PERSPECTIVES OF URBAN AND PERIURBAN HORTICULTURE

WILFRIED HERMANN SCHNITZLER (*) - ROBERT JOSEF HOLMER (**)

ABSTRACT

According to the latest estimate of the United Nations, the World's urban population is expected to increase from 2.76 billion in 1995 to 5.34 billion in the year 2025 at which time more then half (2.72 billion) will reside in Asian cities. Many cities are expected to boom in the near future or are already booming besetting them with nearly insurmountable problems such as employment for often fairly uneducated migrants from rural areas, proper disposal of an ambundance of refuse from households, commerce and industry by safe means and sufficient supply of cheap but nutritious food rich in vitamins and minerals to feed the population of these expanding urban centers. Through analysis of the economic, sociological, and anthropological situtation of urban and periurban communities and small and medium-sized farm enterprises (SMEs) in these cities the different factors and constraints affecting and limiting the potential for vegetable production by SMEs should be evaluated and prioritized. Production technologies that fit the socio-economic and anthropological situation in the urban communities need to be developed.

RÉSUMÉ

D'après les dernières estimations des Nations Unies, la population urbaine mondiale devrait passer de 2,76 milliards en 1995 à 5,34 milliards à l'année 2025, et à cette date plus de la moitié (2,72 milliards) résideront dans les villes asiatiques. Beaucoup de villes devraient être en plein essor dans l'avenir prochain, ou elles le sont déjà, et elles sont hérissées de problèmes presque insurmontables, tel l'emploi pour des migrants presque analphabètes provenant des aires rurales, la décharge d'une grande quantité de déchets ménagers, le commerce et l'industrie par des moyens sûrs et un apport suffisant d'aliments à bon marché mais nutritifs et riches en vitamines et minéraux pour la population de ces centres urbains en expansion.

A travers l'analyse de la situation économique, sociologique et anthropologique des communautés urbaines et périurbaines et des petites et moyennes entreprises, dans ces villes on devrait valoriser et privilégier les différents facteurs et contraintes qui influent et limitent la potentialité de la production maraîchère des petites et moyennes entreprises. Il faut développer des technologies de production adaptées à la situation socio-économique et anthropologique des communautés urbaines.

Supplying the growing world population with food, particularly in developing countries, without jeopardizing the natural resources air, water and soil is an overwhelming challenge. According to the latest estimate of the United Nations, the World's urban population is expected to increase from 2.76 billion in 1995 to 5.34 billion in the year 2025. At this time more than half (2.72 billion) will reside in Asian cities (UNFPA, 1996). Due to a high rate of immigration from rural areas and from neighboring countries suffering political and social upheavals, urban populations in developing countries have been gro-wing and still are growing at a markedly higher rate than the population as a whole, exerting greater pressure on the natural environment than ever before.

Many cities are booming besetting them with nearly insurmountable problems, such as:

- creating jobs for often fairly uneducated migrants from rural areas,
- proper disposal of an abundance of refuse from households, commerce and industry and sewage systems by safe means

and

- sufficient supply of cheap but nutritious food rich in vitamins and minerals to feed the population of these expanding urban centers.

International agencies, national governments and non-government bodies must address the challenge of those requirements for a better livelihood of the city people.

Production of vegetables in urban and periurban centers is particularly suited for small-scale farming due to short crop cycles, high labor input and only small land area required for effective cultivation.

Many vegetable production systems can be considered as "anthropomorphic production environments" (Richter, Schnitzler & Gura, 1995).

Vegetables are grown at many elevations, from sea level to highlands, in almost every kind of soil, under many water regimes from rainfed to nearly waterlogged to fully irrigated. They are often grown in niches or patches, places often more related to market and population centers than to a given agroecological zone.

It is known that consumption of vegetables is far from being sufficient in almost all developing countries.

Hard data are scarce regarding vegetable consumption. Micronutrient deficiencies, however, are better documented.

Two billion people, mostly women and children, are deficient in one or more micronutrients (FAO/WHO, 1992; Bellin & Leitzmann, 1995; Gura, 1995).

The importance of urban and periurban vegetable production to improve vitamin and micronutrient supply, especially for the urban poor is recognized by interna-

(*) Prof. Dr., Chairman of Institute for Vegetable Science, Technische Universität München, Germany.
(**) Regional Project Manager, College of Agriculture Complex, Xavier University, Cagayan de Oro, Philippines.

tional policy-makers and put on a high political agenda (World Bank 1994; FAO 1996).

Suggested research activities

Information on the sociological, economic, ecological and anthropological factors and constraints affecting and limiting consumption, production and marketing of vegetables in urban and periurban areas is only sparse or not available at all. Various technonolgies for vegetable production are available but have to be modified, adapted and testet under the special urban environments. A comprehensive work programm is therefore needed:

– Analysis of the economic, sociological and anthropological situation of urban and periurban communities and small and medium-sized horitcultural enterprises.

– Evaluation and prioritization of different socioeconomic and anthropological constraints for (peri-) urban vegetable production and its impacts on community, small farm enterprises and city administrations should be conducted by interviews to obtain clear understanding of actual situations.

The data to be gathered should comprise of:

- The *present land use*, land availability and suitability for vegetable production including a thorough description of the present cultural practices including infrastructure for regular delivery of supply.
- The *economic impact* of vegetable production referring to income level, labor structure (family labor with special attention to gender and hired labor) and production capital.
- The *environmental impact* with emphasis on present soil and fertilizer management, disease and pest control, water management, and impact to urban development.
- The *nutrition and health impact*, particularly on kind and quantity of food intake, consumption patterns and eating habits, as well as the inner and outer quality of vegetables.
- The *food security impact*, with focus on year round availability of vegetables, access to vegetable supply and kind of vegetables.
- The year-round price fluctuations.

All location-specific, socio-economic and anthropological aspects have to be brought into context with production mangement startegies such as:

- The available germplasm and its agronomic characteristics for desired vegetables.
- Plant nutrition and soil management practices.
- Integrated plant protection.
- Water management.

Envisaged (new) production technologies, according to the actual local situations of the respective (peri-)urban communities and small farm enterprises should be developed through the process of *Participatory Technology Development* (PTD) in cooperation with the (peri-)

urban farmers and SME-developers. The output from the PTD should then be utilized as the new existing technology for the urban horticultural development. A continuous dialogue will be necessary to formulate policy recommendations by respective government bodies to prepare the legal grounds for sustainable urban horticulture.

Crop improvement and seed multiplication

Suitable vegetable crops according to consumption patterns and environmental conditions have to be selected for adaptation, evaluation and multiplication. In many instances it will be necessary to collect genetic material at sites in cooperation with germplasm units of national and international research centers. Local varieties with a high degree of adaptation to the respective environment and with good acceptability by the consumers should be evaluated for possible defects. The different vegetable varieties and breeding lines have to be tested to select the best for specific local conditions. Data to be taken in the evaluation studies are: year and season, location, elevation, soil characteristics, climatological data, farming methods, dates of sowing/planting, time of flowering, time of harvesting, horticultural characteristics of plants and fruits, insect and disease occurrence, yield and quality characteristics and other relevant information.

After evaluation, seeds of the respective varieties have to be propagated. To obtain relevant data for a possible commercialization of the vegetable seeds the following parameters should be determined:

- The productivity in terms of seeds per plant.
- Harvesting time of seeds.
- The storage duration and the optimum conditions for each species by evaluating seed viability.

Soil management and plant nutrition

Environmentally friendly and economically viable fertility management practices under the urban situation is

essential. This can be done by shifting from inorganic nutrient sources to stronger reliance on raw and composted wastes, e.g. city refuse, plant residues and animal manures.
Organic fertilizer production from city wastes can be particularly rewarding by identifying possible organic resources for compost production in urban areas. This can be:
- separated organic household garbage from representative model subdivisions,
- separated plant organic garbage from public markets,
- blood and bone meal from slaughterhouses,
- animal manure from (peri-) urban livestock, poultries, piggeries,
- plant residues from farmers' fields
- local rock phosphate and lime sources.

These tasks should be done in close cooperation with the responsible city officials.
Different composting practices appropriate for the local conditions have to be introduced with chemical analyses of composts for nutrient contents and possible heavy metal residues.
The interactions of organic fertilizer applications on changes of physical, chemical and biological soil properties should be investigated for crop productivity.

Pest and disease control

This problem area must have high priority with benefits to pesticide applicators, to the environment and to the vegetable consumers. The reduction or elimination of applications of chemical pesticides must be attained by simultaneously achieving sustainable growth in and quality of production. This should be approached by technical, economic and ecological surveys of present farmers' practices and analysis for pesticide residues from vegetables coming from farmers' fields to evaluate the status-quo for the quality of the marketable products.
An entomological evaluation in farmers' fields with particular attention to the presence of parasitoids should be done. After the diagnosis of the actual situations, appropriate IPM technologies have to be elaborated and tested for both, economic and technical approaches, namely:
- Use of pesticides not harmful to beneficial insects.
- Rearing and release of beneficial insects.
- Application of biopesticides.
- Use of resistant cultivars in connection with mixed-cropping systems.

Water management

Proper water management means adequate water amounts at the right time. This includes the delivery of needed water (irrigation) and removal of excess water (drainage). An understanding is necessary for water use efficiency: soil profile (water and root distribution), soil properties (physical, chemical, biological), amount of soil erosion, leaching of nitrate, climatological data (air and soil temperatures, rainfall, evaporation, relative humidity, wind speed), together with economic aspects on yield and quality of vegetables. Rainy season water management through raised bed systems may be required under tropical lowland conditions. Permanent high beds improve the hydraulic conditions of wet soils. The furrows between high beds act as sink to drain excess water during wet periods. Raised bed systems can be compared with the usual flat beds including cropping sequences for such systems (Kleinhenz et al., 1995).

Marketing technologies and strategies

The potentials and constraints for urban vegetable consumption and marketing need special attention to provide new outlets for vegetable products coming from small urban and periurban farm enterprises. An initial step should be the determination of quality standards. Quality as an intangible characteristic for many consumers is perceived by value, prestige pricing, quality packaging and labeling. Commercial trends, consumer selection criteria, market shares, range of use, perishability, transportation and seasonal vegetable preferences by the different consumer groups have to be considered. In order to develop a marketing strategy, it is fundamental to examine the market environment in the target markets and the distribution channels at the level of wholesalers and retailers as well as to evaluate the consumer attitudes and perceptions towards new or improved products. This can be approached through (1) identification of distribution channels, (2) determination of commercial potential, (3) development of commercial quality standards, (4) consumer selection criteria, and (5) marketing testing. ●

References

Bellin F., Leitzmann C. (1995) - Die Bedeutung der Mikronährstoffe für die menschliche Entwicklung - ein Plädoyer für Gemüse, Entwicklung und Ländlicher Raum, 4, 7-9.

FAO/WHO (1992) - International conference on nutrition. Rome.

FAO (1996) - Food for consumers - marketing, processing and distribution. Rome.

Gura S. (1995) - Vegetable production - a challenge for urban and rural development, Entwicklung und Ländlicher Raum, 4, 3-6.

Kleinhenz V., Schnitzler W.H., Midmore D.J. (1995) - High bed systems for off-season vegetable production in the tropics and subtropics, Entwicklung und Ländlicher Raum, 4, 26-28.

Richter J., Schnitzler W.H., Gura S. (1995) - Vegetable Production in periurban areas in the tropics and subtropics - food, income and quality of life, Proceeding of an International Workshop. German foundation for International development, Council for tropical and subtropical agricultural Research. Zel, Feldafing, Zschortau.

UNFPA (1996) - The state of the world population, United Nations, Geneva.

World Bank (1994) - Enriching lives. Overcoming vitamin and mineral malnutrition in developing countries.