



Planning an Agricultural Project

by Brad Ward

Brad Ward has many years of experience in agricultural finance as a loan officer and underwriter, and has reviewed and advised on numerous business and farm plans. He also worked for 3 years on the North Coast of Honduras as the farm manager for Cornerstone Farm/Hospital Loma de Luz. His background and experience mean that he has a good grasp of what questions are important to ask when planning an agricultural project. Brad recently joined the ECHO staff.

It has been said that a goal without a plan is just a wish. Studies have shown that individuals with clear, written goals are significantly more likely to succeed than those without clearly defined goals. For example, a study conducted by Gail Matthews, Ph.D., at the Dominican University, found that individuals with written goals had a 42% higher success rate in achieving their goals than those without written goals. In addition, the study showed that individuals who made a public commitment to their goals by sharing them with a friend and allowing themselves to be held accountable to their action plans were 78% more likely to realize success. To be sure, our best efforts don't always result in our definition of success, and we need to rely daily on God so He can direct and even change our path. But Matthews' oft-quoted study illustrates the effectiveness of not only setting goals, but also writing them down and partnering with others as we seek to be better stewards.

A farm / agriculture project plan is a living document. Specifically it is a tool that can help focus finite energy and intellectual and capital resources so that we can make the very most of the "talents" with which our Lord has entrusted us. A good plan accomplishes three main tasks. First, it paints an accurate picture of the agriculture project's current status. It accounts for all of the potential assets and liabilities that affect the project. Second, the plan paints a picture of what the designers hope the project will become. It shares a vision of the project at a certain point in the future. Thirdly, a set of step-by-step instructions link the picture of

the current reality and the goal of the project, helping participants travel from 'that which is' to 'that for which they hope.'

This article sets out to give an overview of one proven method for creating a written agriculture project plan. Because of the scope of the topic, this article will primarily focus on the basic structure of a farm / project plan, the processes of analyzing and recording the project's current situation, and finally the process of refining and articulating the vision of the project as it reaches its full potential. These processes can be used for a great variety of projects including demonstration farms, commercial farms, institutional food production and even small family / subsistence farms. Also, these processes can be useful when working with communities to develop plans for local food security and cooperative income production. An in-depth discussion of how the farm / project plan can be used as a vital management tool will be discussed in a future article. Remember that there is no one right method to organizing, planning and executing a project. Hopefully the ideas shared in this article will inspire your own creativity and will convince you of the value of putting your plan into writing.

To begin, organize your thoughts by building a table of contents, as shown below.

- Introduction
- Current Situation Analysis
- Farm / Project Vision Statement
- Introduction to the Individual Components of the Farm / Project
- Individual Component Plan
 - Current Situation
 - Vision
 - Action Plan with Timelines
 - Component Financial Tools
- Component Integration
- Financial Statements
- Support Documents

With the structure of the plan in place, I will briefly describe the function of each item in the above mentioned table of contents.

The Farm Plan Introduction

The introduction serves as a brief one- or two-paragraph description of your reasons for constructing a written plan, with a brief outline of how the plan will be used to help you manage your farm / project. One reason for creating a plan could be the desire to systematically assess the resources that are available to begin or expand a project. Another reason might be to provide a tool to help communicate the scope of a project and keep stakeholders focused and accountable.

Featured in this EDN

- 1 Planning an Agricultural Project
- 3 Village Chickens, Food Security and Poverty Alleviation: The Benefits of Newcastle Disease Control in Southern Africa
- 5 Engaging Non-Governmental Organizations in Newcastle Disease Control
- 7 From ECHO's Seed Bank: Seed production of *Uberlandia* Carrots in semi arid Africa
- 7 Books, Websites and Other Resources: *Restoring the Soil*
- 7 Upcoming Events
- 8 ECHOes from Our Network

ECHO is a global Christian organization that equips people with agricultural resources and skills to reduce hunger and improve the lives of the poor.

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Current Situation Analysis

This section of the plan is a comprehensive and detailed description of the current state of the project. If the project has not yet begun, this section will describe the current environment in which the project will commence. Descriptions will include both the tangible and the abstract. Tangible items might include descriptions of the size of the land, soils, the terrain, current use, water, climate, existing structures, nearby land uses, available financial resources, etc. Abstract items might include descriptions of things like relationships within the community in which the project will take place, the potential markets for your products, the political climate, expertise of those involved in the project, etc.

It may seem difficult to find time to construct an accurate and detailed description of your farm / project's current state, but without this critical first step the path to a hoped for future will be filled with unnecessary missteps and disappointments. As with any complex project, defining the major categories and then dividing the categories into manageable groups can help you work systematically toward success. Another advantage of compartmentalizing the current situation analysis is that it allows for the sharing of work. Some parts of the analysis will require fact gathering. By delegating these tasks, the work can be completed more efficiently and additional points of view can be represented.

What follows is a list of major categories (physical characteristics, environmental factors and community factors) with a partial list of subgroups that were used as the structure for the current situation analysis of a farm plan in Central America. There is no one right method for constructing a current situation analysis, so use this list to help inspire your own creativity.

- A. Physical Characteristics
 - a. Farm size
 - b. Terrain
 - c. Soil types
 - d. Water
 - i. Existing water sources
 - ii. Possible water sources
 - e. Infrastructure
 - i. Fences
 - ii. Buildings
 - iii. Roads
 - iv. Ditches
 - f. Existing crops / plants
- B. Environmental Factors
 - a. Climate
 - i. Rainfall

- ii. High / low temperatures
 - iii. Seasons
 - iv. Extreme weather events
 - b. Sunlight
 - i. Day length
 - ii. Shade / full sun mapping
 - c. Erosion issues
 - d. Local crop growing seasons
- C. Community Factors
- a. Local institutions
 - b. Neighboring properties
 - c. Labor
 - d. Security
 - e. Existing markets
 - f. Local food preferences
 - g. Property use / ownership

Again, this is just a sample, abbreviated list. The more thought that is put into creating the main categories and subgroups, the better tool the written plan will be. A little effort now can make a great difference in the outcomes of the project.

Farm / Project Vision Statement

This section of the plan is very similar to the current situation section. Here again you will give a detailed description of both the tangible and abstract environments of your farm / project. This time, however, you will describe these environments as you hope for them to exist in the future. The vision statement could describe a set time (e.g., 5 years in the future), or it could be a description of the project at maturity.

The Vision Statement again considers the items listed in the Current Situation Analysis, but now it envisions new assets and products produced through the wise stewardship of the farm / project. Although some subgroups will have the same description (e.g., climate, day length, etc.), many of the descriptions will change dramatically. Additionally, new subgroups will need to be added to help describe envisioned products and infrastructure.

If the project is communal in nature, or will affect a local community (what project doesn't?), be sure to describe the community impacts that you envision. Engage the community to allow a common vision to emerge. Whether through community meetings, focus groups or one-on-one conversations, those affected should be invited into the vision casting process. Consensus is best when it comes to decision-making; those left on the losing side of a vote may work to see the project fail or create new and difficult obstacles to overcome. If consensus among those directly impacted by

the farm / agriculture project cannot be realized, perhaps it is better to wait for a time before proceeding with the project.

Individual Components of the Farm / Project Plan

Begin this section by outlining each major component of the farm / project. For instance, your farm might have (or plan to have) animals, annual crops and fruit trees. In this case, you would list each animal and each crop your plan will cover and give a brief description of their scope. An example could be:

The individual components of Happy Acres Farm:

- Laying Hens – 50 hens plus chick hatching
- Meat Sheep – 20 ewe herd
- Pasture – 2 ha intensively managed
- Corn – 3 ha rotating with beans
- Beans – 3 ha rotating with corn
- Bananas – 2 ha
- Vegetable Garden – ¼ ha with drip irrigation

If the current situation analysis and vision statement are the plan's heart and soul, then the individual component plans are the brains and muscle! These are best described as mini farm / project plans, each concentrating on one specific component of the farm / project. This plan includes detailed descriptions of the current situation and what is hoped for in the future—for each individual component. Additionally, the individual component plan includes **action plans** for each major task and **timelines** that will help to make the vision become reality.

The more detailed and specific the action plan, the more useful it will be as a tool in day-to-day management. Action plans should include specifics such as who will be completing each task, the resources needed to complete each task and timelines in which each task should be completed. Action plans help prioritize tasks, manage resources and stay on track. Finally, the individual component plan should include the **financial tools** needed to manage that part of the project. This would include a budget, cash flow projection and break even analysis. Using these action plans, timelines and financial tools will be the focus of a future article.

Component Integration

The goal of this section of the farm / project plan is to eliminate competition for limited resources, identify synergistic opportunities, and prioritize activities. Use this section to describe the influence each individual component will have on the other components of the farm. To help construct this section of the plan, it might be helpful to begin by listing each important activity in the project. Next, beside each activity list all of the inputs needed and byproducts produced. This list can then be analyzed to find opportunities whereby one activity's byproduct is another activity's needed input.

For example, your plan might include grazing animals for meat or milk and raising chickens for eggs or meat. By analyzing your list, you would find that your grazing animals need to be protected from intestinal parasites and that your chickens need a diet which includes protein. The parasites and eggs in the grazing animals' manure could be a good source of additional protein for the chickens. At the same time, by eating the eggs and worms, the chickens keep parasite problems in check and effectively work the manure into the soil. In this example, soil vitality is increased, feed costs are reduced, and disease is avoided through symbiotic relationships. Now struc-

tures, fencing and management practices can be employed to take advantage of this natural synergy.

Financial Statements

In this section, the financial statements of the individual components are brought together to form a comprehensive financial statement for the entire project. At minimum this should include a budget and cash flow analysis. A budget simply lays out the expected expenses and projected income of a project, while a cash flow analysis maps out the timing of the expenses and also accounts for the timing of potential income. Both tools are critical in helping a manager keep projects on track and, when necessary, make adjustments. Other good financial management tools include break-even analysis and a balance sheet. These tools can be used to assess a project's capacity to grow financial assets. That said, keep in mind that there are valid reasons for doing a project beyond financial returns. Providing dignified employment, educational opportunities and protecting natural resources are some good examples.

Support Documents

These may include things like maps, climate data, charts and photos.

Summary

A written farm / agriculture project plan is a key component of good stewardship. The process of analyzing your current situation and goals will enable you to draw a map that can help you on your journey. Breaking big goals into small, achievable and deadline tasks will give the daily guidance needed to stay on track. Understanding how the individual components of your farm / project work together (or against each other) helps you create a project whose "whole" is bigger than the sum of its parts, and appropriate financial reports give you the tools needed for good management and decision making. Most importantly, the planning process can help you see how God has already blessed you and help you to better put the dreams He has placed in your heart into motion.

Additional Resources

Sample financial planning worksheets and a sample farm business plan are available at ECHOcommunity.org. See the "Farm Economic Tools" section of the "ECHO Technical Notes, Other Useful Documents" page.

Village Chickens, Food Security and Poverty Alleviation: The Benefits of Newcastle Disease Control in Southern Africa

by Robyn Alders (International Rural Poultry Centre, Kyeema Foundation, Mozambique and Australia; also Faculty of Veterinary Science, the University of Sydney, Australia)

Village chickens: an introduction to an undervalued household member

Village chickens can be found in all developing countries and play a vital role in many poor rural households. They provide scarce animal protein in the form of meat and eggs and can be sold or bartered to meet essential family needs such as medicine, clothes and school fees. Village poultry are active in pest control, provide manure, are required for special festivals and are essential for many traditional ceremonies. The output of village poultry is lower than that of intensively raised birds but it is obtained with

minimal input in terms of housing, disease control, management and supplementary feeding. They are generally owned and managed by women and children and are often essential elements of female-headed households.

In many countries, social goodwill is created by offering guests a meal containing meat; more often than not, poultry. Honoured guests can be given a live bird to take home as a mark of respect. Poultry and poultry products can be sold to obtain items that enable families to participate fully in community activities. Village poultry have many advantages in mixed farming systems as they are small, reproduce easily,

do not need large investment and can scavenge for food. They thrive on kitchen waste, broken grains, earthworms, snails, insects and vegetation.

Problem solving R&D in collaboration with farmers

Newcastle disease (ND) is considered the most important poultry disease worldwide and is one of the major constraints to production of village chickens. Newcastle disease belongs to the same family of viruses that causes measles in humans and distemper in dogs. There are many different strains of ND that can cause a range of clinical signs from sudden death (very virulent strains) to greenish diarrhoea (strains with a preference for the gastrointestinal tract), coughing (those with a preference for the respiratory tract) and twisted necks (neurotropic). Many of the clinical signs of ND are indistinguishable from those of avian influenza. This has delayed the detection of outbreaks of highly pathogenic avian influ-

enza, as producers in countries where ND is not controlled are used to seeing high mortality in their chickens.

“Newcastle disease is considered the most important poultry disease worldwide...”

In countries where ND is widespread, outbreaks of this disease regularly result in 50 to 100% of birds dying. In developing countries where ND is not endemic, outbreaks may occur less frequently but potential losses due to the disease make vaccination mandatory.

Collaborative research funded by the Australian Centre for International Agricultural Research (ACIAR) on the control of ND in village chickens in Asia and Africa has resulted in a cost-efficient model for ND control in village chickens. Despite the need to control ND in village chickens, it has been difficult to achieve. Experience has shown that a sustainable ND control program is composed of five essential elements:

- An appropriate vaccine, vaccine technology and vaccine distribution mechanisms
- Effective extension materials and methods that target veterinary and extension staff as well as community vaccinators and farmers
- Simple ways to monitor and evaluate the technical, social and economic aspects of the program
- Economic sustainability based on the commercialization of the vaccine and vaccination services and the marketing of surplus chickens and eggs
- Support and coordination by relevant government agencies for the promotion of vaccination programs.

All of these issues are covered in a series of manuals published by ACIAR that are available for free download. The series includes a field manual, training manual (link below), laboratory manual and an extension manual. Examples of the practical issues associated with implementing successful ND control programs that can be found in these manuals include: tips for administering the vaccine at the household and community level; basic details about record keeping; and preparing for other production constraints that will become more evident once mortality due to ND is reduced.

The implementation of effective ND control programs funded by the Australian Agency for International Development (AusAID) in

countries such as Mozambique, Malawi, Tanzania and Zambia has resulted in increased chicken numbers, increased household purchasing power, increased home consumption of chicken products and increased decision-making power for women. In the south of Mozambique, women have been able to sell excess chickens in order to buy goats and eventually cattle, thus giving them access to resources previously denied to them, as ruminants have been traditionally raised by men. Where families allocate chickens to children, the children may sell their chickens to buy school supplies.



Village chickens can contribute enormously to food security in poor rural households. Photos (this and on facing page) by Alyssa Nicol, used with permission.

Looking forward

The Kyeema Foundation is working with the African Union (AU) Pan African Veterinary Vaccine Centre (AU-PANVAC) to develop a multi-year project to expand this successful ND control model to other AU member states with support from AusAID. The multi-year project will include support for the training of AU-accredited field and laboratory ND control master trainers who will be able to support improved ND control activities across the continent. Countries interested in participating in the project should encourage representatives of national veterinary services to contact the Director of AU-PANVAC.

The Australian International Food Security Centre (AIFSC) is also funding the design of a new research project that will strengthen food security through family poultry and crop integration in Eastern and Southern Africa. The design team brings together international experts in anthropology, ecology, economics, agricultural value chains, veterinary science, human and veterinary epidemiology, communications and human nutrition at the Kyeema Foundation Australian National University, the Royal Veterinary College in London, the University of Witwatersrand in Johannesburg and the School of Public Health at the University of Sydney. The international team is working with colleagues at the East African Community and the Southern Africa Development Community and in Tanzania and Zambia.

For Further information

Australia Centre for International Agricultural Research: <http://aciarc.gov.au/publication/mn086>

Australian International Food Security Centre: <http://aciarc.gov.au/aifsc/>

International Rural Poultry Centre, Kyeema Foundation: www.kyeemafoundation.org

Faculty of Veterinary Science, University of Sydney: <http://sydney.edu.au/research/opportunities/opportunities/1618> ; www.facebook.com/pages/Food-Security-in-Southern-and-Eastern-Africa/155736987902817?ref=hl

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Engaging Non-Governmental Organizations in Newcastle Disease Control

by Thomas Broughton and Erwin Kinsey

Introduction

Church-based missions and other small non-government organizations (in this paper referred to together as 'NGOs') are doing some of the most effective and sustainable agriculture and food security work in developing countries. NGOs are able to innovate and include a package or menu of community options in villages in rural areas. They can be responsive to the interests of communities, and can promote a sustainable model of rural poultry vaccination—sometimes more effectively than the district or local government alone.

What does a typical model of a sustainable Newcastle disease (ND) control program consist of for rural poultry keepers?

The model and how it operates

The NGO involves the local government authorities in the vaccination program. An NGO works with district and village leadership to either raise awareness or respond to a known need for ND control. The NGO agrees to conduct a village meeting with a representative of the district to confirm with villagers their experience of death loss to ND, ascertaining which season of the year it is more prevalent in their experience, and raising interest in a solution. At the same meeting, the model described below (the concept of rural vaccinators administering a service to their neighbors three times per year with cost-recovery) is shared with the community members.

At the end of this village meeting, individuals may be identified who best fit the criteria for community vaccinators (explained during the meeting), and they may be selected for subsequent training.

District extension officers are engaged in partnership to prepare the community and to participate in selecting, supervising, monitoring and reporting on the activities of community vaccinators to the NGO and the district. Ideal qualifications and roles of district extension staff include the following:

- Technical know-how (Certificate or Diploma) in general agriculture
- Prepared to collaborate with NGOs in agricultural development programs
- Willingness to promote an integrated support effort among caregivers in the initiative
- Scope for integration of rural poultry vaccination in their working situation
- Prepared to learn and disseminate new initiatives in food security
- Prepared to assist other stakeholders by follow-up and linking actors together.

This initiative is about empowerment. Community vaccinators will be selected, trained, and mobilized to assist their neighbors. Community vaccinators in other initiatives have proven to greatly enhance the adoption by community members of wider innovations. For example, they have significantly reduced the number of cases of other poultry diseases in the community, increased the adoption rate of simple poultry innovations, and helped to target needy participants who could benefit from initiative interventions.



Ideally, at the same time that community vaccinators are being mobilized, a **community food security committee** is formed among community leaders and existing groups. This committee supports dissemination of interventions by increasing cohesion of sub-groups and promoting wider participation. Strong participation by local village leadership in selection, training and follow-up helps encourage group members to remain active or be replaced. The committees may vary in size and activities according to their interest, but are generally comprised of four or five members chosen

based upon their ability to carry out the following:

- Mobilize selection of appropriate groups within the community for training
- Identify and supervise potential rural caregivers from sub-villages
- Ensure community cooperation so that families pay for animal vaccinations
- Ensure the welfare of more vulnerable households through participation, sharing and caring among members and their families—making visits to households
- Assist in preparation for trainers (e.g., alerting community, arranging a venue for meetings, food)
- Help with other activities, as appropriate (e.g., mobilize home-based care by caregivers, support of HIV+ groups)
- Assist coordination of field days and agriculture shows
- Address environmental issues (e.g., sanitation, tree planting, etc.)
- Provide accountability for equipment (e.g., bicycles) used by community vaccinators
- Share progress reports and productivity records with other village leaders
- Identify and address constraints (e.g., potential markets, sources of micro-finance, or agriculture inputs for group members).

Community vaccinators are chosen by the village government. To meet the selection criteria, they must:

- Be willing to cooperate with the village government
- Reside in or near the respective community
- Be available to undertake regular campaigns
- Be willing to record their work activities and spending (including receipts)
- Commit to provide services on time, by a set calendar
- Agree to and obtain a fair fee for services rendered (contract with village authorities)
- A minimum of 50% of the vaccinators must be women.

Community vaccinators receive a one-week-long orientation training, and are accompanied on their first vaccinations. During this orientation week, community vaccinators are trained in areas related to animal health, with special emphasis on vaccination. In the early mornings, they apply the simple vaccination skills that they have learned by vaccinating farmers' chickens on dates previously agreed upon in the larger community assembly.

A fee should ideally be charged for the first round of vaccination, unless the NGO is concerned that the charge will discourage participation to the extent that the benefit

of the vaccine is less obvious, slowing its adoption. If subsidized the first time, be sure to emphasize that subsequent vaccinations will need to be paid for to cover the costs of vaccines and the community vaccinators' time. Thereafter, community vaccinators are encouraged to buy vaccines and vaccinate chickens on a for-profit basis, with farmers paying for the vaccination.

In Tanzania, for example, community vaccinators buy vaccines for approximately \$6 per vial of 400 doses, or the equivalent of \$0.015 per dose. However, the community vaccinator should charge up to \$0.10 for each chicken vaccinated, as agreed in the community meeting (the same dose—one drop—is given to each bird, whether a small chick or a mature cockerel). At this price, a community vaccinator earns almost \$35 profit from one vial, making it worthwhile to canvas and service the homesteads in her area for three or four days.

Follow-up is as important as mobilizing community vaccinators and food security committees. NGO trainings and mobilization of local farmer groups should be supported with the assistance of district extension staff. This link with the local government, at the district level, ensures a level of sustainability and preparedness for scaling up successful programs. The district staff gathers vaccination data from community vaccinators and submits progress reports (e.g., number of chickens vaccinated in a given period of time). If the NGO can manage, bicycles may be provided to well-performing community vaccinators, to facilitate their movements in the villages. District staff members may receive a small stipend each quarter as appreciation for their involvement in the program.

Sustainability of the model

To a large extent, the model has been found to be successful and sustainable. The success of the model is owed to the following factors.

- 1. Profitability to the community vaccinators.** Community vaccinators derive profit out of this venture; the better performers are also provided with bicycles as an additional incentive to them. As a result, they are able to conduct vaccination as a business and as a means of livelihood.
- 2. Involvement and motivation of the district staff.** The NGO ensures the support of district staff and local leaders by involving them in the vaccination pro-

gram. Local leaders are involved in mobilizing farmers. Also some members of the community households are nominated into the Community Food Security Committee (CFSC). The district staff monitors and supervises the activities and reports to the NGO. To provide motivation, the district staff is given some stipend upon submission of a report to the NGO.

- 3. A three-way reporting structure.** Farmer households report to the CFSC (as indicated by arrow D). The CFSC reports to the NGO (as indicated by arrow C), and district staff reports to the NGO (as indicated by arrow B). The three-way reporting structure helps to ensure reliability of information, as the NGO is able to cross-check by comparing the two reports, then can clarify deviations and reasons for deviations.

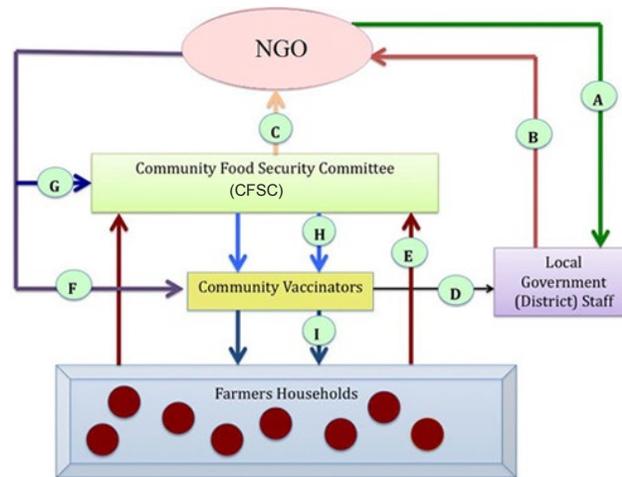


Figure 1:
A: NGO facilitation of the district staff
B: District staff submits progress reports to NGO
C: CFSC reports to NGO
D: Community Vaccinators report to the district staff
E: Farmer households nominate members to CFSC
F: NGO support (e.g. training) to community vaccinators
G: NGO support to CFSC
H: CFSC supervises community vaccinators
I: Community vaccinators vaccinate chickens at farmer household levels

Limitations of the model

The NGO has to coordinate among the local government staff (arrow A), the CFSC (arrow G) and community vaccinators (arrow F), a process that can be tedious and time consuming, especially in the initial stages, before all are equipped with transport and a routine is established. However, if they have been well-trained, vaccinators with community oversight can continue to ensure service provision after the NGO withdraws support in two or three years.

Case Study: Healthy Chickens Increase Villagers' Prosperity

Naisula Estomiy is a 36-year-old mother of two living in Olkereyan village on the outskirts of Arusha in Tanzania. In June 2009, Naisula joined a village group to attend a poultry production training session with Global Service Corps–Tanzania (GSC-TZ). Based on Naisula's intelligent questions and lively participation, Naisula was selected by others in her group to attend a special training to become a community chicken vaccinator. She learned how to vaccinate chickens as a small business on behalf of the group and the wider community.

With support from her village extension officer, she set up a regular schedule of chicken vaccination events in her sub-

village to protect the birds from ND. Before the vaccination program, villagers were unwilling to invest much in raising chickens, since most of them died from ND. People rarely provided food for their chickens, and instead left them to scavenge for food. Naisula learned how to apply the simple eye-drop vaccine to all chickens, whatever their ages, at a cost per vaccination of only 50 shillings (USD \$0.03).

The vaccination program has significantly lowered chicken losses. In 48 villages where GSC-TZ has trained community vaccinators, poultry keepers now experience higher yields. Naisula has increased her flock by 700% to 90 chickens, and collects 25 eggs per day (as compared to the pre-vaccination time when a whole week often

passed with no egg collection.) Naisula is also able to collect a small fee for her vaccination rounds (which reached 3,000 chickens every fourth month), which provides an income of Tsh 150,000 (US\$100) for one week of work each round. Recently, she paid for a wire mesh perimeter fence to confine her growing chicken flock within her yard. The increased income from bird and egg sales has meant she can afford school fees for her two children and more food for her family.

FROM ECHO'S SEED BANK

Seed production of *Uberlandia* Carrots in semi arid Africa

by Dov Pasternak, Agricultural Development Advisor

The carrot is a popular vegetable crop in sub Saharan Africa. It is very rich in beta-carotene, the precursor of Vitamin A.

Currently, seeds of all carrot varieties grown in hot sub Saharan Africa are imported from regions with temperate climates such as Europe and USA. It has not been easy to produce carrot seeds in hot Africa, because carrots require exposure to cold temperatures (vernalization) to induce flowering.

For some time, ECHO has been promoting the *Uberlandia* carrot, developed in

Brazil, that can flower and produce seeds under tropical conditions (e.g., see http://cymcdn.com/sites/www.echocommunity.org/resource/collection/59800F4C-2723-4074-9CA3-DB23AA9F576A/Daucus_carota_Uberlandia.pdf).

For seed production, ECHO recommends digging up the carrot roots about 90 days from planting, then replanting them. This action should induce flowering.

However, we tried this technique at ICRI-SAT research station in Niger, and found that it gave unsatisfactory results.

The roots are usually replanted in March, when ambient temperatures start rising to higher than 40°C. Flowering and seed

production are then carried out during the hottest months of the year (April to June). Under these circumstances, seed yields are quite low.

We have developed an alternative way for seed production as follows: Carrots are sown in a nursery at the beginning of November. Plants are thinned to a spacing of 1 to 2 cm between plants. Carrots are then transplanted in mid-December at a spacing of 15 cm between plants. All the plants treated this way will produce an abundance of flowers and viable seeds, starting in February.

We think that this technique can replace the approach recommended by ECHO, particularly in hot regions.

BOOKS, WEBSITES AND OTHER RESOURCES

Restoring the Soil

We are pleased to announce the publication, *Restoring the Soil*, a unique new book by Roland Bunch. Green manure/cover crop (gm/cc) plants essentially create free fertilizer (by "fixing" nitrogen from the air into a form that plants can use). They also provide large quantities of organic matter, and can help with weed control. They offer a method of restoring soil fertility more quickly than we often think.

Roland Bunch has worked with gm/ccs for decades. He has worked with villager farmers in countries around the world, taking note of what has worked and what has not. In this book, he shares from his vast wealth of experience.

The format of this book makes it unique. The number of gm/cc systems is astonishing, but not all are useful in any given place. This book guides you step-by-step through a decision tree that will help pinpoint gm/cc systems that have been tried and successfully used (without outside intervention) in situations similar to yours.

The first section of the book gives helpful background about gm/ccs, and also gives guidelines for working with small-holder farmers. (Before you begin a project with gm/ccs, you will want to make sure that poor soil fertility is a felt concern of people in the area where you are working.) The next section of the book includes the Decision Tree, in which a series of questions are asked (e.g. about elevation; staple

crops grown in the area; etc). Gradually the steps of the Decision Tree lead to a few recommended gm/cc systems, based on answers to the questions. The various systems referred to in the Decision Tree are described in the third section. The Appendix at the end of the book includes a table listing the recommended gm/cc species. The back of the book also includes a glossary to explain terms that may be unfamiliar, and a more theoretical but very helpful discussion of soil fertility.

We believe this book will provide many helpful ideas for you and for the farmers with whom you work! It is currently available from ECHO's bookstore (www.echobooks.org/) for \$24.99.

UPCOMING EVENTS

East Africa Symposium

Arusha, Tanzania
February 5-7, 2013

A wide range of topics will be addressed at this symposium, including (but not limited to) conservation agriculture; small livestock; rural poultry, village cooperative banks; Farmer Field Schools; vermiculture; fish farming; and mass mobilization using radio. Additional information and registration available through ECHOcommunity.org.

Tropical Agricultural Development I: The Basics

April 15-19, May 20-24 or July 29 - August 2, 2013
ECHO Global Farm, Fort Myers, FL

Participants gain an introduction to aspects of poverty and community development and an orientation to ECHO; they also receive instruction on proven agricultural principles/practices and practical techniques, systems and technologies to meet agricultural and nutritional needs of small-scale, impoverished farmers. Time is also set aside for hands-on work on the farm, visits with staff and study in the ECHO library. More information and registration can be found at ECHOcommunity.org through the calendar of events.

ECHOES FROM OUR NETWORK

A Caution about *Euphorbia tirucalli*

Network member Bob Mann wrote to us from Gloucestershire, England, after reading the article about living fences in *EDN* 116. The article reminded Bob of a warning from *Amaranth to Zai Holes*, about the dangers of *Euphorbia tirucalli*. The warning bears repeating.

Amaranth to Zai Holes (AZ) contains a short note called "A Living Fence that Might Be Deadly?" It is based on a note in the October-December 1991 issue of *Agroforestry Today*, which in turn is based on an article in *The Economist* (July 6, 1991 pp 86-87) and *The Lancet* (May 30, 1987 pp 1257-58). It reads as follows:

"Farmers near Kabale in Kenya describe traditions, now considered superstitious, that certain euphorbias cause cancer when planted near the homestead." [Euphorbias in Africa fill many of the environmental niches that are filled by cacti in the Americas.] Now the carcinogenic effects of one common living fence species, *Euphorbia tirucalli*, have been described. The active carcinogen has been found not only in the plant itself, but in extracts from nearby soil, vegetables and drinking water. "The report suggests that Burkitt's lymphoma, a common childhood cancer in East Africa, is caused in part by consumption of water and vegetables from sites near this euphorbia." The plant grows profusely in Kenya's Eastern, Western and Nyanza Provinces and in parts of Tanzania. In southwestern Uganda it is widely planted as a living fence to exclude livestock from protected springs, suggesting the frightening prospect that water that has been assumed safe is in fact very hazardous."

After reading about *E. tirucalli* in AZ, Bob looked up several references and sent us the articles. One article was a copy of the description of *E. tirucalli* as given in the SIDA/Regional Soil Conservation Unit (RSCU) Technical Handbook No 10, 'Useful Trees and Shrubs for Uganda' by A B Katende et al. He commented, "The descrip-

tion says this plant is useful as a live fence. Also included were three medical research references where *E. tirucalli* is mentioned, including a review by an international team of researchers, 'Burkitt's lymphoma in Africa, a review of the epidemiology and etiology,' by Jackson Orem, et al., African Health Sciences, Makerere Medical School, Sept 2007.

Bob commented the review "is far reaching, and discusses the ways in which malnutrition, malaria, and exposure to toxic herbs can weaken the immune system and make HIV more likely. In [a] discussion about herbal exposure...it says 'This role of euphorbiaceae species as possible environmental co-factors in the pathogenesis of endemic Burkitt's Lymphoma (eBL) is supported by findings from Malawi where the plant is found more often at homes of eBL patients than in those of controls.'

"As the ECHO note in AZ pointed out, the most frightening aspect of the research findings is that the active carcinogen has been found not only in the plant itself, but also in extracts from nearby soil, vegetables, and drinking water. The carcinogen is therefore easily absorbed by people who live nearby through drinking the water and eating crops.

"This plant is called 'Nkoni' in the local Luganda language in southern Uganda where I have been working over the past 8 years. It is used as a live fence and as a boundary hedge; livestock do not touch it. But in 2007 we decided to advise village people not to use this toxic plant as a boundary hedge or for protecting surface water supplies, because of the medical research findings about the danger of children becoming very sick with cancer.

"Just last year I was sent a video clip from [an organization] in eastern Uganda which showed how they are trying to grow food crops, and I noted they were using *E. tirucalli* as a new type of live fence around their fields, because as they said, 'The cattle won't touch it, and keep away.' So I sent a warning to the Mission, telling them that this particular plant was a danger to people's health and should not be used.

"The information that I [included came from] the SIDA/RSCU Technical Handbook mentioned above. I wrote down those indigenous plants/trees growing in Uganda that were specifically described as useful for live-fencing, as follows: *Carissa edulis*; *Commiphora Africana*; *Dichrostachys cinerea*; *Dovyalis abyssinica*; *Acacia mellifera*; *Acacia nilotica* and *Ziziphus abyssinica*.

"[Each of these plants/trees is] indigenous and...thorny. In addition, Bougainvillea, Mauritius thorn (*Caesalpinia decapetala*), and Lantana can also be...good hedges. From experience of research workers with the Agroforestry Department of the National Agricultural Research Institute (NARI) at Brikama, in The Gambia, West Africa, they say that most hedge plants, whether indigenous or exotic, require proper management by way of regular trimming and weaving to make them compact and dense, so that livestock cannot pass through."

Erwin Kinsey, director of ECHO's East Africa Regional Impact Center, has lived and worked in East Africa for many years. He commented, "*Euphorbia tirucalli*...is used as a living fence primarily BECAUSE it is NOT edible fodder, is drought resistant and is easy to replicate. However, I was aghast one day to watch camels along the roadside consuming *E. tirucalli* when I passed through Nanyuki, Kenya during a particularly long drought period. I was so surprised that I stopped the car to make sure they were swallowing it—they DID."

Kinsey added, "Living fences which are edible by goats do not successfully confine them, which is why perhaps [it is best] not to use fodder trees as living fences, a possible correction to *EDN* 116! Hedgerows for fodder ARE appropriate and, when protected until branch growth exceeds the height of the reach of goats, they can persist as living fences. When we discuss as not suitable for fodder, *E. tirucalli* qualifies according the definition in *EDN* 116, but now that has to be further qualified. Many species which are not edible by cattle are consumed by goats who were formed by God to be browsers."

PLEASE NOTE: At ECHO we are always striving to be more effective. Do you have ideas that could help others, or have you experimented with an idea you read about in *EDN*? What did or did not work for you? Please let us know the results!

This issue is copyrighted 2013. Selected material from *EDN* 1-100 is featured in the book *Agricultural Options for the Poor*, available from our bookstore (www.echobooks.org) at a cost of \$19.95 plus postage. Individual issues of *EDN* may be downloaded from our website (www.ECHOcommunity.org) as pdf documents in English (51-118), French (91-118) and Spanish (47-118). Recent issues (101-118) can be purchased as a group from our bookstore (www.echobooks.org). Earlier issues (1-51 in English) are compiled in the book, *Amaranth to Zai Holes*, also available on our website. ECHO is a non-profit, Christian organization that helps you help the poor to grow food.