another health benefit of the Philippine Periurban Vegetable Project is improved food security by implementing production systems for sustainable year-round supplies of vegetables to markets in Metro Manila.

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