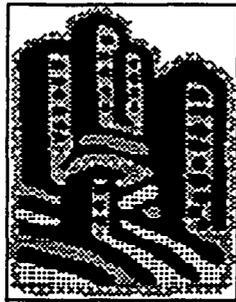


**Promoting Urban Agriculture:  
A Strategy Framework for  
Planners in North America,  
Europe, and Asia**

*by*  
*Paul Sommers and Jac Smit*  
*The Urban Agriculture Network*  
*1994*



**Cities Feeding People Series  
Report 9**



ARCHIV  
631(1-21)  
I 5  
sept. 9

## Reports Available in the "Cities Feeding People Series"

1. Urban Agriculture Research In East & Central Africa: Record, Capacities and Opportunities by *Camillus J. Sawio, University of Dar es Salaam (1993)*.
2. Urban Agriculture Research In East Africa: Record, Capacities and Opportunities by *Davinder Lamba, Mazingira Institute (1993)*.
3. Urban Agriculture Research in East & Central Africa I: Record, Capacities and Opportunities by *Kadmiel H. Wekwete, University of Zimbabwe (1993)*.
4. Urban Agriculture Research in East & Southern Africa II: Record, Capacities and Opportunities by *Admos Chimbowu and Davison Gumbo, ENDA-Zimbabwe*.
5. Urban Agriculture Research in West Africa: Record, Capacities and Opportunities by *Souleymane Diallo, ENDA-Tiers Monde (1993)*.
6. Urban Agriculture Research in East & Southeast Asia: Record, Capacities and Opportunities by *Yue-man Yeung, The Chinese University of Hong Kong (1993)*.
7. Urban Agriculture Research in Latin America: Record, Capacities and Opportunities by *Julio Prudencio Bohrt, UNITAS (1993)*.
8. Urban Food Production: Evolution, Official Support, Significance by *Luc J.A. Mougeot, International Development Research Centre (1994)*.
9. Promoting Urban Agriculture: Strategy Framework for Planners North America, Europe and Asia by *Paul Sommers and Jac Smit, The Urban Agriculture Network (1994)*.
10. Urban Agriculture and The Sustainable Dar-es-Salaam Project, Tanzania by *Camillus Sawio, UNCHS-IDRC Project Coordinator (1994)*.
11. Une histoire de deux villes: Canadian Community Gardening in Montreal and Toronto by *Sean Cosgrove, Toronto Food Policy Council (1994)*.
12. Urban Agriculture: Can Planners Make a Difference? by *Timothy Greenhow, SWEDEPLAN/Swedish National Board of Housing, Building and Planning (1994)*.
13. Agricultura urbana en América latina: evaluación in situ para iniciativa regional por *Julio Prudencio Bohrt, consultor del CIID (1994)*.
14. L'agriculture urbaine en Afrique tropicale: évaluation in situ pour initiative régionale by *Kando Golhor, consultant du CRDI (1995)*.

Copies can be obtained free of charge by writing to Ms. Radha Jagai, Cities Feeding People Series, Environment and Natural Resources Division, IDRC, P.O. Box 8500, Ottawa, Ontario, Canada, K1G 3H9 or by fax at (613) 567-7749.

# **PROMOTING URBAN AGRICULTURE: A STRATEGY FRAMEWORK FOR PLANNERS IN NORTH AMERICA, EUROPE AND ASIA**

## **1.0 INTRODUCTION**

Urban agriculture is an integral part of life for hundreds of millions throughout the cities of the world. Many valuable programming lessons have been learned from activities in Asia, Europe, and North America. These experiences need to be shared with city planners and managers in order to further refine on-going efforts and spread the benefits to those denied access to urban agricultural activities.

The first part of the paper will present a general description of the significance of urban agriculture; who practices it, why they do it, and where its done. The second part presents a planning framework for expanding urban agriculture activities or for establishing an urban agriculture program.

## **2.0 THE SIGNIFICANCE OF URBAN AGRICULTURE**

If there is one common denominator amongst urban people of the world it is agriculture. Urban agriculture, the production of crops and livestock in intra-urban and peri-urban areas is practiced by people from all walks of life: elites and recipients of social welfare; gang members and ladies clubs; the physically and mentally impaired; seniors and children alike. They grow food for different reasons, in all types of locations, and use very different production methods. The numbers show just how significant urban agriculture is:

- In Poland, 28% of urban families are involved in urban agriculture activities. There are over 900 000 plots on 42 000 hectares of land. It is estimated that a further 700 000 families are waiting to purchase a garden plot (Smit et al. 1993). Approximately 30% of Russian food is produced on only 3% of the land in suburban "dachas" (Center for Citizen's Initiatives 1993).
- In former West Germany, 800 000 garden allotments covered 24 000 hectares.
- Urban agriculture in the Netherlands is estimated at 33% of total agricultural production. Plans call for a "rim city". Rotterdam to Amsterdam will serve as the "tire" with agriculture as the "hub".

- Urban agriculture in Sarejevo is alive and growing. Since the start of the blockade 2 years ago, self-reliance in urban food production, is estimated to have grown from 10 percent to over 40% for vegetables and small livestock.
- In the United States, metropolitan areas contain 33% or 696 000 of the estimated 2 million farms in 1991. These farms, which operate of 16% of farmland, account for 35% of all crops and livestock sales (Heimlich and Barnard 1993). Approximately 25% of all households are involved in urban agriculture. An estimated \$38 million dollars worth of food is produced from urban plots. There are over a thousand municipal greening projects.
- New York City has over 1 000 community gardens; Boston 400; San Francisco 100. Philadelphia's "Green" Program, which spread to Canada, has an impressive record in urban agriculture. Montreal has 10 000 allotments. Toronto has nearly the same number. Vancouver's "City Farmer" Program has been running for 20 years.

## **2.1 URBAN AGRICULTURE'S MULTIPLE PURPOSES**

The reasons why agriculture is practiced vary as much as the types produce grown in an urban garden. For the poverty-stricken, it is often multi-purpose and a question of survival. For the economically secure, it is for exercise and recreation. Gardens also serve as a tangible form of cultural preservation. A survey conducted by UNDP identified over 40 distinct farming systems with produce ranging from medicinal herbs to aquaculture (Mougeot 1993).

### **2.1.1 Food**

For Poles, urban agriculture plots provide one out of every 15 kilograms of food. For retired persons, the ratio is one out of every 7 kilograms. The cropping pattern is designed to maximize production. The garden structure is often a three-layer system with fruit trees at the top, berries in the middle layer, and vegetables on the lowest layer (Smit et al 1993).

Most households in the Southeast Asia and Pacific Island Regions practice urban agriculture for a single reason: food. Urban agriculture is often the most direct means for obtaining a fresh, continuous, and healthy food supply to supplement the main parts of meals.

A household plot will often contain more than 50 different kinds of plants, mixed together with livestock and, where feasible, fish.

In cities in the South Pacific, urban gardens often contain crops grown traditionally in outer-island gardens. Traditional root crops and vegetables can be too expensive for the poorer segments of the population, so these people tend to grow their own food.

The small food gardens of Yerevan, the capital of Armenia, are frequently a major component in a household's survival strategy. Seedlings are raised in homes during the long, snowy winter. At the first possible opportunity to plant, large numbers of people can be seen busily planting every space available in their garden. A typical garden contains a multi-layer mixture of Mediterranean-type vegetables, spices, herbs, fruit trees and grape vines. Once produce is ripe, almost all the crops are processed and stored for future use.

For the temperate climates of North America and Europe what portion of food needs can be met from an urban garden? The answer depends on a number of physical and climatic factors. One estimate is that a 10 metre by 10 metre plot in a 130-day growing season will produce enough vegetables for a year. Nutritionally, the produce would provide most of the vitamin A, vitamin C, nearly 1/2 of the vitamin B complex, and iron needed (Minnich 1983).

### **2.1.2 Income**

Income generation and savings are major incentives for undertaking urban agriculture. In Bangladesh, 10% of the total family income is often derived from small homegardens (AVRDC 1991). In Honiara, the Capital of the Solomon Islands, surveys show that families now save up to 20% on their food bill by growing food that they would have once purchased (Solomon Island National Nutrition Survey, 1991).

On the periphery of nearly every major Southeast Asian city are small, intensively cultivated plots of vegetables. These plots are usually buzzing with activity as produce is continuously harvested and sold. The mini-states of Singapore and the Territory of Hong-Kong, with some of the highest population densities in the world, hardly come to mind when thinking about urban agriculture. However both cities have thriving commercial food and ornamental production enterprises. Singapore and Hong Kong are thought to be 30-50% self-reliant in fresh produce. In the major cities of the Southeast Asia, where land is available, households often design their productive land so that it has a multiple function, food production being one of these. A portion of the produce is used for home consumption and the remainder is sold.

In the United States, urban farms sell 13 times more per acre than non-urban farms (Heimlich and Barnard 1993). A League of Women's Voters survey suggests that 80% of urban buyers are willing to make an extra effort to

buy locally produced foods. The popularity of the Montepiller (Vermont) weekend farmers' market, supports the above survey results. Small farms near this city are using organic or environmentally friendly methods to attract clients, many of whom prefer foods produced in this way (Pulver 1993).

Restaurants in Chicago and Washington D.C. buy over 80% of their seasonal vegetables from local sources. The "Greens" Restaurant, one of San Francisco's most popular eating establishments, is known for its nature-friendly, fresh produce. The restaurant uses "greens" from its organic farm in Marin County, some 15 miles away (Alexander 1983).

Along the Southern California Coast, where real estate prices are some of the highest in the U.S., urban agriculture is alive and well. Ornamentals, especially cut flowers and potted plants are grown commercially in green houses and open fields, next to homes valued at \$500 000.

The Los Angeles riots of 1992 illustrate the need to engage youth in meaningful economic activities. Urban agriculture has proven to be a successful way of engaging youth in constructive activities. Post-riot rehabilitation funds were used to create a 7.5 acre community garden. Over 100 families participate. In a related project, gang and potential gang members were involved in raising a variety of herbs and spices. Their garden produce is used as ingredients for a salad oil that is marketed in South-Central Los Angeles and in other parts of Southern California.

### **2.1.3 Recreation**

Recreational gardening is very popular in Europe. The situation in Zurich is typical of that in most European cities. One of the most sought-after urban privileges is being allotted a piece of garden land near your residence to create your own world of food and flowers. In Berlin, 15% of city land is used for urban agriculture activities. All 80 000 garden allotments are occupied with a further 14 000 persons on the waiting list. Annual rents are as high as \$400 U.S. Dollars. During the growing season, especially on weekends, families can be seen tending their gardens and sipping refreshments in front of their tiny cottages built as part of their garden allotment.

### **2.1.4 Cultural preservation**

In the Makaha area, on the Island of Oahu, a native Hawaiian group has developed a parcel of land that is both a working farm and cultural preservation site for native traditional Hawaiian plants and cultivation practices. In Tauton, Massachusetts, it is easy to identify homes owned by families of Portuguese decent: the lots are covered with grape vines (Treves 1994).

## 2.2 ADAPTION TO THE URBAN ENVIRONMENT

Urban agriculture fits no specific geographic location. It is practised legally and illegally wherever land is available, on both private land and public land. In many low-income urban communities on the East Coast of the United States, abandoned lots, which were often unsightly, are being converted into community garden sites. The sites are managed by community residents:

- The Green Guerrillas in New York City are helping to establish gardens, wherever space is available in Harlem, the South Bronx, and the Lower East Side.
- The Chicago Botanical Garden's "Green Chicago" outreach program helps neighborhoods to create gardens, especially on the South and West sides.
- The Tilth Group in Seattle has the P-Patch Program that works with neighborhoods to create gardens.
- In Hawaii, the Honolulu City Council allots land along the Ala Wai waterway. They provide improvements including fencing, water faucets, and storage sheds for tools.
- In Los Angeles' densely populated San Fernando Valley (which was once predominantly agricultural), the only remaining large-scale urban agriculture is done in the floodplain area. Commercial enterprises grow sod lawns and summer vegetable crops on lands leased from the city.
- In Yerevan, the sky over city streets serve as food production sites. Grape vines are trained on trellises to arc over roads.
- Rangoon, Manila, Jakarta, Bangkok, and others, small water-loving crops are grown in canals that run in front of houses.
- In Suva (Fiji) and in Stockholm, front lawns are quickly being converted to garden plots. In parts of Taipei, food is grown on trellises over water canals and along rail lines. Nearly every square metre of land is planted with something. Floating gardens, constructed on bamboo rafts, can be seen in front of homes along many of the canals or waterways of Bangkok, Thailand. Residential lots on the edge of Hanoi City use an agricultural system locally known as VAC. Crops (food and flowers), livestock, and fish are grown in a closed agro-ecosystem. Each part of the system uses and supports the other. Balcony and rooftop gardens are commonly seen in European, North American and Asian cities.

In sum, urban agriculture is practiced by a variety of people and is done for a wide range of reasons. It is undertaken wherever land or space is available: residential plots, public access areas, abandoned or vacant lands, balconies, canals, or rooftops.

The success of urban agriculture is a result of both individual efforts and government-supported initiatives. What should be the role of urban planners and city managers in accelerating the expansion of urban agriculture activities?

### **3.0 CHALLENGES FACING THE FURTHER DEVELOPMENT OF URBAN AGRICULTURE:**

Urban agriculture is an ideal tool for the city planner to work with. Urban agriculture potentially fits into nearly every major on-going program in urban centres today. These programs include environmental improvement, solid waste management, crime prevention, health care, child nutrition programs, redevelopment/inter-city enterprise zones, and education.

The strategy framework for strengthening and accelerating urban agriculture is straightforward. A strategy workshop on urban agriculture is an effective method for raising its profile among planners. Such a workshop could review current city government programs; identify opportunities for including an urban agriculture component into existing programs; and identify resources from government and the private sector that could be tapped to carry out activities (Sommers 1991).

### **3.1 ENVIRONMENTAL IMPROVEMENT**

There is near universal agreement that protection and further enhancement of the physical environment in urban areas is a top priority. Urban residents need green space and they can be quite militant in demanding it. The 1960s "Peoples Park" saga in Berkeley, California, is an example of the level of aggressiveness which some residents are willing to exhibit in order to protect green space and prevent cities from becoming asphalt jungles.

Promotion of urban agriculture as part of an urban environment policy is logical. As discussed previously, some countries in Europe and North America have undertaken a number of different agricultural programs which have resulted in an improvement of the urban environment. In general, Asia has lagged behind North America and Europe in implementing effective programs to curb pollution. Polish and Armenian gardeners use ecological cultivation methods and intensive

production techniques which conserve and enhance the local environment. Chicago's Urban Forest Climate Project has been studying the effect of vegetation on the city environment. The study's conclusion was that a program to plant trees and create forest-like conditions would have a positive cost-benefit ratio (McPherson et al 1994). The City of London was planned as a city with a 'green rim' of agriculture and forest around it, though in practice, this has not worked as well as for some cities on the continent.

Land-use planning was strictly controlled in the former Soviet Union and parts of Eastern Europe. Extensive use of high-rise flats insured that prime agricultural land was preserved. Most areas of these cities are intensively planted. Main streets are lined with trees and neighborhood parks abound. However, this is not the case in Armenia where Yerevan's urban forest is rapidly disappearing. Due to a chronic energy crisis resulting from the collapse of the Soviet Union and the current economic blockade, the residents of Yerevan are busy cutting trees all over town. Stumps have replaced trees. It is estimated that Armenia has lost over one million fully mature trees in the past few years, with no end in sight (Armenian Assembly of America 1994).

### **3.2 WASTE MANAGEMENT**

The issue of the disposal of an ever-increasing amount of refuse is a chronic problem for city authorities. Disposal systems are expensive to operate and fraught with environmental challenges. In recent years, a number of cities have introduced different types of recycling programs to deal with the solid waste issue.

Urban agriculture should be a component of any solid waste policy. The City of Los Angeles has a pilot project in which residents must separate organic wastes from gardens and lawns from solid waste materials, such as glass and cans. These organic materials can be useful products for urban agriculture activities and for the maintenance of scenic parkways.

Possibilities also exist for re-use of liquid waste. In Santee, California, waste water is reclaimed and used in a series of recreational lakes. The Desert Inn Hotel in Las Vegas uses purified effluent to irrigate its 52 hectare golf course.

Separation of waste at source is already being done in parts of Asia and the South Pacific. In the Solomon Islands, approximately 75% of total refuse put out for collection was organic and recyclable. The government felt that collecting this type of material was costly and unnecessary. It used a two-pronged strategy for addressing the issue. A radio campaign was designed, urging residents to recycle the organic material back into their homegardens. The second activity had the objective of earning money from organic material. The remaining organic refuse

was picked up and taken to a site where it was composted. The processed material was then offered for sale to the public or used to improve public parks and gardens. Observations show that households have listened to the radio campaign and responded by using organic refuse in their gardens.

A section of Fiji's Suva City Refuse Centre has been converted into a commercial enterprise for producing flowers and ornamentals. Since flowers and plants are not consumed, they pose no threat to human safety. (Some organic materials are contaminated by heavy metals and pathogens). The compost, which is rich in organic materials, could be safely used to produce non-edible plants.

### **3.3 CRIME PREVENTION**

One of the most important issues of concern to urban residents in North America and Europe is the rise in violent crimes. This issue is also becoming a concern for residents of Asian cities. Statistics show that teenagers and young adults are responsible for the majority of violent crimes. Those who commit crimes or are predisposed to commit crimes often cite the lack of activities and of meaningful work as one of the main reasons for engaging in criminal activities.

Urban agriculture has been used successfully as a method for deterring would-be criminals and turning them into productive citizens. One success story is with the inter-city youth of Los Angeles who are growing herbs and spices and producing a commercial salad dressing. San Francisco has a prisoner training program which includes food production that continues beyond release from prison.

### **3.4 URBAN REDEVELOPMENT**

Decay is a part of urban life, in the United States and parts of Europe. Every major city has sections that are characterized by abandoned or condemned buildings and debris-filled lots. These are environmental nightmares: they are physically unsafe and often serve as magnets for criminal activity. Urban agriculture should form a part of any programme that deals with urban renewal. The United Kingdom cities of Sheffield and Birmingham have converted abandoned industrial areas into sites for urban agriculture. Examples from North American cities, which were mentioned previously, show that local communities will respond to the challenge of cleaning up vacant lots and transforming them into green centres for food and recreation.

### **3.5 INTER-CITY ENTERPRISE ZONES**

Urban agriculture should be a component of any plan to establish an inter-city enterprise zone. Opportunities for the production of food and ornamentals abound. There is a need for small-scale food production centers specializing in ethnic foods and spices catering to residents in the nearby area. Ornamental horticulture is particularly well-suited to sites with limited space. Flowers and indoor or outdoor plants, can be grown under nursery conditions. Supplying neighborhood offices and businesses with fresh flowers and indoor plants through plant "rentals" are two opportunities which can be further explored.

### **3.6 CHILD NUTRITION PROGRAMS**

The nutritional status of low-income urban residents is disturbingly low, especially in some major American cities. Micro-nutrients that are present in fruits and vegetables are often consumed at rates below the minimum daily suggested intake. Since young children need only one cup of vitamin-rich vegetables daily to satisfy micro-nutrient requirements, urban food production may offer a partial solution to the nutrition problem.

A wealth of experience is available from the developing world on planning for nutrition improvement through urban agriculture. Two particularly successful programs are the Solomon Islands "Sup-Sup" Garden Project and the Thailand Vitamin A Improvement Project. The combined efforts of the Honiara City Council and the Sup-Sup Garden Club increased the total number of homegardens by an impressive 20% in two years (Schoefield 1991). The New Zealand Department of Scientific and Industrial Research Organization report identified the key elements in the successful promotion of urban food gardening:

- thorough analysis of the factors impacting of child malnutrition;
- identification of solutions using existing knowledge, skills, and resources of households which are at risk nutritionally;
- establishment of a neighborhood garden service center which provided: planting material and garden supplies from organic and solid waste materials, demonstration plots for small-scale intensive food gardening, technical assistance at both the garden service center and through visits to individual gardens, and a mass media campaign (Sommers 1991).

The Thai Project, Social Marketing of Vitamin A-Rich Foods, used a similar strategy to the Sup-Sup Garden Project. The main difference in the Thai project was the promotion of a single food, ivy gourd. An initial review shows that production has expanded and an increase in consumption by children has been recorded (AVRDC 1991).

Urban agriculture improves access by the poor and all residents to healthy, locally grown produce. Mothers and/or care providers receiving assistance from government nutrition programmes in North America and Europe could be encouraged to engage in small-scale food-growing activities.

### **3.7 HEALTH CARE**

The intense debate on what to do about universal health care in the United States is continuing. There is little argument that people need to take more responsibility for their own health, especially in making sound food choices and in preventing non-communicable or life-style diseases. The cost to city governments, in terms of treatment and lost revenue from worker illness, is unacceptably high. Urban lifestyles, characterized by a sedentary life with minimal physical activity, leads to a number of health-care problems. Most of these problems are preventable. Most health experts agree that the key to preventing many non-communicable health problems is a combination of moderate exercise and healthy eating habits, including a large portion of fresh fruits and vegetables. One hour of moderate work over a one week period (for example: digging, planting, cultivating) will provide a significant amount of exercise needed to keep healthy.

In the Central Pacific country of Kiribati, one urban district medical program used urban agriculture as a main primary health-care strategy. It had become difficult for government to provide hospital care. Records showed that the majority of requests for hospital admission were for illnesses related to lifestyle including cancer, hypertension, diabetes, and heart disease. The central hospital decided on a two-pronged strategy to address the health-care crisis: reserve hospital services mainly for emergency injury and limit the number of patients with life-style diseases. The public health staff would begin a campaign to promote food-growing. The theme of the campaign was to encourage people to take more responsibility for their own health situation. The treatment: more exercise and increased consumption of fresh produce. The method: homegardening. The chief medical officer, who became known as the garden doctor, observed during personal visits to his patients that most had started small food gardens and were actively involved in the production and consumption of the produce (Takatio 1985).

### **3.8 EDUCATION**

The issue of providing meaningful and relevant education to today's youth is an on-going challenge. Should urban agriculture be a part of the curriculum? All of the issues raised above clearly point to the fact that urban agriculture is a relevant and potentially vibrant part of urban life.

A few options can be considered for inclusion of urban agriculture in the educational system. The role of urban agriculture should be blended into existing curriculums. The Vermont-based Food Work's Project has developed a primary school curriculum based around agriculture and the environment (Peduzzi 1993).

Guidelines for including urban agriculture could be developed and presented through in-service training courses. Another opportunity is through the offering of urban agriculture as a occupational training course. The Los Angeles Unified School District, through its Occupational Center Program, offers certificate courses in agricultural occupations relevant to the urban environment. Young adults, out-of-school youth, and adults needing to be retrained develop business and technical skills in nursery management and lawn and garden maintenance. The Los Angeles Tree People teaches urban ecology to over 60 000 school children each year.

#### **4.0 CONCLUSION**

This paper was designed to stimulate creative thoughts on ways to effectively plan for urban agriculture. In sum, urban agriculture is alive. Its roots are firmly planted in the cities of the world. It has grown through individual initiative as well as through the support of government and non-governmental organizations.

Cities that have urban agriculture programs need to expand them. Those that don't need to start. Perhaps no other activity touches so many aspects of urban life. The benefits of urban agriculture are known. With effective planning urban agriculture can grow and blossom into its full potential.



## REFERENCES

Alexander, M. (1983). Personal Communication.

Armenian Assembly of America (1994). Deforestation Alert. Report to Non-Government Organization Committee.

Asian Vegetable Research Development Center (1991). Household Gardening Experiences in Asia. Center for Citizen's Initiatives (1993).

Davidiants, Vladimir (1994). Armenian Monthly Public Health Report. U.S. Center for Disease Control.

Heimlich, R. and Barnard C. (1993). Agricultural Adaption to Urbanization: Farm Types in United States Metropolitan Areas. U.S. Department of Agriculture, Economic Research Service.

McPherson, E.G. et al (eds.)(1994). Chicago's Urban Forest Ecosystem: Results of the Chicago Urban Forest Climate Project

Minnich, J. (1983). Gardening for Maximum Nutrition. Rodale Press.

Mougeot, L.J.A. (1993). Urban Food Self-Reliance: Significance and Prospects. IDRC Reports Vol.21, No. 3.

Peduzzi, C. (1993). Personal Communication.

Pulver, L. (1993). Personal Communication.

Schoefield, P. (1991). Evaluation Report: UNICEF Pacific Island Family Food Production and Nutrition Project. New Zealand Department of Scientific and Industrial Organization.

Smit, J., Ratta, A., Nasr, J. (1993). Urban Agriculture:Resource for Food, Jobs, and Sustainable Cities. UNDP. New York.

Solomon Island Ministry of Health (1991). Solomon Island National Nutrition Survey.

Sommers, P. (1991) Household Food Security in the South Pacific. South Pacific Commission Head of Agriculture Conference, Tahiti.

Sommers, P. (1991). Testimony Select Committee on Hunger, U.S. House of Representatives.

Takatio, T. (1985). Personal Communication.

Treves, J. (1994). Personal Communication.

US Department of Agriculture (1991). Statistical Abstract, 1991.