

# **IHS Project Paper Series**

**Project Paper No. UEM17  
Urban Agriculture in Community Gardens**

**Julio Prudencio Böhrh, Bolivia**

## Other papers that have appeared in this series

- UEM 1. *'Inter-institutional Consultation and Urban Environmental Management in San Marcos Cajamarca'* by Marina Irigoyen and Russeles Machuca., Peru, 1997
- UEM 2. *'Environmental Sanitation and Infrastructure: The Case of the Marginal Urban Areas of the Southern Cone of Lima'* by Silvia Meléndez Kohatsu, Víctor Carrasco Cortez and Ana Granados Soldevilla, Fovida, Peru, 1997
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- UEM 13. *'Environmental and Health Improvement in Jajmau Area, Kanpur: Lessons and Experiences for Wider Replication'* by Ministry of Environment and Forests; India, 1997
- UEM 14. *'Institutional and Development Framework for Urban Environmental Management in Bolivia'* edited by Gastón Mejía; Bolivia., 1998
- UEM 15. *'Institutional and Development Framework for Urban Environmental Management in India'* edited by HSML., 1998
- UEM 16. *'Promotion of Employment, Health and the Environment, Lima'* by César Zela Fierro and Cecilia Castro Nureña; Peru, 1998
- UEM 17. *'Urban Agriculture in Community Gardens'* by Julio Prudencio Böhr; Bolivia, 1998
- UM 1 *'Urban Economic Restructuring and Local Institutional Response: the Case of Bulawayo, Zimbabwe'*, Mirjam Zaaijer, IHS, The Netherlands, 1998

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No. UEM 17**

**Julio Prudencio Böhr**

**Urban Agriculture in Community Gardens**

*David J. Edelman Editor  
Ed Frank, Project Manager*



**Institute for Housing and Urban Development Studies  
Rotterdam, The Netherlands  
February 1997**

# Introduction to the Capacity Building for the Urban Environment Project

## *Focus and Outline of the Project*

*Capacity Building for the Urban Environment* is a comparative research, training and experience exchange project that was launched in October 1994 with the support of the Dutch government. It provides an inventory and review of the experiences of relevant bilateral and multilateral organisations and of Best Practices in urban environmental management. For the countries of India, Peru and Bolivia, it identifies, communicates and extends the application of Best Practices in environmental management for cities. In May 1995, the project was expanded to include Senegal/West Africa with the support of the Swiss government.

The focus of the project is on learning from experiences in urban environmental management at the city level and on developing strategies for capacity building in order to replicate and scale up the best of these experiences elsewhere. The overall co-ordination of the project is the responsibility of the Institute for Housing and Urban Development Studies in Rotterdam, while co-ordination in the participating countries is the responsibility of the following partner organisations:

- Human Settlements Management Institute (HSMI), New Delhi, India;
- Instituto para la Democracia Local (IPADEL), Lima, Peru;
- Instituto de Desarrollo Urbano (CIUDAD), Lima, Peru (since January 1997);
- Centro de Servicios para el Desarrollo Urbano, (PROA), La Paz, Bolivia, and
- Institut Africain de Gestion Urbaine, (IAGU), Dakar, Senegal.

## *Project Activities*

Support to cities in the form of applied research and development activities in the area of urban environmental management has been, and continues to be, provided by the co-ordinating partner organisations through the following set of activities:

### *Research*

Within the applied research programme undertaken in the project, Best Practices in urban environmental management in Bolivia, India, Peru and, to some extent, Senegal were identified, and their lessons and experiences reviewed. An analysis and review of the identified Best Practices then took place involving a large number of individual research groups and professionals. In a process of on-going monitoring and review, guidance and support were provided by IHS and its partner organisations. The results of both the individual studies of Best Practices and their review are being published in several books and papers in both English and Spanish. These and their publication dates are listed in the *Introduction to the Project Papers*, which follows this note.

### *Networking*

In identifying the research priorities of the project, during the conduct of the research studies, and throughout the review of research findings, a structure was developed and utilised to ensure the participation of all interested and concerned individuals and institutions through a consultative process. Expert group meetings and consultative seminars were organised for this purpose.

### *Capacity Building Strategies*

After the Best Practices research, analysis and review were completed for all countries, outline capacity building strategies were developed for each based on what was learned from these local experiences and practices. These strategies were developed through a broad-based consultation process involving a large number of research institutions, individual professionals and academics, city representatives, NGOs and local representatives. They are currently being modified based on the outcome and findings of Habitat II, which was held in Istanbul in June 1996, and the emphasis has now shifted to applying a number of Best Practices to selected cities.

### *Best Practices Documentation*

Concurrent to and co-ordinated with this project, IHS served as the secretariat of and contributed to the review of the Best Practices that were submitted to the United Nations Centre for Human Settlements (UNCHS) for the *Global Best Practice Initiative for Improving the Living Environment* in preparation for Habitat II. HSMI, PROA, IAGU and IPADEL were also involved and contributed to the national preparatory processes that took place in their own countries. An overview of the Best Practice submissions to UNCHS, as well as summaries of the additional case studies received by IHS, are being made available on the Internet through the IHS Home Page.

### *Databases*

Two databases are also under preparation: an institutional database and a literature database. The institutional database is being developed in co-operation with the International Institute for Environment and Development (IIED) in London. It contains entries on relevant organisations, some of which are documented in extensive profiles, while others are included as shorter reference information entries. IHS is developing the second database, which provides references in the literature on experiences with urban environmental management.

### *Rotterdam Seminar*

The Rotterdam Seminar, which took place in May 1996 during the two weeks preceding Habitat II, brought together all principal researchers, as well as city representatives and other professionals involved in the project for a period of intensive discussions. The seminar resulted in a document that provided a comparative analysis of practices and experiences in the field of urban environmental management. This analysis included the project process and network building, governance, job creation and poverty alleviation and gender. This was published as a book in February 1997 and is listed later in the *Introduction to the Project Papers*.

The Rotterdam seminar also discussed *city-level capacity building strategies* for the cities of Calcutta, India; Ilo, Peru; Santa Cruz, Bolivia and Dakar, Senegal. Experiences in *urban environmental management* were reviewed for the cities of Tilburg, The Netherlands and Nairobi, Kenya.

### *Habitat II*

At Habitat II the project was presented in the Special Meeting on Implementing the Urban Environment, organised by UNEP and UNCHS, as well as in other fora.

*Capacity Building Strategies for Peru, Bolivia, India and Senegal*

The outline capacity building strategies which were developed in preparation for Habitat II (i.e., by CIUDAD, PROA, HSMI and IAGU with the support of IHS). They are being modified for implementation, which is expected to begin late in 1997.

*Outline Training Program for Local Officials, CBO Workers, and other Partners for Peru, Bolivia and India*

These training materials are to be developed over the next few months and will comprise curricula for short courses related to the most directly applicable Best Practices identified for each country in view of its national strategy for capacity building in urban environmental management.

*The Development of a Medium-Term Capacity Building Strategy for Senegal and West Africa*

This activity is in progress and addresses the building of individual and institutional capacities at the local level for urban environmental management in both Senegal and throughout West Africa.

Ed Frank, Project Manager  
Rotterdam, February 1997



## Introduction to the Capacity Building for the Urban Environment Project Papers

A number of publications have appeared under the Capacity Building for the Urban Environment project. These are listed below and can be ordered from IHS or its partner organisations respectively:

- *Capacity Building for the Urban Environment*, edited by David J. Edelman and Harry Mengers, summarises the research findings of the project and the conclusions of the Rotterdam Seminar. It was published by the Institute for Housing and Urban Development Studies (IHS) in Rotterdam in February 1997;
- *Urban Environmental Management: The Indian Experience*, edited by B.N. Singh, Shipa Maitra and Rajiv Sharma, reviews the Indian experience in urban environmental management and presents all the Indian Best Practice of the project in detail. It was published by the Human Settlements Management Institute (HSMI) and (IHS) in New Delhi in May 1996;
- *Problems and Issues in Urban Environmental Management: Experiences of Ten Best Practices*, also edited by B.N. Singh, Shipa Maitra and Rajiv Sharma reports on the Indian Best Practices of the project in an abridged form. It was published by HSMI and IHS in New Delhi in May 1996, and
- *Ciudades para la Vida: Experiences exitosas y propuestas para la accion*, edited by Liliana Miranda Sara, presents the Best Practices and outline capacity building strategies for Peru and Bolivia for a Spanish speaking audience. It was published as Volume 6 in the Urban Management Series of the joint UNCHS/UNDP/World Bank Urban Management Programme in Quito in May 1996.

The objective of this series of *Project Papers*, then, is to bring to an English speaking, audience the results of the project research in Peru and Bolivia appearing in the Miranda book. In addition, the Indian research, while documented in English in the second and fourth references listed above, has not appeared as complete, individual studies. Consequently, a selection of these will also be selected for this series. Finally, the first reference in the above list covers aspects of the research undertaken in all four countries of the project. Consequently the selection of work appearing in the *Project Papers* includes the following:

### *Bolivia*

- 'Urban and Environmental Reality Workshops' by Zoila Acebey;
- 'Urban Agriculture in Community Gardens' by Julio Prudencio Böhr, and
- 'Institutional and Development Framework for Urban Environmental Management in Bolivia' edited by Gastón Mejía.

### *Peru*

- 'Defence and Conservation of the Natural Swamp Area Pantanos de Villa, Lima' by Arnold Millet Luna, Eduardo Calvo, Elsie Guerrero Bedoya and Manuel Glave;
- 'Consultation in Urban Environmental Management: The Case of Ilo' by José Luis López Follegatti, Walter Melgar Paz and Doris Balvín Díaz;
- 'Promotion of Employment, Health and the Environment, Lima' by César Zela Fierro and Cecilia Castro Nureña



- ‘Environmental Sanitation and Infrastructure: The Case of the Marginal Urban Areas of the Southern Cone of Lima’ by Silvia Meléndez Kohatsu, Víctor Carrasco Cortez and Ana Granados Soldevilla, and
- ‘Inter-institutional Consultation and Urban Environmental Management in San Marcos Cajamarca’ by Marina Irigoyen and Russeles Machuca.

### *India*

- ‘Power to the People: The Local Government Context’ by the Times Research Foundation;
- ‘Carrying Capacity Based Regional Planning’ by the National Institute of Urban Affairs;
- ‘NGOs/Civic Societies and Urban Environmental Advocacy’ by Development Associates;
- ‘Integrated Low-Cost Sanitation: Indian Experience’ by Sulabh International Institute of Technical Research and Training;
- ‘City-Wide “Best Practices” in Solid Waste Management in Collection, Transportation and Disposal’ by HSMI/WMC of UIFW;
- ‘Environmental and Health Improvement in Jajmau Area, Kanpur: Lessons and Experiences for Wider Replication’ by Ministry of Environment and Forests;
- ‘An Approach to Pollution Prevention in Electroplating Sector’ by Development Alternatives;
- ‘Integrated Study on Wetlands Conservation and Urban Growth: A Case of Calcutta's Wetlands’ by Institute of Wetlands Management and Ecological Design;
- ‘Sustainable Urban Development: A Case of Navi Mumbai (New Bombay)’ by City & Industrial Development Corporation;
- ‘Community Based Sanitation and Environmental Improvement Programme: Experiences of Indore, Baroda and Ahmedabad’ by Shri Himanshu Parikh, and
- ‘Institutional and Development Framework for Urban Environmental Management in India’ by HSMI.

It should be emphasised here that the nineteen *Project Papers* in this series reflect the views of their authors only and have been edited to varying degrees. Initial English language editing was done by, among others, B.N. Singh, S. Maitra and R. Sharma for India and by D.J. Edelman for Peru and Bolivia. In fairness to both the authors and the publishers, they should, therefore, be characterised as working papers rather than full academic papers.

David J. Edelman, Series Editor  
Rotterdam, February 1997

# **Urban Agriculture in Community Gardens**

**Julio Prudencio Böhr**



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## Introduction

This paper reports on the investigation made into one of the Best Practices in Urban Environmental Management in Bolivia selected by PROA (Urban Development for Integrated Services) of El Alto, Bolivia and IPADEL (Institute for Local Democracy) of Lima, Peru with the support of IHS (Institute for Housing and Urban Development Studies) of Rotterdam, the Netherlands. The objective of this analysis is to evaluate the methods of community vegetable gardens in Villa Tejada, in the city of El Alto, as a way to improve the quality of life of the city's residents, as well as to support the urban environment there, in order to determine if they may serve as models to be duplicated and/or scaled upwards.

To do so, an analysis of the community gardens project was made, emphasising the development of the project, the context within which it has developed, inter-institutional relationships, environmental management and others factors. This is presented in Chapter I. Chapter II contains an analysis of the outcome of the development of the gardens, dealing specifically with the impact on participants in as far as nutrition and eating habits of the population, employment generation, family budgets, and training of the women involved in the actual work are concerned. Finally, in Chapter III, a general appraisal is made of the overall experience of the gardens in as far as its main achievements and difficulties are concerned.



# 1. The Community Vegetable and Plant Garden Project

## 1.1 Context of the project: City of El Alto

The city of El Alto is located on the Andean High Plateau above the capital city of La Paz at 4100 metres, with temperatures generally cool and running from -4 degrees centigrade to 17 degrees centigrade. The climate is dry, with strong cold winds of up to 67 km/hour and an average annual rainfall of 504 mm.

This city's population is currently close to 405,492, with a high rate of rural-urban migration (41%). Many of the poorest and most socially deprived groups of the La Paz metropolitan region live here. The City of El Alto has very low rates of basic service and infrastructure coverage, far from adequate settlement and housing conditions, and poor use of housing space. Up to now, 43 popular settlements have been identified, all of which have precarious housing. Actually, most dwellings are one room houses with floor areas ranging from 30 to 50 m<sup>2</sup>, built with adobe (sun dried bricks), tin roofs, dirt floors, and with no equipment or utilities whatsoever.

As far as community utilities are concerned, 80% of the housing fund in El Alto lacks public electricity, and there are over 200 points of infection due to non-existent urban hygiene. Moreover, every 7 out of 10 people do not have running water in their houses. The rest have access to potable water from mobile water tanks, public water outlets, small rivers and streams (G. Sandoval and F. Sostress, 1989).

Another very serious problem is that El Alto faces is environmental. The lack of running water, the absence of hygiene in food preparation, the scarcity of eating utensils, the lack of personal hygiene and the inadequate outlets for excrement place this city's population in a very vulnerable biological environment. A high rate of contagious and infectious diseases, mainly gastrointestinal and respiratory and linked to environmental pathologies, is present. Only 6% of the health centres of the metropolitan area in La Paz and El Alto eliminate infected residues through sewerage. There is also a high percentage of migrants in El Alto, who live with farm animals (e.g., sheep, cows, pigs and rabbits) as part of a cultural manifestation, which also represents a source of direct and indirect maladies due to both a lack of hygiene and promiscuity (G. Mejia, 1995).

The growth rate of El Alto has caused an increase in the number of motor vehicles (both public and private), which in turn has led to higher levels of acoustic and chemical pollution. Also the surge in the number of factories, handicraft workshops and small enterprises has contributed to air pollution and a continuous degradation of underground waters from the filtration the untreated waste of inadequate sewerage systems (G. Mejia, op.cit.).

Solid waste represents another negative factor in this area. El Alto generates 200 MT/ day of garbage, only 30% of which is properly collected by municipal and private garbage services. The remaining residue is found in unoccupied land parcels, green areas, streets and others (HAMEA, 1995). Out of the total garbage in El Alto, 49 % is composed of dirt and dust, 24% of food residue, 11% of paper and cardboard, 11% of plastic bags and other plastics and 3%



of metal and tin plates. The rest is made of bones, clothes, wood, rubber, crystal and other items (G. A. Velarde et al, 1993). In addition, 94% of the streets in El Alto are dirt roads, while the rest are either paved, stone paving tile or stone. All, however, are usually full of dirt, paper and other refuse, especially domestic garbage.

## **1.2 The communal vegetable and plant gardens of Villa Tejada**

### **1.2.1 Beneficiaries**

Most beneficiaries of the project (57 in total) are women between 40 and 69 years of age, while 19% are between 30 and 39 years old. Most of these women come from the country side and from mining centres, although a few come from the city of La Paz. Most have no schooling, and only 26% of these have gone beyond grade school. A high percentage of these women are heads of households, and they are either widows or abandoned women with the number of children varying from 5 to 9 each. The households of these women are often quite large since they are usually made up not only of their children (young and adult), but also of in-laws, grandchildren and often nieces and nephews.

The women's main activities are household chores, although most of them, if not all, in order to create additional income resort to a number of survival strategies, most within the informal sector, such as handicrafts, small retail business, clothes washing and so on.

Their housing is precarious, with most structures of adobe with tin roofs, with separated, small rooms (sometimes 2 or 3), which are used according to the needs of the household. They can be workshops, bedrooms or a kitchen, and they are generally on a lot of approximately 300m<sup>2</sup>, which allows space enough for farming and animal raising. They have electricity and potable running water, although a sewerage system is not present.

### **1.2.2 Historical background of the development of the gardens**

The community vegetable gardens project (officially called Co-operative Agropecuaria Solidaridad or CASOL) started in the Don Bosco Parish of El Alto in 1984, when a Christian solidarity group was formed to help impoverished people. Three stages may be identified in the development of the gardens.

The first stage, when the project was created and first implemented (1984-1988), can be characterised as one designed to help people who were destitute as a result of monetary hyper-inflation, the lack of food, food price speculation and, later, as a result of several social and economic regulations which were made (Structural Adjustment Programme) and which resulted in massive unemployment, an increase in food prices and living costs and decreased income. Within this context, several projects designed to increase and generate income were developed. This is how these projects for community vegetable gardens were born. They were targeted towards self-consumption of food, creating day care centres for children, providing homes for children and starting handicraft production projects. This is when *Ricerca e Cooperazione* (an Italian NGO) started to support and manage CASOL's work.

The second stage covers 1989 through 1991, and its main trait was the constant mobility of the women involved in the project. Starting with 33 original participants, there were 100 in 1990 and 85 in 1991. This was a result of the way in which the project functions internally, as well as to the heterogeneous backgrounds and characteristics of the participants. Towards the end of 1991, some changes were introduced in occupational fields, and the project was restructured, thereby moving towards the idea of a co-operative based on more organic and technical work due to the need for a legal instrument and institutional representation (J. Sandoval, 1994).

The third stage may be identified as having a clearer and more defined line of activities within the group, including a closer look at legal constitutional aspect of the co-operative, the development of an internal activities manual, new elections, technical training and the introduction of administrative systems.

As a result of all these developments, a new autonomous, regulated and structured institution called *Cooperativa Agrícola de Comercialización Ltda.* was born, and it was legally registered in both state and trade bodies. The implementation of the various responsibilities linked to the development of a co-operative, and, above all, to the real transfer of the management and organisation of the participants without any outside support is still going on.

### **1.2.3 Actual structure and how it functions**

The project is organised with a Board of Directors consisting of a president, a secretary, a treasurer and a deputy, while the oversight commission is made of a president and a deputy. The management committee and the social committee are each made up of two members.

All functions and activities related to these bodies are basically the same as in other similar organisations (i.e., supervision, information, control, member registration, financial management, inventory control, etc.). However, certain other aspects of the organisation must be outlined because they are important to the functioning of the co-operative. These include planning, follow-up, co-ordination, management and control mechanisms. Thus, the management, production and marketing committee (APC) plays a fundamental role within the organisation since the greatest part of the operations of the group is its main concern.

This committee is made of democratically elected members, with job contracts and salaries for working in the co-operative. Each member has a salary of Bs 250 per month, provided she works solely for the project. A member does not receive the monthly payment made by CASOL members for two years. The two members of the APC must present a production, marketing and management plan for CASOL. This plan should consider control mechanisms for labour organisation (i.e., the preparation of tree nurseries, plant and vegetable production, seed provision and working equipment, maintenance and production control), marketing, (i.e., retail planning, retailing to members, prices, identification of retail outlets and so forth), production, tool maintenance, members, collection of money, salary payments, garden maintenance and the management of other assets.

In as far as group leaders are concerned, this such function is revolving and mandatory for six month periods. Duties include attendance control, as well as labour and activity planning with the APC.

All members are obliged to work in the production and marketing of a certain number of plants per month. If not complied with, or should money be withheld, punitive measures are drastic, such as two months suspension without pay.

The group's organisational chart has gone through several changes in the past few years, and several different methods of operation have been tried. The present one, however, seems to be thus far the most convergent with members' interests, culture and idiosyncrasies.

Another important factor to consider is the monetary donations that members are compelled to make (Bs 0.50 per month = \$US 0.10) in order to develop a solidarity fund, which may help members in need with emergency credit and funeral expenses, for example.

Out of the total monthly income, certain amounts of money are destined to cover expenses such as real estate taxes, a Christmas bonus, seed purchases, maintenance and expenses for utilities such as water, electricity and telephone service. The balance after payments is distributed among all members as monthly income.

### 1.3 Production

The CASOL Co-operative has three vegetable and plant gardens in several places in El Alto, each of approximately 1000 to 1500 m<sup>2</sup>. In the Villa Tejada area, there is a garden which has two greenhouses (163m<sup>2</sup> each), each with different products. However they each also have approximately 19 furrows of lettuce (each furrow holding approximately 28 heads of lettuce heads or 8 metres), 9 furrows of celery (vertically = 4 metres) and 6 furrows of salt wort. In the surrounding areas one may find celery and parsley. Each greenhouse has with 28 tunnels, each of which is approximately 0.90 x 3.50 metres and 0.30 metres apart from each other. Each has 5 production furrows for products such as spinach, turnips, garlic and lettuce, with a variable production of between 8 and 12 metres measuring 3.15 metres each, which makes a total farming area of 251 metres. In the Santa Rosa area, there is another garden with 8 greenhouses (93.4 metres each) and close to 72 tunnels (3 metres each), which amounts to a total area of 963.6 metres of farming ground. Finally, in this latter area, CASOL has grounds of 1000 m<sup>2</sup> with no built in infrastructure, but only 150 metres of it have been used for open air farming

In total, CASOL has 10 greenhouses and 10 tunnels, with overall farming land of 1.365 metres in which 18 different species of vegetables are grown, 26 species of flowers and several forest species, as well as medicinal plants and tuber species such as potatoes. The highest production lies in lettuce and spinach (due to their high market prices with an adequate potato farming scheme. Members have technical know how. Therefore, they use rotation schemes of different products so as to let the soil recoup its nutrients. In addition, production is horizontal, using only natural fertiliser (such as cow and sheep manure, black soil and turf), which is purchased twice a year in huge quantities (around 6.000 m<sup>3</sup> to be later distributed among all gardens). However, in the near future, this will be substituted by compost. For this effect a small recycling plant of organic residue has been built.

Production varies according to the time of year being the lowest in winter due to cold weather and frost, although production time varies according to product. For example, cucumbers are produced every 5 months, while turnips need only two months. Production is, furthermore, as was stated earlier, organised according to the women's group work. They do garden work once a week (in half day shifts) with specific products and in rotation.

## 1.4 Environmental management

There are several aspects to consider as far as environmental management is concerned; these include: water, air, soil, sun, etc. As far as soil is concerned, as stated earlier, El Alto has rocky and barren soils with no running water. Therefore, various places have become polluted in spots.

One of the sites where CASOL established a garden was originally a garbage dump full of holes and which was patiently and carefully cleaned out. It was then fenced, and basic utilities such as running water, sewage, etc. were introduced to enable the grounds to be used for farming. However the hardest part is not necessarily soil regeneration but the legal recuperation of land subject to the activities of clandestine realtors (a very common practice in El Alto, especially when it comes to parks and unoccupied green areas). These realtors often claim property rights to such land and sell it for housing construction.

As far as running water is concerned, members have made all necessary arrangements to have it installed directly for farming purposes, although in small quantities. One must remember that a high percentage of people in El Alto do not have running water; therefore, its use on the farms is limited to very early morning and late evening hours. Although the water obtained is purified and/or potable, the amounts used are not necessarily correct, since members do not know the proper amount to be used for each crop. Based upon certain estimates made in June 1995 at the Villa Tejada garden farm, 23 m<sup>3</sup> of water were used for a farming area of 251.04 m<sup>2</sup>; in Santa Rosa, 64 m<sup>3</sup> of water were used for a farming area of 963.60 m<sup>2</sup>; and at the Santa Rosa II garden farm, 11.60 m<sup>3</sup> of water were used to serve a farming area of 150 m<sup>2</sup>. This demonstrates that one cubic meter of water has generally been used for farming plots between 11 and 15 m<sup>2</sup>.

Sometimes too little or too much water is used with the expected negative consequences of some crops drying out or rotting respectively. However the fact that potable running water is being used guarantees the quality of the product. This is especially important at moments of a high incidence of cholera in cities such as El Alto, where living conditions are far from ideal. This use of pure water, however, increases demand by El Alto consumers.

Another important environmental issue is that of energy use. In order to gain more and better solar energy to be used in the greenhouses, the co-operative has built (upon the suggestion of the NGO which supported it and as a way to diversify and improve farming production) green houses with double glass roofs, which, of course, increases temperature enormously and allows production of several different crops along one of the biggest walls of the greenhouse. Air vents have been built both on the upper and lower parts of the wall in order to achieve cold and warm air circulation, which is also useful for mushroom production (champignon) outside, but next to the greenhouse. Regretfully, producing mushrooms requires a highly sophisticated technology, which has not yet been mastered by the members.

Finally some environmental sanitation management aspects must be considered with CASOL. During different times and circumstances, CASOL members, together with women from the SOLIDARIDAD group, have participated in various training courses and seminars related to health campaigns, hygiene, the care of parks and green areas and so forth. These training programmes have been successful, and the women have taken what they have learned to their houses, thus enabling important changes to be achieved in the daily living habits of themselves and their families. Thus, all members now have plants and flowers in

their own houses. Also, those households which earlier did not have sewerage systems have built outhouses, which has resulted in an important decrease in respiratory infectious diseases, especially amongst children.

However the environmental situation surrounding the garden farms' premises are not the best due to excess garbage disposal and the far from good garbage collection programme of city hall. These garbage dumps are the direct effects of the origins and culture of the population, since women do not separate and properly dispose of solid waste due to a lack of information and no exposure to modern ideas concerning health, recycling, etc. As a result, they dump food residue in their own yards to feed their animals (ducks, hens, and others), which run freely about the house. This, of course, increases health risks, especially amongst children.

Another bad habit they have, insofar as environmental protection is concerned, is the burning of residue such as paper, cardboard, wood furniture and so on, in the belief that such ashes may be used for farm production as fertilisers. However, recent national campaigns on environmental protection have caught the members' attention, especially on residue burning, and they are beginning to turn to compost. Small recycling plants have also been built in each farm.

## **1.5 Marketing and supply systems**

The seed supply required for CASOL production in Villa Tejada is acquired in two ways. The first, and most important, is through internal production of its own seeds in plant nurseries prepared by the members. This includes vegetables, plants and others. The second way of obtaining a supply of seed is the purchase of seeds from NGOs which offer a great variety of vegetable and garden produce at relatively low prices, generally about four times a year.

The marketing system of the products has changed through the years. In 1992, "marketing committees" were formed. They sold the produce in different markets and supermarkets in the city. This method was discarded due to high transportation costs and money from the sales was not always returned to the co-operative.

There are two retail systems now being used, internal and external retail. Internal retail allows members to buy products in whatever amounts they require, either for their own consumption or for their further retail, both in cash or on short time credit. However, in the case of flowers (decorative flowers and forest species), limits have been drawn, both insofar as the amount of produce itself as well as the period for which credit is allowed. 15 days is the upper limit for repayment. Furthermore, plants and other produce may not be returned, which sometimes causes members to lose income if their sales do not reach what they planned.

External retail, on the other hand, is under the sole responsibility of the member in charge of administration, production and marketing, who has to seek potential markets for the products. Produce transportation costs are paid by the member in charge. Usually these are between Bs 3.8 to Bs 4.3 (\$US 0.92, which means approximately 1.52% of her monthly salary). This money is not refunded, since the person in charge according to the regulations, assumes all these costs against her fixed monthly salary.

In addition to transporting the produce to the retail outlets, the member closely controls both internal and external retail. Generally, sales are done through a specialised marketing

organisation. This is an NGO which collects high quality produce and commercialises it as high quality, biologically prepared produce, and packages it in various sizes. These products are then sold to supermarkets and specialised stores, to wholesale retailers and to individuals. The retail prices are based upon a survey of actual market prices, always taking into account both size and quality. The NGO also imports seed to sell to producers, thus increasing the incentive for product diversification.

In general terms, the new commercialisation system is more suited to the functioning structure of the co-operative, allowing easy and fast wholesale and offering fresh produce (as a rule sold the same day as harvested) to neighbours, members' relatives and people close to the co-operative.

## 1.6 Production costs and retail prices

Due to the lack of statistical data, an exact appraisal of production costs, investment and other expenses incurred by CASOL members is hard to achieve. However the importance of such data is obvious; therefore approximate data are furnished. The Italian NGO involved in the project has covered from the start all fixed cost investments, land purchases and the building of the greenhouses. These investments were covered by the contributions of solidarity institutions and organisations, as well as by the members' contributions through their labour and gathering of the materials used (stone, sand and so on). An approximation of the total cost is found in the following table.

*Table 1: Investments in the vegetable and flower gardens (\$US)*

<i>Location</i>	<i>Land Price</i>	<i>Greenhouse Cost</i>
Villa Tejada	3,000	7,000
Santo Rosa I	4,500	7,500
Santa Rosa II	3,000	-
Total	10,500	14,500

Besides these investments, other investments must be considered. These include running water for the three gardens, electricity and telephone services, which were entirely covered by the members.

Exact data on production costs are also mostly absent. An example could be the daily salaries for soil preparation, planting (nurseries, plant transplants and so forth), other farming (hilling, weeding, watering and so on) and harvest activities for which there is no data available and for which no appraisal has been made. As an indicator, however, it could be pointed out that the shift cost per member is Bs 10 (\$US 2.15). Since each member works half a shift per week, her monthly work is two shifts. This would total \$US 245.10, which does not strictly cover an investment in work, but also in training, marketing, management and so on.

As far as other items within the cost structure, there are only the following references. First, seed purchases vary in price according to produce, amount purchased, number of annual crops and so forth. There is, consequently, an investment range of Bs 3 (\$US 0.60) to Bs 160 (\$US 34.40). For produce such as garlic, pepper, radish, parsley, salt wort, cauliflower, turnip and others, an ounce of seed for Bs 3 each is purchased to cover 7 metres of farmland. Other

types of produce, such as lettuce, cost of Bs 25 per 100 grams, which is sufficient for a six month period. Spinach seed costs Bs 160 for two pounds, and cucumber seed is Bs 30/100 grams; both supplies last a year. Second, manure is calculated at Bs 920 (\$US 198) for a whole year's supply. A truckload of sheep manure costs Bs 800 per year, a cubic metre of black soil Bs 40 per year and three cubic metres of cow manure Bs 80 per year).

In order to have a clearer view of CASOL's situation, however, a closer look at income and expense should be made. The months of February and June 1995 are taken as examples. Income is derived from plants and vegetable sales (both to members and outside customers), while expenses are made up of service costs such as electricity and water, taxes and purchases of seeds and plants. During February 1995, an income of Bs 1.161 was registered, this being summer and rainy. However, in June, only Bs 882 was registered. This may be easily explained by low production. Costs were higher in February (Bs 449.20) than in June (Bs 414.76), although water costs were higher in June due to the dry season and a greater need for water. February's income was Bs 711.80, which was distributed among all 57 members, that is, \$US 2.68 each. This income was lower in June, and only \$US 1.76 per member was distributed. In June, there were more expenses and lower production and therefore less income for members.

Another important issue to be considered is market price for the produce at certain times. If CASOL sells directly from its gardens in Villa Tejada to the public, actual market prices are utilised, as established by supply and demand. There are, therefore, higher or lower prices for certain crops (such as radish, lettuce, onions and carnations). However whenever the produce is sold to the NGO, the retail prices are higher, which, of course, increase income.

## **1.7 Inter-institutional relations**

From its start, CASOL was supported by a foreign (Italian) NGO in various ways, including inter-institutional relations. Since this support no longer continues, the co-operative is learning how to carry on with this task. Lately, it has been considering a change here to enhance and strengthen its work. The members are now applying and all that was learned in acquiring finance in the past to other financing sources in the filling out of applications, the development of proposals, and the design of project profiles to support the project.

Some inter-institutional relationships have been developed with NGOs and the municipal government of El Alto. The relationship with El Alto's municipal government (HAMEA) has been going on for some years. Some agreements have been reached and joint work has been done in the past. For example, HAMEA has hired an engineer to support CASOL's work and promised to acquire small plants and nurseries for a reforestation program. Other agreements were made, which were not totally fulfilled. However, there are now authorities, who do not acknowledge such agreements and, consequently, no joint activity is being done.

Actually, the municipal government should establish rules and regulations for inter-institutional work, as well as frameworks for agreements and projects with outside NGOs, additional co-operatives and other organisations. However, it is just starting to establish environmental policies regarding garbage collection, green area conservation, sewerage, recycling of gray water, land partition and so on, urban farming, including vegetable production, small farm animal raising, recycling of organic residue, hydroponics, etc.

The municipal government is just starting to create the necessary organisational structures in a number of departments to deal with these subjects. However, it does not have the necessary financial support nor the technical, administrative or management capacity. There is no defined policy on how to educate the public on environmental subjects, and there is little, if any, joint work programmes with other institutions (other municipal governments, NGOs, trade unions, etc.). Moreover, it has not, up to now, systematised work on environment related subjects.

Although HAMEA has produced some regulations, norms and statutes related to environment, these are not being carried out, nor does the municipality have the ability to enforce them. In addition, one must consider the lack of education and participation of the population itself as far as environmental subjects are concerned, plus the almost non-existent interest in the preservation of green areas. Nevertheless, it must be pointed out that with the new Popular Participation Law some policies will be developed that will lead to increased participation in this regard.

Some relationships with trade unions have been established (the Departmental Work Union or COB, the Departmental Women's Federation and others) with which it occasionally carries out some public demonstrations, including marches, strikes, etc. There are also links with some organisations which are related to the Catholic church. Indeed, the origins of CASOL lie with the Don Bosco Parish in El Alto, with which celebrations, training courses, seminars and so on are carried out.

CASOL does not, however, have relations with the neighbourhood organisations called Juntas Vecinales or with other women's organisations in their area (e.g., the Women's Centre and Mother's Centres) with which it should relate and carry out joint environmental projects. Their common cultural background could be a link and incentive to begin to co-operate this way.

As far as NGOs are concerned, only TAHIPAMU (the History Workshop for Women) is related to them. This NGO has offered training courses and some financial support, and it remains in charge of salaries paid to these responsible for accounting and marketing of CASOL over the whole year. In addition, the Italian NGO, Riccera Cooperazione, has aided in formulating and preparing proposals. With other NGOs working in El Alto, some of which are expert in environmental issues, there exist no relations in spite of their common objectives and experiences.

All the above shows that the acquired and developed potential of CASOL in so far as urban gardens, the environment, member training and management of projects are concerned, is not being sufficiently exploited or shared with related organisations or the municipal government, which should formulate appropriate enabling policies. As an example, HAMEA should start forestation programmes, training and capacity building programmes, home growth vegetable programmes and so forth.





## 2. The Project's Impact on Participants

### 2.1 Nutritional levels and eating habits

One of the most important aspects of the research has been the findings about the consequences from the garden projects on the households of the participants, and one of the most significant of these is that regarding improved nutrition. To demonstrate this, an analysis of household food intake was made, which considered quantities, processes and nutrients.

Customary household food intake among the poor in Lima covers approximately 27 products, of which bread, potatoes, sugar, oil and salt are the most often consumed. The question here, then, is the impact of the farm gardens of Villa Tejada on CASOL's member households as far as calories and protein are concerned; that is, it is important to ascertain whether there has been a real change in protein and calorie consumption. In order to answer this question, the food intake of member households of CASOL has been compared to that of households not related to CASOL in terms of both calories and protein. A number of conclusions can be drawn:

- Households related to CASOL consume a greater variety of products (18 products) than non-CASOL related households (14 products);
- The same situation is found with calorie and protein intake. CASOL member households have an intake of 1786 calories per day and 45.10 grams of protein per day, while non-related households have an intake of 1747 calories per day and 43 grams of protein per day. However, this means that *both* related and non-related households do not meet the minimum required daily intake of both calories and protein according to data provided by a specialised nutrition organisation. For CASOL members, the calorie deficit is 18%, while for protein, it is 4%. For non-members, the figures 30% and 21% respectively;
- The products with the highest calorie content for both sets of households are bread and pasta, which shows the importance of these products in daily consumption among low income households, who substitute these items in the food basket for other foods which are costlier and inaccessible considering their earnings;
- Another important product consumed by CASOL member households is rice in so far as calorie and protein intake is concerned. Such products are not found in non-related households;
- As far as tubers are concerned, CASOL related households consume a greater diversity of larger quantities, especially of potatoes;
- With regard to vegetables and other farm produce, the findings are similar to those for tubers. CASOL related families show a greater diversity and quantity of product consumption; that is, they eat more than three times as much per person as far as quantity (and quality) are concerned. This means vegetables account for four times the amount of

calories and double the amount of protein in the diets of CASOL members compared to non-member households;

- Another important dietary factor is that CASOL related households consume twice as much sugar as non related households, and
- Fish and meat consumption is low for both household types. On the day of the interviews, for example, *none* of the households consumed either fish or meat, products of enormous importance to a well balanced diet.
- Another important and related issue to consider in this analysis is that of the origin of the products consumed. Taking once again the regular food basket of the households related to CASOL and analysing the nutritional contribution of that produce, the important role played by the garden project can be demonstrated further. Thus, if a number of project products are considered (i.e., those originating from a co-operative garden of Villa Tejada), both from their consumption and their caloric contribution to the food basket, a number of factors become apparent. These include that:
  - Four products of the 18 contribute more than 76% of the daily caloric intake in the CASOL related households. From those 4 products, 2 (bread and pasta) are solely wheat based, another is sugar based and the last is potato based;
  - Transformed products account for six of these and direct consumption for ten. Likewise, 77.8% of the calories come from transformed products (out of these, 46% come from bread), and the rest (22%) come from direct consumption products;
  - Out of the total caloric intake in the CASOL related households, 98% come from purchased products and 2% from the garden production at CASOL. This seems to confirm the results of an earlier study (J. Prudencio, 1992) of the nutritional aspects of food consumption in CASOL related households. This previous study indicated that out of the total caloric intake, only 1.70 % came from the production of one of the project gardens (generally onions, spinach, lettuce and celery). However, in reality this percentage has increased somewhat. The low figure in the more recent survey reflects low production and consumption at this time of year. This last point is relevant because the percentage of garden-based consumption increases significantly during harvest periods. It must, therefore, be taken into account that at the time of this survey, it was wintertime, the period of lowest and least diversified garden production, and
  - Only lettuce and celery are related to CASOL gardens seasonal production; the rest of vegetables consumed (i.e., tomatoes, onions and peppers) are purchased. However, these products, including potatoes, come from the CASOL gardens in Villa Tejada during the growing season.

In order to bring this analysis of the impact of vegetable production within the project on the consumption habits and nutrition of CASOL member households, reference will now be made to them in relation to price per calorie (according to average market prices per 100 grams of produce in El Alto in July 1995) by origin and total consumption value. Considering that a well balanced diet should include at least one product in a number of groups of products, one can evaluate cost efficiency (in terms of calories) of each expenditure (consumption value) in each of the groups. The following then become important:

- Regarding tubers, Chuño (dehydrated potatoes) is the most expensive per calorie, since potatoes are the most calorie laden product;
- Among the most consumed vegetable, tomatoes are the cheapest per calorie, while pepper is the most expensive. As far as the price per calorie of the produce of the CASOL gardens; carrots are Bs 0.23 per 100 gr. and celery is Bs 0.41 per 100 gr., which are neither the cheapest nor most expensive in this group;
- As far as grains and cereals are concerned, the cheapest product per calorie is rice, and the most expensive is bread, although the latter is bought in great quantities;
- Within other groups of products, oil is a cheap product per calorie, contrary to that of eggs. The rest of the products show a low cost per calorie, and
- The total expenditure of daily average consumption in a household (6 members) related to CASOL (assuming all household members eat only at home and have no other expenses related to food) is Bs 13.98 (\$US 3.00), of which 95.71% is spent on purchases of products outside CASOL, and the rest (4.29%) is used for CASOL products.

## 2.2 Family income and expenses

Aside from caloric and nutritional importance, vegetable production also has an economic impact on the households of CASOL members. To look at this in some detail, four types of member have been considered according to their work and income levels. The average income level of each household is between Bs 472 per month (\$US 101.50) and Bs 852 per month (\$US 183). The important point here, however, is what percentage of the income of the member households can be attributed to the work of the women in the gardens. Before stating this, however, a few points should be made. First of all, the female members of CASOL are involved in a number of different activities to increase their incomes, most of which are related to the informal economic sector, as part of their survival strategies so as to escape poverty. Second, Income of these women is not only monetary, but also material, although this latter income lies between only 1% and 7% of the total. The total income of these women, then, ranges from \$US 20 to \$US 212, and for their work in the gardens, women's income represents between 2% and 13% of their total income. This does not apply to those women who work full time at CASOL. In that case, their salaries represent 60 % of total income;

A last aspect to be considered in this analysis is that of household expenditures. This study has found the following in this regard:

- The main expense is food, which represents between 52% and 83% of total household expenditures;
- In relation to income, the higher the income, the lower the percentage expense on food and the lower the income, the greater the relative food expenditure;
- The second highest expense item is that of housing, especially due to taxes;
- Those households with less income limit expenditures to the basic ones of food, housing and, and

- On the other hand, higher income households, have a greater number of expense items than the poor. These go beyond the basic survival expenses and include such items as seed, clothing parties etc.

## 2.3 Employment

Each member of CASOL spends one half day of her time (i.e., a 4 hour shift) per week working for the garden farms; this means 16 hours monthly, at an average hourly wage of Bs 0.75. However the impact of this work is not only due to the possible extra income generated but also is a result of the know-how and skills acquired. It is clear, for instance, that during the time spent in the co-operative, members have learned more about nutrition, management, marketing, and, above all, farming, which allows them to practice all these skills at home. Thus they are able to farm for themselves as well, thus improving their own and their families' eating habits, as well as the environment. Their new skills also increase their opportunities to find better jobs.

The relatives of members also benefit from this experience. A number of members carry their children with them to work at the co-operative, and the children help in farming tasks, thus acquiring these skills. Also, members share their knowledge with other relatives.

Thus far, one might conclude that, as far as economic factors are concerned, working in the co-operative's gardens isn't the best of jobs. However, from a viewpoint of skill, knowledge and training acquisition, it is highly beneficial to the female members, both at the personal, as well as the family level.

## 2.4 Participation and development of the women

Women's participation in the various activities related to CASOL, especially at the start, created a number of family misunderstandings, both with husbands and children, who claimed that these activities meant an abandonment of the women's household duties as wives and mothers with no economic retribution matching the effort and time invested. Some family members even claimed that their mothers had to humiliate themselves to sell their products to clients. This problem was later resolved when each member clearly explained and outlined her participation in the co-operative, and became able to contribute the household, both in money and kind.

The personal change in attitude of the women was also important, however. These women have gone through several changes on a personal level, through CASOL and its related activities, and questioning the women on these matters led to the following findings:

- Women have been much more active and participate at a higher level in meetings, seminars and workshops. This means they have somehow overcome their shyness and have lost their fear to speak in public, which is usually a problem, especially in the Andean region;
- More knowledge and information is available to them regarding politics, the social and economic situation, labour related issues and so forth, which evidently gives them a

greater self assurance in their attitudes and proposals . They now have their own criteria and arguments to impose or at least expect to have their opinions heard (especially with their husbands). They are no longer easy to fool;

- A strong feeling of solidarity and friendship has developed among the members (they no longer feel isolated or alone), along with a sense of sharing their products;
- They are more self-assured as women, mothers, wives and housewives. Their own self esteem has grown. They feel the work they do both in and outside their houses is very positive. Thus their feeling of personal gain and awareness has risen because of their newly acquired knowledge and the work they do. Their attitude towards their own lives has changed, and they hope their children can improve their lives;
- The organisation makes them feel strong and assured. It has somehow become the centre of their work and daily living;
- They feel useful being able to contribute to the household income, having more knowledge to pass on to their children and being able to handle their households in a better way. This also means they have more economic and personal independence, which is a great achievement in this social and cultural environment, and
- The project's results have caused them to be looked upon in a 'better way' by their peers and relatives, who now support and encourage them to continue their work. This has also contributed to an improvement in their internal household relationships, which have become more positive and stable.

The last aspect of the development of the women to be analysed is their own ideas on the gardens and the project's work in general. It has become clear that:

- They like their work and the activities which they perform. Consequently, their participation in the various activities developed by CASOL is very high and continuous;
- They feel comfortable as work and peer groups;
- They do not find their work at CASOL to be tiring or excessive;
- They have actually abandoned other activities in order to attend to their commitments to CASOL, and
- Their relationship with CASOL has led to a number of benefits for them. These include a) training and education on various matters (e.g., agriculture, health, organisation, etc.), which is in turn transferred to their children and husbands; b) the chance to find and develop themselves; c) the ability to stand up for their rights, and d) the opportunity to be more generous and less selfish.



### **3. A Brief Appraisal of the Garden Experiment**

The above discussion of the community and vegetable garden project leads to the necessity of summarising briefly the research findings in the form of a short appraisal, listing both its achievements and obstacles. This is done in the following sections.

#### **3.1 Main achievements**

The appraisal begins by first citing the project's achievements. These include:

- The creation of alternative jobs and the improvement in the incomes of low income women in El Alto;
- The development of strong solidarity among members of CASOL;
- The development of reference work groups for various activities;
- The promotion and improvement of women's rights;
- The understanding and adoption of democratic and participatory practices;
- The structuring of a productive organisation with management led solely by the women who are members of the co-operative and with no external influences on them;
- The creation of an organisational and management model which could be replicated in El Alto and elsewhere in Bolivia within other institutions with women members of similar cultural and social characteristics;
- The improvement of the diets of participating households, not only in quantity, but also quality and diversification;
- The fact that women are the participants and members and that they generate extra income for their household budgets;
- The training and education of women in farming techniques, as well as in management and marketing, and
- The development and increase in women's responsibility and the creation of motivation and interest among them to continue in the project.

Consequently, CASOL, through its work and the results obtained, has somehow in an indirect way pressured and obliged other government and non governmental organisations in El Alto to work and support income raising activities for low income people. It has done this while increasing the amount and quality of urban farming produce, and given more attention to environmental issues and an improved use of natural resources. It is a great achievement for this type of productive project to still be existing in El Alto. Over the last 6 to 7 years, this



has been the only surviving experience; the rest have either disappeared or had no success at all. It is also a great achievement for the project to be self supporting. It has not required subsidies, although its performance could be improved through technical support in the productive area.

### **3.2 Main obstacles**

There have, of course, been obstacles along the way. These are described here and can be summarised as follows:

- The project has somehow evolved from the former dispersed activities management schemes, with few labour regulations and ambiguous management targets. The former model was poorly structured and ineffective. There is now a better structured management form which brought with it changes in organisational, technical and management practices;
- The change from an initial situation of high technical and financial dependence on a foreign NGO to one of entirely self supporting management, while allowing the group to take over the project's administration, it has led it to face difficulties in increasing and diversifying production and marketing;
- The relationship of the project with other solidarity groups in areas outside of Villa Tejada in the Don Bosco Parish was not organic. On the contrary, it was weak, and in the process of trying to make their activities complementary, these other groups were plagued by the lack of defined profiles and the technical basis for their existence;
- The project lacked the support of government, the municipal authorities and other NGOs. This made it difficult to create organised and co-ordinated activities (in as far as marketing, the environment, forestation and other activities are concerned), which could benefit the inhabitants of El Alto, and
- The limited material possibilities for expanding this experience and achieve greater productive results, which would in turn mean higher incomes for the COSAL members.

### **3.3 Lessons learned**

The key factors which influenced the project's success are the fact that women related to CASOL have developed their own place where women of similar social, cultural and economic characteristics may come together and find friendship, a haven from their numerous problems, as well as technical education and training, which makes them feel better about themselves and understand their contributions to their households. They now feel useful in life.

Another matter to be considered is the fact the members have actually managed to produce fresh quality, low priced products in the gardens of Villa Tejada, which is very important at this particular moment when cholera is a threat in El Alto. Nevertheless, diversification of products, improved and new technologies, etc. would be of great benefit. However, this requires better outside support, greater inter-institutional co-ordination, a broader base in the exchange of experiences and joint efforts with other, similarly minded organisations.

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