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***URBAN
AGRICULTURE IN
ST PETERSBURG
RUSSIAN FEDERATION***

***CONDUCTED BY THE
URBAN GARDENING CLUB***

April 2000

2000

EUROPEAN HEALTH21 TARGET 11

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HEALTHIER LIVING

By the year 2015, people across society should have adopted healthier patterns of living

(Adopted by the WHO Regional Committee for Europe at its forty-eighth session, Copenhagen, September 1998)

ABSTRACT

Serious ecological problems in the urban environment are common to most big cities around the world. In Russia these problems are aggravated by industrial development and lack of government funding for ecological improvement. Key facts are male life expectancy estimated at 58 in 1997 and existing environmental hazards. In addition to poor environmental conditions, most people in cities suffer from a lack of basic food. In St Petersburg the amount of vegetables per citizen is 5 times lower than in the central districts and 2 times lower in peripheral ones. The St Petersburg Urban Gardening Club aims to make the city more ecological. Being officially registered, the Club can work with the authorities and the mass media. The Club was officially registered in 1992 as a nongovernmental organization and works towards increasing the production of vegetables, particularly for the benefit of vulnerable groups. A special feature of the club is research into roof top gardening techniques in city conditions including residential buildings, schools, hospitals and institutions.

Keywords

AGRICULTURE
FOOD PRODUCTION
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REFUSE DISPOSAL
RUSSIAN FEDERATION

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Urban agriculture in St Petersburg
Russian Federation
Conducted by the
Urban Gardening Club

Past, present and future perspectives

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Russian Federation

April 2000

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1. Background

Serious ecological problems in the urban environment are common to most big cities around the world. In Russia these problems are aggravated by disproportional industrial development (industrial production sites with ancient or disabled purification systems are situated within city borders), lack of government funding for ecological improvement, and disempowerment of people due to long suppression of their social and political activity.

As a result, the pressure created by people living in large Russian cities becomes destructive for the population. Male life expectancy was estimated to be as low as 58 in 1997. Environmental hazards are one of the key factors responsible for this decline.

The health of the population is, to a large degree, defined by conditions of the ecological, sanitary/hygienic and epidemiological situation. The harmful factors in the environment are numerous. However, the influence of these factors on health is complex and still not well researched.



The condition of the environment over the past few years is not the best. The country's serious social and economic situation has aggravated the already poor ecological conditions. Surprisingly, the closure of many industrial plants has not resulted in a significant improvement in pollution levels of the natural environment. More than 60 million Russian citizens live in cities and live in conditions with a constant excess level of harmful substances in the air. Annually more than 30 million tons of pollution from industrial enterprises and about 20 million tons from vehicles (a figure which has almost tripled over the last 3 years) are being released into the environment and the pollution level has already reached the level planned for the year 2010. This results in an average of about 400 kgs of hard particles from air pollution per inhabitant. In 171 Russian cities the concentration of air polluting substances exceeds the concern level (CL), and in 55 cities the CL is exceeded by no less than five times. More than 3 million people, including 600 000 children, live in conditions where there is a dangerous level of air pollution. Especially affected are those cities which have heavy industrial plants

producing colour substances and black metallurgy, chemicals, petrochemicals and others. About 50% of the population drink water which is not of the appropriate hygienic standard.

In addition to poor environmental conditions, most people in cities suffer from a lack of basic food, and their menu is very limited. In St. Petersburg the amount of vegetables per citizen is 5 times lower than in the central districts and 2 times lower in peripheral ones.

General information on the Russian Federation

General statistics on urban and peri-urban agriculture in the Russian Federation are presented in Annex 1.

In an urban area of 405 500 km², 70 000 000 persons were engaged in urban agriculture activities in 1997.

Independent reports carried out in the Russian Federation, between 1926 and 1996, suggest that the urban population grew from 18% to 74%. There are 1330 towns and 124 town agglomerations, each with more than 120 000 citizens (official data from a Ministry of Building report) covering a total area of 405 500 km² (2,6%), and consisting of 2/3 of the industrial potential and 90% scientific potential (A. Lola, B. Menshikova, "Russia - country of unacknowledged urban systems", article, "Ecos-inform" magazine 3-96, page 20).

In 1991, for the first time after World War II, there was an absolute decrease in the urban population by 1 600 000 people - 8% ("Promishlennoye i grazhdanskoye stroitelstvo" journal, 3, 1997).

Table 1: Number of urban settlements in the different size categories

Population thresholds	Number of settlements (1997)
more than 1 million residents	13 cities
500 000-999 999	18 cities
100 000- 499 999	134 cities
50 000-99 999	179 towns
20 000-49 999	370 towns
10 000-19 999	264 towns
5 000-9 999	83 towns
3 000-4 999	20 towns
less than 3 000	6 towns

The historical context of Urban Agriculture (UA)

The history of urban development in the Russian Federation helps to understand the different types of urban agriculture that have developed.

There are different types of towns; the tradition of dachas/weekend houses; the tradition of houses with relatively large plots for backyard gardening; and private plots for collective farm labourers. Historically, the Russian Federation has been a state where most people lived in the rural areas. Because of economic reasons, at the end of the last century, millions of Russians moved to towns in order to seek employment.

There are three types of towns in Russia. From the 15th to the 19th century, **fortress-towns** were created to provide protection against enemy raids (Belgorod, Novi Oskol, Voroneg, Usman, Kozlow, Tambov, Saransk). **Resource-towns** (Ekaterinburg, Monchegorsk, Nickel, Apatiti, Vorkuta, Novokuznetsk, Solvichegodsk, Inta, Mirnii, Neftekamsk) came about because of industrialization in areas rich in mineral resources. **Ancient Russian towns**, as sustainable habitats, meet the ecological and economic needs of their inhabitants (Novgorod, Pskov, Kursk, Bryansk, Smolensk, Staraya Russa, Vyazma).

It is necessary to distinguish between the ancient/fortress towns and the new industrial resource towns. Each type has a different development pattern: in the ancient/fortress towns there is radial growth and a large peri-urban area with small plots and houses (dachas); and in the industrial towns there are large housing blocks "down town" directly surrounded by large-scale commercial farms (former collective and

state farms). Outside the downtown area, there are more unfavourable agriculture areas (covered by swamp or bushy growth), consisting of plots 0.4-0.8 ha, which people obtained in Soviet times.

The Regional Union of Horticulturists stated that up to 2 000 000 people are dacha plot users. Urban agriculture is not just a hobby or a way to relax but a most important socio-economic factor. Around 40-50% of town dwellers supplement the family budget by growing food. Even balconies, roof tops, and basements have become places of horticultural activity.

Some enterprises and private entrepreneurs use basements to grow mushrooms and vegetables and others process and dry fruits and vegetables. Older, larger companies (works, factories, military R&D firms) continue to grow vegetables for their canteens and flowers for use in greenhouses.

At first, dachas in peri-urban areas (plots 0.08-0.12 ha, with cottages) were exclusively state property and were placed at the disposal of the Soviet Union's "high society". Initially this was supposedly for temporary use, but in reality dachas could be owned for life and inherited by the next generation. Dacha inhabitants were Communist Party functionaries and outstanding scientists, artists, actors, etc. Dachas were places for relaxation and agricultural activities near towns and within towns, and represented no more than an exotic hobby.

After the Stalin era, some land in peri-urban areas was made available as dacha plots through the "Community for cooperative building of single storey cottages" (DSK) for ordinary people. This process took place from 1959 to 1962. DSK are blocs of gardening plots (0.08-0.15 ha) with buildings for permanent use. Houses were built by special building companies on the basis of cooperative fees and these houses were regarded as the assets of the dacha-building cooperative union.

After the late 1970s almost all Soviet enterprises and organizations began to ask local authorities for permission to acquire plots for gardening, with single-storey houses on them. Usually the land that was made available were forest sites located 2-3 km from railroads or motorways and 20-100 km from cities. The plot-owners' main objective was to grow fruit, ornamental plants and vegetables for home consumption, while any surplus could be sold to neighbours and any chance purchasers.

From 1986 to 1996 the number of urban gardeners doubled and now the country has some 22 500 000 plots with an average area of 0.06 ha. In the period 1992-1995 the need to cultivate land was guided by the need to survive. In any case, the plots were located mainly in forested areas or on unused land which was very poorly drained, or with substantial slopes, or often severely eroded or threatened by water erosion.

From 1985 to 1990, enterprises helped their staff with loans to spend on their plots of land. Loans of 3000 rubles over a period of 5 years, at a token interest rate (2-3%) were offered during this period by Sberbank. The loans were guaranteed by the enterprises, but then, because of bankruptcy and lack of money, such support disappeared. In 1996 the government bank offered 15 000 000 rubles to gardeners for periods of 2 years at an interest rate of 90%.

In any event, the tax payment for 1 square meter of land has risen each year since 1991, and increases of as much as 1500 times within a four-year period are quoted. Taxes have been levied throughout the country on plot buildings. Taxes on police maintenance are in force in some regions, although gardeners have hired guards on their own account. Gardeners' organizations have to pay all taxes into budget and non-budget funds, although all gardeners' fees are taxed in advance. Often the situation arises when fees (for interior road maintenance, electricity, maintenance of wells) contain tax payments which comprise

more than half of the entire sum. Sometimes gardeners' organizations have to pay land taxes at a high rate because they are located close to a town, and they have to pay into the local fund for regional road maintenance, the local fund for educational development, and social and health care funds.

2. Urban agriculture in St. Petersburg

2.1 Geography and climate

St. Petersburg is located in the north-west region of Russia on the Neva River delta on the banks of the Gulf of Finland. Including the surrounding territories supervised by the city administration, it occupies an area of 1,439 square kilometers. The city occupies 44 islands formed by the Neva River. St. Petersburg is the largest city in the world to be located on such a northern latitude.

The climate is approximately the same as Anchorage, Alaska, USA. There is an average of only about 60 sunny days a year. The vegetation period is about 4 months (mid-May to mid-September). It is possible to grow leafy greens, potatoes, tomatoes, etc; however corn, buckwheat and water melons cannot be grown. The growing season can be extended for about one month using plastic and greenhouses.

2.2 Population of St. Petersburg

As of January 1 1999, the population was 4.73 million inhabitants (approximately 3% of the total population of Russia). The birth rate is 6.6 births per 1,000 inhabitants; the death rate 13.7 per 1,000 inhabitants. There are 2.8 million inhabitants of working age and approximately 1.3 million registered pensioners. According to official data, there was 1.6% unemployment on 1 January 1999 with 40,600 officially registered unemployed, compared with 89,900 in 1998.

2.3 St. Petersburg Urban Gardening Club (UGC)

The Urban Garden Club has developed from Agricultural Initiatives of the Center for Citizen Initiatives USA-Russia (CCI), a non-profit foundation.

A group of enthusiasts decided to establish the St. Petersburg Urban Gardening Club to make the city more natural and ecological. In addition, being officially registered meant that the Club could work with the authorities and the mass media. The Club was officially registered in 1992 as an NGO, a non-profit public organization.

The idea started in 1991 after a visit by Martin Price from the American Evangelic Organization, "Echo". He suggested the idea of gardening on apartment building roof tops. He managed to motivate several enthusiasts and the concept was supported by the Center of Citizen Initiatives USA-Russia. ("Echo" suggested several non-standard agricultural technical methods, mostly for roof top gardening, and the Club adapted and developed them. «Echo» develops and introduces non-standard methods in regions where, for whatever reasons, regular agriculture is impossible).

2.4 Goals of the Club

- To increase the production of vegetables and greens, especially for vulnerable groups;
- To develop urban agriculture as an integral part of the urban productive system.
- To investigate roof top gardening techniques in city conditions;
- To conduct ecological education among citizens, schools, hospitals and institutions;

- To take part in ecological improvement of the environment;
- To influence urban planning of apartment buildings in favour of urban agriculture.
- To disseminate “know-how” to city gardeners;
- To work with the city administration and the mass media.

Other reasons for choosing roof top gardening as an important component of urban agriculture are:

- to produce healthy food
- to increase access to private outdoor green space - at home or at work - within the urban environment
- to support urban food production
- to promote individual, community, and cultural diversity
- to improve air quality and reduce CO₂ emissions
- to delay stormwater runoff;
- to increase the amount of friendly habitats for birds
- to insulate buildings
- to increase the value of buildings for owners and tenants alike
- to create job opportunities in the field of research, design, and construction
- landscaping/gardening.

It is important to note that in the city it costs a lot to lease land. In contrast, the roof tops are always available and free from vandalism.

The Russian people have experienced shortages of basic food stuffs and many hardships over the past decade. Roof top gardening is considered to be an important part of urban agriculture and a novel way of producing greens and vegetables for urban people, especially for those who have no access to land or dachas (a dacha is a plot of land outside the city). Roof top gardens make it possible for people to garden even in downtown city areas.

The potential for roof top gardening in St. Petersburg is huge. The Urban Gardening Club has done research, conducted tests and now has excellent information for interested Russian city farmers. For example, in just one district (St. Petersburg has 12) it is possible to grow 2000 tons of vegetables per season from 500 roof tops. In addition, if there are large areas of unused flat land in the middle of cities, the potential value for producing vegetables is increased even more.

2.5 Social-political aspects of urban gardening:

Other aims include:

- to disseminate information about the roof top gardening experience through the mass media
- to create a reference manual with information, materials and team building techniques
- to develop simple training that can be easily used by people in cities anywhere in Russia
- to develop local political support.

In order to show that this model is feasible and replicable, information is presented to the city administration as an example of urban gardening and is publicized through the mass media.

2.6 Social/human:

Other aims include:

- empowerment of residents
- re-education about cooperative care for commonly owned or shared property
- identification of community leaders
- formation of action groups
- training to develop volunteers
- sharing of resources and skills
- resource saving behaviour, entrepreneurship and self-governance
- general improvement in the quality of life.

2.7 Local economy:

Other aims include:

- creation of conditions for developing small businesses
- creation of working places within the community house
- creation of “LETS” (Local Exchange and Trading Schemes) type system of work exchange
- support for individual initiatives
- developing know-how on how to use available municipal resources and how to get administrative support.

3. How the project evolved

The Urban Gardening program in St. Petersburg started from two roof tops, one at the project institute «Lengiprovodchoz» which was used as a demonstration garden to show people that it is really possible to grow food under these conditions. The second roof top garden was organized on a big apartment building with 540 residents.

A retired pensioner, Ms Alla Sokol, the former chief engineer of a flower company, was the first enthusiast to take on the responsibility of starting a new roof top garden in her house. She decided to supply those who did not have access to dacha plots with fresh vegetables and greens. They could buy her produce at very moderate prices.

The first experiments in both roof top gardens proved to be successful. All the goals were carried out:



Alla Sokol and Mary Appelhof on Rooftop Garden, St. Petersburg, 20 May 1999

1. Mary Cochram, a volunteer from ECHO (Educational Concerns for Hunger Organization, based in the USA), assisted the program to introduce new gardening methods on the roof tops.
2. This proved that is possible to grow food on the roof tops.
3. A lot of enthusiasts started to be interested.
4. We had good media coverage throughout the growing season (TV, radio, newspaper articles).
5. The soil and vegetables from roof top gardens and experimental ground level gardens were tested for heavy metals. The results of the tests were very encouraging.

The vegetables tested for heavy metals from the roof top gardens had lower levels of metal contaminants than vegetables bought and tested from the city markets . The ground level gardens had slightly higher levels of contamination than in roof top produce but still less than vegetables from the market. The “cleanest” vegetables were those grown on the roof top of the project institute. The amount of heavy metals was twice as low as the limit (the concern level, CL). The vegetables grown at ground level in the backyard of the project institute had the second lowest concentration of heavy metals. The level of lead was close to the CL. The vegetables grown in a dacha near St. Petersburg 30 kilometers away had levels of copper and lead which were more than two to three times the CL. Seriously contaminated vegetables were bought at the city market. They had levels of copper and lead 5-6 times greater than the CL. Therefore, the Urban Gardening Club is convinced that it is possible to grow vegetables in cities and that they are safe to eat.

4. Roof Top Gardening

The Roof Top Gardening Club was based on the following criteria:

- The roof top gardens must be made from local materials, not from something imported into the country.
- They must be inexpensive to construct, preferably using recycled materials costing very little.
- They must have a very low weight per area of growing space (unless located on the ground).
- The emphasis should be on obtaining satisfactory production with minimum input, rather than maximum possible production with high input.

4.1. The stages of development

Year	Goals
1993	First experimental rooftop gardens (RTGs) Check the opportunity to grow vegetables and flowers Experimental ground level garden Test vegetables for heavy metals and contamination
1994	Test gardening techniques in RTGs Propagation of the idea of RTG; attracting RTG enthusiasts
1995	Continue testing RTG gardening techniques, experiment with different soil mixes Involve more participants RTG and ground level gardens in city prison «Kresty» Develop a model ecological apartment building (EcoHouse)
1996	The profitability of RTGs RTGs for invalids, schools and orphanages Exhibition “City and flowers”

1997	RTG for invalids at prosthesis institute - development of rehabilitation program RTG in school, ecological model of apartment building Recycling Greenhouse on the RTG
1998	Work in a new direction - horticultural therapy for invalids Support existing RTGs Help in organization of new gardens and RTGs Increase public awareness about urban agriculture and disseminate the RTG experience
1999	Increase vegetable and greens production, especially for vulnerable groups Start mini worm farm in basement of apartment building Start to grow chicory salad - witloof in basement Separation of garbage and processing through composting Creation of conditions for small business development Develop urban agriculture into an integral part of urban productive system Summarize experience of RTG techniques in city conditions Conduct ecological education among citizens, schools, hospitals and institutions Take part in ecological improvement of environment Impact on urban planning of apartment buildings with a view to urban agriculture Disseminate "know-how" to city gardeners Disseminate information about the Sustainable Community Apartment model Work with city administration and the mass media

4.2 Basic technical and economic parameters of Roof Top Gardening

See Annex 2.

4.3 Crop rotation and yield

See Annex 3.

4.4 Soilmix preparation

The basic components for an ideal compost for RTG and ground level gardens are peat, gardening soil, and, if available, manure and liquid manure. To prepare the soil it was necessary to remove a layer of 10-15 cm and stack it, while simultaneously layering it with manure (10-20 % of volume) and mineral fertilizers. To accelerate decomposition, it was aerated 1-2 times. Soil was used in a mixture with peat of average degree of decomposition. For good results, 20-25kg sawdust were added to 1m³ of mix. To 1m³ of soilmix were added: 350gr of ammoniac saltpeter; 400gr double Superphosphate; 400gr of potassium and microfertilizer. The acidity of the soilmix was about ph6-7; to regulate acidity, lime and perlite flour were used, approximately 1.5-2.5kg on 1m³ of soilmix.

4.5 Fertilizing vegetables on the roof tops

Green and spicy plants, together with basic vegetables, serve as a source of vitamin intake (anti-oxidants, vitamins and minerals). Many have medical properties. The productivity of green cultures is considerably increased if organic and mineral fertilizers are used. When choosing a fertilizer, we took into consideration the fact that when leafy vegetables are grown above the ground, there is a risk of accumulation of nitrates

and nitrites in the plants. In particular, the great influence which nitrites have on green cultures make the timing of the last treatment of nitric fertilizer specially important.

5. Growing chicory salad - witloof

In 1999 the Urban Gardening Club began the “witloof” program, which is designed to supply residents of apartment houses with vitamins from greens during the winter time.

Taking into account the fact that many suffer from illnesses caused by deterioration in environmental conditions, it is necessary to pay special attention to improving the nutrition of the general public and to expanding the assortment of foodstuffs. According to WHO, many diseases are caused by low consumption of vegetables and fruit. If the daily diet of an adult contains less than 0,5 kg of vegetables and fruit, then the individual is at risk of developing many diet-related diseases. Especially important in a diet is a large variety of vegetables, which means overcoming seasonality where possible. The Club, together with the Vavilov Institute for Horticulture, has found a salad, witloof, which has proved to be a valuable crop for cultivation in the winter when people do not get enough fresh vegetables. It grows in the form of green heads sprouting from roots from autumn to spring, including the months of December, January and February, when the local diet is very poor and greens on the market are very expensive. The food value of witloof is difficult to overestimate. It has a pleasant, fresh taste and is rich in nutrients. In addition, it does not require much growing space and is very easy to sprout.

Witloof is a nourishing vegetable, suitable for use in a medical diet. The heads contain many vitamins and are especially recommended. By selecting different varieties, it is possible to have a continuous production of witloof from October to May. The different varieties of witloof can be sprouted in the dark in cool places at home. Witloof roots are harvested from the end of September. It is best to harvest it in October, before the frosts. It can be stored at a temperature of 0 to +5⁰C.



Depending on the variety, it is possible to begin sprouting 3 to 4 weeks after harvest and until spring. Witloof must be sprouted during the winter months (December, January, February). In some apartment buildings, witloof is now being sprouted in the basement where the temperature is about 15⁰ C and roots have been distributed among the residents and sprouted by their families. The ideal temperatures for the sprouting of witloof are lower than 15⁰C; the quality of witloof production decreases at temperatures

higher than 15⁰C. Therefore, witloof can be sprouted within the temperature range of 10-12⁰C up to 18⁰C.

The sprouting is carried out in complete darkness in black plastic boxes or black packages. Roots are placed close to each other and are covered with a layer of wet saw dust, pit moss or dirt. The average sprouting takes about 20 to 28 days (3 to 4 weeks). It is not necessary to add fertilizer because the roots

have sufficient nutrients for the green heads. This makes it possible to grow the roots organically on the field. So the final production of green heads can be considered as organically grown.

With the assistance of the Vavilov Institute, this experiment started in summer 1998, where about 100 kg of witloof roots were harvested. They also provided us with the opportunity to keep the roots in storage at the Institute. At the end of January, a portion of witloof -1/4 - 25 kg was sprouted and harvested. In the middle of January the heads reached half size, approximately 40 grams each.

6. Vermicomposting

Closely linked with the Roof Top Gardening program is a project involving the vermicomposting of food waste produced in the kitchens of residents of a 9-storey cooperative apartment building located in St. Petersburg.

The goals of this project are:

- to set up systems which benefit the environment
- to be an important component of RTG program through the recycling of kitchen waste and used soilmix from the roof top
- to attempt to achieve sustainability.

The red worms (*Eisenia fetida*) used are known as red California worms. A mini farm was organized in the basement of an apartment building.

The process, known as vermicomposting, consists of adding food waste (primarily vegetable and fruit waste) to an aerated container housing a colony of red worms living in a moist environment. Shredded paper, regularly discarded from apartment complexes, can also be added. The decomposers of this food waste include bacteria, fungi, protozoa, and other organisms. When the process is carried out in the presence of oxygen, there is surprisingly little odor. The red worms eat not only the food waste, but also the bacteria, fungi, and protozoa, and excrete quantities of manure, known more commonly as biohumus or vermicompost. Harvested as a dark material which smells like moist earth, biohumus is full of nutrients and soil micro-organisms which support plant growth. Under proper environmental conditions of temperature, moisture, ventilation, pH, and avoidance of harmful materials such as excess salt or ammonia, the worms and their associated organisms eat the food waste, break it down, and turn it into something useful.

Vermicomposting meets a number of objectives. Because vermicomposting requires the handling and processing of food waste from many households, it will be necessary to obtain the cooperation and permission of various administrative departments in the Moscovsky District, the City of St. Petersburg, and other governmental agencies. Presentation of the project to the relevant agencies and development of administrative support takes time, patience, persistence, and a great deal of fortitude.

There is an opportunity for the creation of a small business with two or three employees. At present 200kg of kitchen waste is processed per month. In the near future it will be possible to process from 1 to 1,5 tons of kitchen waste per month, which will require about 100m² of basement space .

6.1 The cost vermicomposting

It can be seen that the vermicomposting mainframe could become a profitable business, becoming self-sufficient very quickly. Thanks to the extremely valuable advice of Mary Appelhoff, a specialist in worm production from Kalamazoo, USA, who visited us in May 1999, we were able to avoid many mistakes. For full break-down of costs see Annex 4.

7. Horticultural Therapy project

Within the framework of rehabilitation and job placement, the purpose of the horticultural therapy project is to use horticultural therapy methods to teach new skills to people possessing a reduced ability to work. The aim of the project is to transform the courtyard of the Prosthesis Institute into a therapy garden, especially equipped with working places for horticultural therapy, where training of handicapped could take place.

The therapy garden provides new opportunities for people who have undergone limb amputations, as well as for those missing limbs since childhood. The garden creates an atmosphere of transition from despair to



hope. It helps to promote a peaceful dialogue with nature and provides opportunities for the handicapped to work in a garden, specially created for them.

The garden is very productive: flowers and herbs are grown and in winter these provide the raw materials for flower arrangement classes. The garden is a place for work and therapy and a place for training horticultural skills.

A total of 400 clients per year can be trained in this garden. Initially 200 square metres of garden

was built as a model in the Institute's backyard. Paving slabs for paths were laid and training areas, including special lawns, a watering system, and raised beds, were created.

Work carried out in 1999

The most convenient plot of land was chosen, close to the main buildings and favourably situated for optimum sun exposure. It includes a path (1,2 m. wide, 20m long) which starts at the entrance and ends up on an area measuring 10 by 12 metres. On one side there is a raised bed to be used for recreational purposes. The bed is easily accessible from a wheel chair, since they are both the same height. The edge of the raised bed is made from used tyres. Part of the surface of the bed is planted with lawn grasses. Removable plastic containers with vegetables, herbs and flowers are placed around the grass. Ten working tables are used by the clients and are easy to remove. The plastic containers can easily be put onto the tables for manual work such as replanting seedlings. A teaching schedule and a description of the rehabilitation program is being developed by the rehabilitation department.

8. The gardens in the city prison



In 1995, the city prison «Kresty», which has 10 000 prisoners, expressed an interest in gardening. This overcrowded prison created roof top (and ground-level) gardens to feed the inmates and to provide a creative outlet for their energy. There is a lot of unused land inside the prison territory. The plots of land for this experiment are located along the impregnable, barb-wired prison walls. However, the main vegetable garden was laid out on the roof of the prison garage.

On the whole, three harvests of vegetables are collected in «Kresty» and this success cannot only be attributed to good weather. According to roof-garden enthusiasts, the vegetable gardens of «Kresty» prison will yield rich harvests every year. The lack of wind and warm microclimate of the unique architectural complex of «Kresty» prison, built in the 19th century, contribute to the fast growth of vegetables.

The roof top (and ground-level) gardens in the city prison «Kresty» had good crops of greens that were sufficient not only for use in the summer season, but also for drying for winter storage. The garden is fully supported by the prison

administration and is used not only for harvesting vegetables, but also for educational purposes, and the probability of prison riots may also be reduced.

The administration of the prison is very satisfied. The vegetable garden also provides additional greens for the table at a time when the prison is facing serious financial problems. Mr A. I. Zhitenev, deputy director of «Kresty», commented, "Our problems are well-known. We are open to any kind of assistance. The roof vegetable garden will be enlarged." According to Mr V.A. Koroiev, who is President of the public foundation «Kresty», the vegetable garden that was made in the prison with the assistance of the Urban Gardening Club is just the first of such experiments. This experience will be used in organizing larger vegetable gardens in other prisons and camps. As a result, convicts will be able to acquire farming skills. The public foundation «Kresty» intends to establish contacts with international charity foundations, who perhaps will be able to supply Russian prisons not only with seeds, but also with agricultural equipment and machinery.

According to A.Ya. Sokol, the President of the Urban Gardening Club, this initiative is an opportunity for people to be personally responsible for their own lives, rather than hoping that someone else will assist them. The Urban Gardening Club has also received a request from a prison located in Vyborg, a city north-west of St. Petersburg, and has sent them basic instructions and know-how. Another request has been received from a women's prison near St. Petersburg, which indicates a growing interest among prisons in the program.

9. The Kolpino boys' prison

Kolpino is a cluster city of St. Petersburg located about 35 km to the south. Kolpino prison houses boys from 10 to 18 with various criminal violations. If a boy has been sentenced for a longer period, he is later transferred to the «Kresty» prison for adults.

The first garden was started on a ground level plot of land inside an old ruined greenhouse with an area of



200 square metres. All debris were removed and new soil was delivered. Because this area is not fenced, the boys allowed to work there were chosen from those just about to be released, in order to reduce the risk of escape. The initial conditions were the same as those at the school described above – a cold spring and a hot summer, with little rain. It was decided to plant some root vegetables also, and some radishes. The crop of greens was good. The greens – mostly dill - were harvested four times per year. The water supply for irrigation was provided by a hose about 100 metres long. A raised bed system was used, which is good for roots, drainage and for sun exposure. The boys competed for the right to work in the garden, which became a privilege and a reward.

The prison administration received the idea of gardening with enthusiasm, hoping that it would help to restore two old ruined greenhouses. A business plan, which provided the necessary know-how to seek and obtain financial support was devised.

Based on this experience, and having obtained an understanding and feeling for gardening in the prison, the administration intends to develop a special plan to provide the boys with skills and also to provide supplementary nutritious food for the boys to eat. The prison administration is reporting about the experiment to the city administration responsible for prisons and has submitted plans in order to obtain support.

10. Secondary school No 42

A roof top garden was started in school no. 42 for producing vegetables and greens, for the purpose of teaching the children (mainly 5th grade); for example, to teach them biology by showing how plants grow. The school roof top garden is an experimental plot for biology classes. The teachers were not well acquainted with gardening and were not sure that this experiment would be successful.

Spring 1998 was very cold, with minus 1-5⁰C at the end of May. They only managed to plant the first seeds in the middle of June, with pupils from the 10th class. They prepared the soil mix, added fertilizers, and so on. They planted dill, parsley, peppers, tomatoes and annual flowers, and did not have high hopes for a good harvest. Planting was only completed on 20 June, much later than usual. The summer turned out to be very hot and dry. Watering was carried out by using hoses and plastic buckets. Despite the late planting, the teachers were surprised to see a good green carpet in July. The first plant harvested was dill and it was of very good quality. During the summer these greens were harvested 4 times and each harvest was very prolific. The extra dill was sold in the local market. Celery was planted at the end of June, and it gave a

good crop right up to the first frost in October. The salad was also good. The tomatoes and peppers were ready at the end of July. The flowers blossomed well and transformed the school roof into a beautiful oasis. With the help of the children, some of flowers have been replanted from the roof to the ground level plot in front of the school.

After having such a successful experience, the teachers became very optimistic and they decided to continue roof top gardening the following year, growing seedlings and annual flowers. They collected flower seeds from the rooftop garden and will plant them not only on the roof, but around the school. This work will attract many children for summer planting. Moreover, the biology teachers are now planning to develop special classes in biology. The results of the school rooftop gardening experience have been reported to the city education committee and have met with enthusiasm. It is hoped that the experience will be copied by other schools.

11. Media coverage and feedback from the general public

As a result of Urban Gardening Club (UGC) activity, TV channels 5 and 36 of St. Petersburg, Moscow TV channel NTV; the newspapers "Smena" and "Novosti Sankt-Peterburga;" the Moscow newspaper "Komsomolskaya pravda", « Ecochronicle » and others, have publicized the experience of gardening on the roofs of St. Petersburg (Annex 5). As a result of these articles and programs, the number of people participating in urban gardening has increased but it is impossible to estimate the increase in the number of roof top gardeners. At an exhibition, where 1500 people visited the UGC booth, the following comments were made by visitors, both verbally and in writing:

Gardener-pensioner T.G. Soboleva: "Perfect idea and direction in our overcrowded city. The huge area of roofs of houses and industrial constructions is wasted."

Engineer L. A. Pavlova: "I would like everyone to realize that it is necessary to invest in gardening, greening, parks, flowers. It's painful to see children going for a walk on bare asphalt."

Pensioner I.R. Kulikova: "Without fail I will make use of your advice. At my house there is a flat roof and it is not being used."

Ilya Ryabinin: "I am a school boy in the 7th grade. I visited the roof top garden. This garden is an example of persistence and self-reliance of enthusiasts of this business. I think that a lot of inhabitants in St. Petersburg will be interested in this activity."

O.I. Lichtina, pensioner: "I will join the program "Roof Top Gardening" with pleasure. I have been thinking about this idea for a long time, but I did not know how to go about it."

Working pensioner F.G. Pavlenko: "It is a pity that you do not have a large following, due to lack of information and absence of advertising. If information about your success was available to a wide circle of the inhabitants of St. Petersburg, all the roofs of our city would be green with gardens".

12. Obstacles:

- Resistance from the municipal authorities. Difficulties ("red tape") in certification process. It is very difficult to obtain permission from the authorities to use a roof as a garden.
- Resistance to new ideas, especially from older, more conservative residents.

- Facilities - it is necessary to have strong and leak-proof roofing.
- Cost - the proper cheap soil mix and materials are not always available. The main principle of roof top gardening is that these soils should be cheap and lightweight. In a store in Russia at present two pounds of soil mix cost as much as one pound of bread. The price for one container is the same as 2.5 pounds of bread. The Urban Gardening Club is looking for cheap and practical methods. A waste treatment plant agreed to provide free compost (only transportation costs have to be covered); and discarded tyres are used for containers.

13. Urban Gardening Club Publications

The Urban Gardening Club published a book entitled "Roof Top Gardens". More than 800 copies have been distributed and sold to administrators, health departments, architects, and heads of industry. A press conference has been organized to focus attention on city farming. In the book the idea of blocks of apartments collaborating and jointly recycling their kitchen waste using red worms is described.

Twelve different flyers, entitled «The healing garden» which give people a basic knowledge about gardening in a city plus the necessary “know-how” have been issued.

14. Other projects in which the Urban Gardening Club participates:

- St. Petersburg Sustainable Community Development Project (1999-2000)
- EcoHouse: (Web info: <http://www.cityfarmer.org>)
- SWAPUA project (conducted by ETC Netherlands) (1999-2000)

15. The Future

- Increase in food supplies, fresh vegetables and herbs for residents, especially for pensioners and those on low incomes, in order to support health.
- Creation and testing of a sustainable community development model replicable for apartment blocks in Russian cities.
- Improvement of local environmental conditions: increase in the vegetation area per capita resulting in improvement of air quality.
- Reduction of the amount of solid waste.
- Resource saving through recycling of glass, paper, aluminum and organic waste.
- Reduction of food garbage with simultaneous reduction of transportation costs.
- Energy and water saving.
- Growth of number of socially active people.
- Improve social cohesion by creating more personal links between residents.
- Creation of 3-6 jobs per apartment block.
- Development of a favourable environment for small businesses.

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<http://www.wormwoman.com/vermillennium.html>

Annex 1: Urban and peri-urban agriculture in Russia

General data (State Statistics Committee Yearbook, official edition, 1997)

Total country area	17 075 400 km ²
Urban area	68 301 km ² (0.4%)
Dwelling area	6 800 km ² (0.1 %)
Industrial and storage zones of urban area	61 501 km ² (0.3 %)
Number of inhabitants	
Total population-	147 502 000
Labor- activity age persons	84 337 000
Pensioners	30 500 000 (20,67%)
Busy in all-economical activity (1995)	66 441 000 (45,4%)
Busy in conventional agricultural activities	9 744 000 (14.7%)
Land possessor on various legal bases (Presidential Decree N 337 / 7.03.96)	40 000 000
Rural population	39 709 000, (26%)
Land share owners on 11.10.98(Presidential Decree N 337 / 7.03.96)	11 800 000
Individual farm owners- (farmers)	274 000
Rural individual subsidiary backyard gardens	16 000 000
Quantity of sadovodstvo and dacha plots	22 500 000
Urban population	108 100 000, (74 %)

Land under agricultural use, total in millions of hectares	Large commercial farmland	Farmers' land (including reindeer pastures and farmers' forests)	Individual subsidiary farmland, total in millions of hectares	Individual subsidiary farmland in rural areas and peri-urban areas with permanent residence	Individual subsidiary farmland in rural areas and peri-urban areas with summer cottages (dacha gardening/ (sadovodstvo /ogorod)).
1	2	3	4	5	6
707.4	560.0	34.2	10.7	5.8	1.8
Production from different types of economy in %	Large commercial farms	Farmers	Individual subsidiary farms		
100	52	2	46		

NOTE. The Statistics Committee does not distinguish between land data related to individual subsidiary farms and rural area data and urban or peri-urban area data. They are combined in columns 5 and 6:

Annex 2: Basic technical and economic parameters of roof top gardening

Parameters	Unit of measure	Open air	Under plastic
Total occupied area including vegetables:	m²	300	300
Radishes		100	80
Salad		80	60
Dill		40	30
Fennel		30	20
Green onion		50	50
Tomatoes			30
Cucumbers			30
Productivity of vegetables:	kg/m²		
Radishes		1.2	2.0
Salad		1.5	2.5
Dill		0.8	1.7
Fennel		1.8	3.0
Green onion		12.0	15.0
Tomatoes		-	15.0
Cucumbers		-	20.0
Output of total production (in view of crop rotation)	Kg		
Radishes		240	640
Salad		240	600
Dill		64	153
Fennel		162	360
Green onion		600	750
Tomatoes		-	450
Cucumbers		-	600
Requirement of seed	Gram/metre²		
Radishes		5.5-6.0	4.0-5.0
Salad		2.0-2.5	1.5-2.0
Dill		25-30	20-30
Fennel		4.0-5.0	3.0-4.0
Green onion	g/m ²	10.0	10.0
Cucumbers	g/m ²	-	0.5
Tomatoes (seedlings)	Pieces/m ²	-	4-5
Requirement of soilmix, total	m³/m²	0.35	0.35
Requirement for fertilizers and microfertilizers	gm²		
Ammoniac saltpeter		30	40
Superphosphate idle		60	70
Potassium		40	50
Microfertilizers		1.0	1.5-2.0
Number of the workers		2	3
Expenses for production, in total	Thousand rubles	28.8	45.2
Including seed and seedlings	Ruble/m ²	5.5	4.5
Fertilizers		3.0	3.3
Wages		40	60
The transport charges		20	40
Miscellaneous costs (amortization, operating repair, energy, water. etc.)		27.5	43.0
Total		96	150.8
Total cost of production	Thousand rubles	70,0	247.7
Per square metre	Rubles/m²	232	826
Capital investments for growing			
Total	Thousand rubles	62.1	99.6
Per square metre	Ruble/m ²	207	332
Soilmix	Ruble/m ²	128	128
Building materials	Ruble/m ²	62	187
Agreements	Ruble/m ²	17	17
Expected result. Total	Thousand rubles	41.2	202.5
Per square metre	Ruble/m ²	137	677
Terms of repayment	Years	1.5-2.0	0.5

Annex 3: Crop rotation and yield

Name of vegetables	Terms of cultivation		Area m ²		Yield from kg/m ²		Volume of yield, kg	
	Open	Under plastic	Open	Under plastic	Open	Under plastic	Open	Under plastic
1	2	3	4	5	6	7	8	9
1st crop rotation								
Radishes	20.04-25.05	1.04-5.05	100	80	1,2	2,0	120	160
Salad	20,04-10,06	1.04-10.05	80	60	1,5	2,5	120	150
Dill	20.04-10.06	1.04-20.05	40	30	0,8	1,7	32	51
Fennel	20.04-15.06	5.04-20.05	30	20	1,8	3,0	54	60
Green onion	10.05-10.06	1.05-1.06	50	50	12.0	15.0	600	750
Tomatoes	-	10.05-1.0.9	-	30	-	15.0	-	450
Cucumbers	-	10.05-1.0.9	-	30	-	20.0	-	600
Sub total:							926	2221
2nd crop rotation								
Radishes	25.05-25.06	6.05-16.06	100	80	1.2	2.0	120	160
Salad	12.06-15.07	6.05-10.06	80	60	1.5	2.5	120	150
Dill	12.06-15.07	15.05-16.06	40	30	0.8	1.7	32	51
Fennel	16.06-11.07	21.05-22.06	30	20	1.8	3.0	54	60
Sub total:							326	421
3rd crop rotation								
Radishes	-	21.06-25.07	-	80	-	2.0	-	160
Salad	-	12.06-15.07	-	60	-	2.5	-	150
Dill	-	17.06-18.07	-	30	-	1.7	-	51
Fennel	-	23.06-24.07	30	20	1.8	3.0	54	60
Sub total:							54	421
4th crop rotation								
Radishes	-	26.07-27.08	-	80	-	2.0	-	160
Salad	-	16.07-19.08	-	60	-	2.5	-	150
Fennel	-	25.07-27.08	-	20	-	3.0	-	60
Sub total:								370
5th crop rotation								
Fennel	-	20.08-30.09	-	20	-	3,0	-	60
6-é crop rotation								
Fennel	-	22.08-1.10	-	20	-	3,0	-	60
Sub total:							-	120
Total:							1306	3553

Seed requirements

Vegetables	Area, m ²		is required gr/m ²		Is required total, gr*	
	Open	Plastic	Open	Plastic	Open	Plastic
Radishes	100	80	5.5	4.5	550	360
Salad	80	60	2.2	1.8	176	108
Dill	40	30	4.5	3.5	180	105
Fennel	30	20	2.8	2.5	84	50
Onion bulbs(kg)	50	50	10	10	500	500
Cucumbers	-.	30	-	0.5	-	15
Tomatoes (ps.)	—	30	—	5	—	50

Requirements – materials

Name	Unit of measure	Amount
Soilmix	m ³	55
Board 40 mm	m ² /m ³	175/7
Board 45 mm	m ²	1.5
Plastic	m ²	250
Nails	kg	30

Annex 4: Breakdown of costs needed to start Vermicomposting

Indices	Unit measure	Amount	
Total basement space for w/compost	m2	90	now
Capital investments	rubles	44309	
Current expenses	rub/month	1350	
Compost outlet	kg/year	1560	
Pure profit from compost	rubles	11700	
Profitability		0,7	
Total basement space for w/compost	m2	225	future
Capital investments	rubles	110925	
Current expenses	rub/month	40500	
Compost outlet	kg/year	42000	
Pure profit from compost	rubles	23668	
Profitability		0,7	

Annex 5: Newspaper article on roof top gardening

What Good Is a Roof, If There's Nothing Growing On It?

Many city residents commute to their garden plots on trains and buses. But for the residents of #9 Pulkovskaya street, all they need to do is get into an elevator to go to their garden. The neighbors all get together and agree on joint "field" work days. I get into the elevator together with the chairwoman of the Urban Gardening Club, Alia Yakovlevna Sokol. "Right now we'll drop in on the Petrovs to get some buckets, and then - up to the roof. They've waited for us long enough." The Petrovs get into the lift with their buckets. They promise to arrive in an hour or so, after they finish washing their windows. But on the roof, work is already in full swing. In the shallow beds they're planting radishes, lettuce, onions, cucumbers, tomatoes, cabbage, peas, beets, beans and flowers. Everyone is participating in the planting - both children and adults.

A Scarecrow on the Roof

Alia Yakovlevna tells me about how her roof was "won." Getting permission to use the roof for a garden was not simple. But it seems that Alia Yakovlevna does not carry the family name Sokol in vain ["sokol" is the Russian word for "hawk"]. She managed to get hold of the city administration. She calculated the load on the roof and proved that with the use of light soil, there's no danger of the roof falling in. In addition to this, Alia Yakovlevna had to clean up the roof, clear out all the gutters (the building no longer accumulates icicles in the winter), and clear out the attic. She even succeeded in fending the birds off the plants - with the help of scarecrows.

"That sunny spring day," she recalls, "when a huge truck unloaded bags of soil in our courtyard - we still remember it as a holiday. However, getting the bags of soil up to the roof was no easy task, especially when we had to stoop to haul them through the [low-ceiling] attic. From all the volunteers who live in the building, we formed a gardening group. In the first year on our one-hundredth of a hectare we grew 27 kilograms of radishes, 15 kilograms of onions, and 9 kilograms of parsley. We fed all our neighbors. And the air became cleaner. The residents of the upper floors said they noticed this immediately."

Gardening - An "Infectious" Disease

Roof top gardening in Russia is taking its first steps. But in America the total area of such gardens is almost 900 thousand hectares. One time the city authorities of Salt Lake City decided to place a tax on these "gardens in the sky." But as soon as this decision was published in the newspapers, the Mayor found himself surrounded by angry gardeners. The demonstrations continued for two days. The authorities gave up and the tax was not introduced. The conflict ended with the installation of a garden on the roof of City Hall.

In St. Petersburg such gardens already exist at the Carburettor Factory and the "Rubin" shipbuilding enterprise. The "Kresty" detention center also wanted to set up a "field" on their roof. The Urban Gardening Club helped the prisoners build a roof top garden and also raised bed gardens in the courtyard. We're sitting in Alia Yakovlevna's apartment. On the table - a jar full of pickles, containing cucumbers which were grown on that very same roof where we've just been. "Most of the troubles were with the soil," Alia says. "It has to be light and inexpensive. The best for this is compost. In the basement we have a big box with worms, into which we toss our food wastes. The worms process the wastes, and we get excellent soil."

With one of her neighbors a curious thing occurred. He - a respectable, well-off man -was noticed doing a strange thing: pulling banana skins out of trash cans at the produce market. It turned out that he was collecting materials to be "processed" by the worms. The main thing, Alia Yakovlevna considers, is a successful start. In their building there are 287 apartments, and 540 residents. The entire roof has 1700 square meters of space, and they've only planted about 200 square meters of that. But if this keeps going as well as it has been, soon they'll have the whole roof green!!

By Rodion Chepalov, Published 6/17/98 in newspaper, St. Petersburg News

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