A Greenhouse Garden Project in the Former Soviet Union: Goals, History and Guidelines  
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Goals: 1) To encourage churches and Christian ministries in the former Soviet Union to undertake greenhouse cultivation as a means of decreasing dependence upon non-sustainable outside funding;  
2) To provide training and fresh, quality produce for older orphans, recovering alcoholics, and low-income families

Project History

I have been involved in international missions primarily in three ways. First, since 1993, I have served as editor of the East-West Church and Ministry Report, a 16-page quarterly newsletter focused on church life and ministry in the former Soviet Union and Central and Eastern Europe. As a professor of modern European and Russian history teaching at Christian colleges and universities, a good deal of my research and writing for the EWC&M Report (and for other publications) has centered on ministry issues related to former Soviet bloc nations. Second, between 2000 and 2009, I led seven short-term mission teams working with orphans in three Russian provinces (Vladimir, Kostroma, and Ryazan). In addition, from 1999 to 2005 I taught an introduction to missions course at Beeson Divinity School, Samford University. All of these experiences led me to reflect upon the best approaches to establishing self-sustaining churches and ministries.

In the last decade and a half I have become increasingly concerned that Western and Korean missions to former Soviet bloc states have too often been fostering dependence upon outside funding, rather than fostering independent churches and ministries. Ten years ago, in 2005, I gave a presentation to missionaries in Moscow on the theme of overcoming dependency in Russian ministries. Not satisfied with writing and talking about the problem, in 2014-15 I raised funds to launch an experiment in greenhouse cultivation in Ukraine and Russia. The purpose of this project is to demonstrate one approach to decreasing dependence upon overseas funding for ministry in the former Soviet Union.

Jacob Mittleider and Greenhouse Cultivation

One model that has impressed me is the Adventist seminary and farm at Zaoksky, near Tula, Russia. I first visited Zaoksky in 1993 where I observed serious efforts to become self-sustaining by means of traditional farming and greenhouse cultivation (for the benefit of the seminary cafeteria and for the sale of produce), through a canning factory, and through a printing press that prepares denominational literature and accepts outside jobs.

The Zaoksky farm was founded by Jacob Mittleider, a U.S. citizen of Russian-German heritage who worked at Zaoksky from 1988 to 1994. Mittleider worked in 27 counties over 38 years undertaking 75 gardening demonstration and training projects. In these years he also wrote...
10 gardening books, some of which have been translated into Russian. For his work at Zaoksky, one Russian agricultural university awarded Mittleider an honorary doctorate. Moscow’s Izvestiia newspaper described Mittleider’s garden at Zaoksky as follows: It “looks like a work of art. The neighboring collective farm field is full of weeds, but here where the land is the same, you won’t see a single weed.”

On a second visit to Zaoksky in September 2015 I met Dr. Alexei Chizov, who now heads the farm and the instructional program inaugurated by Jacob Mittleider. Participants in the current greenhouse gardening project will study at Zaoksky under Dr. Chizov in March 2016. This instructional program includes extensive hands-on practice as well as classroom instruction.

Advice and Counsel
Besides a concentrated course of reading on greenhouse cultivation, I have had the benefit of advice from many quarters. I have received valuable counsel from four professors of agriculture at the University of Kentucky, from staff of Grow Appalachia and its greenhouse project based at Berea College, Berea, Kentucky, and from an agricultural consultant based in Washington, DC, with experience in Kazakhstan.

Benefits of Greenhouse Cultivation
University of Kentucky Professor Shubin K. Saha has summarized the benefits of greenhouse gardening as follows:

- protection from adverse weather (high winds, storms, hail, frost)
- better regulation of watering
- increased yield
- improved quality
- reduced disease from leaf wetness [and some reduction in other plant diseases and insect infestations]
- season extension (earlier planting, earlier harvesting, offseason production, early and late higher-profit market window)
- greater access to fresh fruits and vegetables for personal use as well as the market

General Guidelines

1. Choose an east-west orientation for the greenhouse, minimizing any shading from buildings and trees and shrubs (Nelson, 20; Hanan, 31).
2. The best site is mostly level with a slight slant for better drainage.
3. It is best to cut back grass and weeds around the greenhouse to minimize the introduction into the greenhouse of weeds and harmful insects.
4. It is recommended that the site have a shed or other structure that can be locked to store tools, fertilizer, and other materials (Hanan, 31).
5. It is best if someone lives on the property for 24-hour security.
6. For the 2016 growing season, tomatoes and cucumbers should be the only crops grown. The reason for this requirement is that it will greatly simplify accurate record
keeping and allow for the preparation of a more useful end-of-season report covering all greenhouse sites. Each site is eligible for up to $500 beyond the initial grant of $2,000 based on the accuracy, completeness, and timeliness of cultivation records to be submitted at the end of the 2016 growing season.

7. Because of funding limitations and because of a desire to model a high-yield but basic, relatively inexpensive greenhouse garden, the budget does not include provisions for heating, electric fans for ventilation, or lights.

8. The expectation is that produce will serve a) for local consumption by the sponsoring church or ministry and b) for sale for income. Each sponsoring organization will decide what percentage of the produce will be used for local consumption versus sale for income.

9. Since sale prices are highest at the beginning and end of the growing season (when there is less competition from non-greenhouse production), it is recommended that sales be concentrated in the beginning and end of the growing season. A 2012 report, *Greenhouse Sector in Ukraine*, notes:

a. “Greenhouse tomatoes prevail in the market from November to May. Prices go down when open ground tomatoes come to the market (June-August). The ratio of average annual prices between open ground tomatoes and greenhouse tomatoes is 1 to 4.”

b. “When greenhouse cucumbers of Ukrainian origin come to market, this usually leads to higher prices, given their higher production cost compared to the imported products, especially of Turkish origin. However, in terms of consumer preferences, Ukrainian cucumbers are competitive enough due to their freshness and the prevailing opinion that domestic production is safer. By the end of March, the prices are falling but remain high as long as cucumbers from greenhouses come to the market in late May – early June.”

c. “Pricing trends for greenhouse cucumbers are characterized by a strong degree of seasonality: maximum values are observed from November to April. Mass inflows of Ukrainian cucumbers in the market occur at the end of February – early March. Before that, imported cucumbers dominate the market.”

10. It is recommended that each site use its own seedlings, which will be more cost effective and will allow growers to be certain that they are using healthy, strong plants for cultivation. For the 2016 growing season Irina Dzyba will be preparing tomato and cucumber seedlings for each Ukraine greenhouse site.

11. For seed trays, a mixture of sand and peat moss (not sawdust) is recommended.

12. It is recommended that site directors conduct daily inspections of plants for leaf damage and harmful insects (especially on the underside of leaves).

13. One thermometer should be installed outside the greenhouse and one inside to determine the amount of ventilation required on a given day.

14. Each person working in the greenhouse should fill out the “Onsite Daily Work Checklist” every day of work, and the site manager should summarize the collected daily
checklists weekly. A water-resistant folder or box in each greenhouse should contain multiple, blank copies of the checklist form, with one to be filled out by each worker each day.

15. Adequate ventilation is important to minimize mildew resulting from high humidity.

16. “Humidity can be reduced by watering early in the day when the warm air can absorb moisture from wet surfaces.” (Nelson, 424)

17. It is very important to document which varieties of tomatoes and cucumbers are chosen for cultivation. The exact number of plants of each variety grown should be noted as well as the number of tomato and cucumber plants that fail to produce.

**Plant Protection Precautions and Procedures**

At each greenhouse site the sponsoring organization and its greenhouse director will decide between traditional and organic gardening. In its favor, organic gardening produce commands higher prices in the market and avoids the necessity of procuring protective clothing, eye gear, boots, and gloves for handling pesticides. However, with traditional gardening certain insect infestations and plant diseases are more difficult to control without the use of pesticides and herbicides.

In either case (traditional or organic) sanitary precautions can significantly reduce damage from harmful insects and plant diseases. Advice in this regard follows:

**Precautions (to minimize insect infestations and plant diseases)**

1. “Insects can be brought into the greenhouse on plants” (Nelson, 342).
2. “Common sources of insect and disease problems are established plants brought to the greenhouse. You will often be approached by friends who want you to rejuvenate a plant for them. This often leads to more trouble than the plant is worth. Do not allow the entry of such plants in your production area” (Nelson, 342).
3. Care is “required to prevent sample contamination. Common contaminant sources include dirty sampling tools, dirty containers, cigarette or pipe ashes” (Hanan, 481).
4. “The best preventive for contamination is use of clean tools, clean plastic buckets, clean plastic bags” (Hanan, 485).
5. “There are disease organisms transmitted in soil or ground water which can be carried in on the bottom of a pot or the sole of a shoe” (Nelson, 407).
6. “Plant parts should never be [disposed of]…where a disease organism can grow” (Nelson, 422).
7. “Weeds should be cleared away from the area surrounding the greenhouse and should also be eliminated in the greenhouse because they provide a hiding place and a source of food for insects” (Nelson, 341).
8. “Some growers keep the area bare around their greenhouses while others maintain mowed grass. Thrips develop in grass flowers, hence, mowing is important. This greatly reduces the types and numbers of insects invading the greenhouse” (Nelson, 341).
Procedures for Control of Insects and Plant Diseases (if not pursuing organic gardening)

1. “It is inevitable that insects are going to get into the greenhouse. If they can be detected early, they can be eliminated before any significant damage is done and before any drastic pesticide applications are required” (Nelson, 342).
2. “The greenhouse environment is well suited to insects. A careful plan of prevention and control of insects must be developed” (Nelson, 341).
3. “Knowing the inevitability of disease, the manager must be careful to check daily for its presence in the same manner that he or she watches for insects and checks the need for water” (Nelson, 407).
4. “It is of utmost importance that the greenhouse be inspected daily by the most knowledgeable person” (Nelson, 203).
5. “The few minutes it takes to water affords a chance to further inspect plants for insects, disease, nutritional disorders, and any other problems” (Nelson, 342).
6. “Most insects seek the undersides of leaves. An inspection of plants from above may not reveal their presence” (Nelson, 342).
7. “It is a good insurance measure to spray periodically to stop insect and disease problems before they begin” (Nelson, 342).
8. “Pesticides serve an invaluable role in the greenhouse. The subtropical environment of the greenhouse and unlimited host plant supply provides an ideal setting for insect development” (Nelson, 394).

Safety in Handling Chemicals (Pesticides, Insecticides, Fungicides, Herbicides)

1. [In Ukraine] “small household…use of pesticides often violates the norms” (Greenhouse Sector in Ukraine).
2. “Handling of pesticides is a very serious matter. Many of the materials are highly toxic to man. Even where the immediate toxicity is not great, there is the risk of a long-term effect. Often the long-range effects are not known. All pesticides should be handled with great caution” (Nelson, 394).
3. “While one should not fear pesticides, a healthy respect for them is essential. The pesticide program should be in the hands of one carefully trained for the job. It should not be a job passed weekly to different personnel, often those least familiar and qualified” (Nelson, 394).
4. “Store pesticides in a well ventilated, locked closet or room to which children and other unauthorized people have no access. Be sure the temperature remains between 20° and 90° F (4 to 32° C). Place a warning sign on the door indicating that the room contains pesticides” (Nelson, 394).
5. “Some pesticides are dated as to their effective life, many are not. Generally after one year they should be inspected for symptoms of deterioration. The effectiveness of some pesticides is reduced or lost while others may become toxic to plants. To help guard against this problem, pesticides should be dated when purchased and properly inventoried to insure use of the older materials first” (Nelson, 394).
6. “Empty pesticide containers are potentially dangerous because of the difficulty of removing all residue from them” (Nelson, 403).

7. “Be sure that labels remain on all containers. Tape or glue them on if they become loose. Read the label before using any pesticide. It contains valuable information as to which insects and crops it can be used on” (Nelson, 395).

8. “At the time you begin to apply pesticides, place signs at the greenhouse entries forbidding entrance and indicating that pesticides have been applied” (Nelson, 403).

9. When applying pesticides wear unlined elbow-length rubber gloves and rubber boots. It is important that they not be lined since cloth linings will absorb pesticides and are difficult to wash. Waterproof coveralls extending from the neck to wrists and ankles should be worn. Do not wear absorbent coveralls since they will absorb spills and hold the pesticide in contact with the body. It is well to keep the coveralls buttoned at the neck and outside the gloves and boots so that pesticides cannot enter them. A rubberized hat with brim should be worn since pesticides are readily absorbed through the scalp (Nelson, 396).