

WESTERN CHINA AGRO-ECOLOGICAL VILLAGE DEVELOPMENT PROJECT

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by



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1.0 Project Overview

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Project Title

The Western China Agro-Ecological Village Development Project (WCAEV)

Location of the Project

Dingxi County, Gansu Province, encompassing the 4 villages Zhangjiachuan, Fengjiacha, Chankou, and Beichuan in the Fuxing watershed.

Zhunger County, Inner Mongolia, encompassing the 4 villages Sujiata, Nalingo, Bainilaing and Oboyen in the Deshengxi watershed.

Project purpose

The project aims to improve the economic and social well-being of marginalized farming communities with a focus on women, while at the same time protecting and enhancing the natural resource base through the use of participatory development methods and the holistic agro-ecological village development model.

2.0 Project Description

2.1 Local Context

The environmental quality of Western China remains in a long-term trend of deterioration as the growing population places tremendous pressure on the country's diminishing natural resources. Western China is a major priority of the central Chinese government as this region suffers from a high incidence of poverty and the most seriously eroding soil and expanding desertification in the world. Soil erosion is becoming so serious that in the year 2000, Beijing was hit by 19 severe sandstorms originating from the western regions. The extensive soil degradation is a result of intensive cropping, excessive use of woody vegetation and crop residues as fuel or feed, over-grazing by animals, and cultivating crops on steep slopes. This furthers desertification and increases pressures on the land from increased clearing and usage of sensitive areas, high input farming and other unsustainable practices. Additionally, yearly rainfall in the region is decreasing and severe droughts are frequent, meaning rural farmers have limited water available for consumption and irrigation. The demand for irrigation water and high silt output from erosion is so serious that during the past ten years the Yellow River has ceased flowing downstream of the region for extended periods of time.

There also is a growing disparity in wealth in China as peasant farmers are left behind while the nation economically progresses. Low commodity prices caused by the globalization of grain markets and the high rural population, have created intensive demands on the land to meet the livelihood requirements of small farmers, resulting in a high incidence of poverty. Rural folk, particularly men and young adults, are forced to migrate outwards from their villages to work for income, further destabilizing farm resources and the family structure. This forces women to bear the brunt of labour demands at home including household demands and farm labour. The quality of life for rural women is poor in this historically patriarchal society as their workload is heavy, decision-making and education is limited and they rarely leave their villages.

2.2 Project Objectives

The overall objective of the project is to increase the self-reliance and quality of life of agrarian communities living in environmentally sensitive areas by improving the economic and social well being of marginalized farmers, particularly women, while at the same time protecting and enhancing the natural resource base. The project envisions empowered and gender sensitive agrarian communities meeting their subsistence and other needs in a sustainable manner. As a result of using resources provided by the project, the primary beneficiaries will experience an improvement in economic, social and environmental conditions.

The project intends to achieve a number of short-term outputs during the project lifetime:

1. Annual and baseline collection of data regarding local agro-ecological and socio-economic conditions

2. Development and administration of activities that improve communication between citizens, government and technicians
3. Increase in community based activities including the implementation of trainings that include women
4. Introduction to agro-ecological principals and sustainable farm management
5. Activities promoting communication, public engagement and the establishment of a rural development model that can be replicated in other regions of China

The project intends to achieve a number of medium-term outcomes during the project lifetime:

1. Increased knowledge of local agricultural, ecological and socio-economic conditions by both project team, local government officials and beneficiaries
2. Improved communication between citizens, government, research institutes and local technicians
3. Development of local capacity building and training program
4. Application of ecological farm management and the distribution of new/improved varieties from trial farms into communities
5. Local area re-vegetated and contoured to stabilize and reduce soil erosion.

Over the long-term, the project will address the following development priorities:

1. Environment: The project aims to actively rehabilitate the natural resource base of 2 watersheds that reflect the environmental problems of western China, through the adoption of ecological farming practices. One main objective is to reduce soil erosion and increase the long-term viability of the land through sustainable agriculture. Another is to manage livestock in a manner that prevents further soil erosion.
2. Basic Human Needs: Community building, education and social development will be increased through participatory farmer-to-farmer training, which will foster the entrepreneurial spirit and capacity of men and women in the community. The project aims to improve food security and family health through self-reliance in food production, reduce external agricultural inputs including fossil fuels, synthetic pesticides and fertilizers, and minimize vulnerability to extreme weather conditions and drought.
3. Infrastructure Services: The project will support Phase I of the WCDS strategy, involving infrastructure development where services including roads, terraces, stone masonry terrace walls, water storage reservoirs, check dams to help manage water and silt movement, solar energy heating, discharge and water gully head protection earth works, canals and water storage retaining walls, will be installed into rural communities.
4. Women in Development and Gender Equity: Both women and men will be actively encouraged to participate in all project activities. In particular, women

will be encouraged to participate and conduct farmer trainings, and take a larger role in on-farm decision-making through increased access to information.

5. **Human Rights, Democracy and Good Governance:** The project utilizes a participatory approach to development. The project will cultivate and expand the capacity of the communities to generate leadership through a farmer-driven development process, which is essential to the long-term, sustainable results. Communities will be empowered to work in partnership with government to improve local communication links and to facilitate more local input into decision-making processes.
6. **Private Sector Development:** The project intends to improve local economy through market diversification, which will provide a more constant flow of income. Training in ecological production methods will allow farmers to generate income while expanding the productive capacity of the land.
7. **Policy Development:** The project aims to work together with communities, research institutes and local government extensionists and technicians to illustrate a successful model for development that could potentially influence national policy. The project also aims to increase awareness and responsiveness of Canadians to the challenge of creating sustainable development in developing countries and to improve the transfer of information, technology and development skills between Canada and China.

3.0 Project strategy

3.1 Project Methodology

New strategies and efforts are required to create effective sustainable rural development models to respond to these problems. It is evident that a holistic and integrated approach is required to respond to the interrelated challenges of environmental degradation, inadequacies in health and nutrition and low income generating opportunities in the region. The Western China Agro-Ecological Village Development (WCAEV) Project was established in July 2002, to assist the people in communities in Gansu province and in Inner Mongolia. The agro-ecological village development model is currently being implemented in these two locations in Western China. The project emphasizes participatory development processes with communities using a four-step plan (institutional building process, capacity building and training, farm planning, field level implementation) to increase food and energy production and create sustainable livelihoods for individuals and communities, while at the same time protecting and enhancing the natural resource base.

In China, the use of participatory methods and the agro-ecological village model provide a promising new approach for sustainable development in rural communities. While participatory development approaches (such as farmer-to-farmer training) are becoming more widely embraced as nations realize their effectiveness in rural development, there has been little integration of participatory methods into China's development where top

down extension approaches are very common. The project is strengthening efforts in China to encourage participatory processes for sustainable community development through innovative local organizing and capacity building activities.

The Chinese government is committed to piloting this novel approach to improve the quality of the life of the rural poor, restore environmental integrity and accelerate sustainable community development efforts in China. The project is integrated into Phase 2 of the Western China Development Strategy implemented by the Chinese Federal Government and designed to reduce environmental degradation, raise farm family incomes and address socio-economic factors such as household water quality, energy resources, nutrition and education. A key feature of the project is the interdisciplinary team comprised of Canadian and Chinese development workers, soil scientists and agronomists. The Chinese government realizes that while there have been major strides in the adoption of sustainable technologies, it is of paramount importance to explore new approaches to introduce these appropriate technologies to communities to accelerate rural development and ensure their long-term adoption. The severe environmental problems in Western China make the region an ideal candidate for introduction of the agro-ecological village sustainable community development model, and the project provides excellent exposure to support participatory community development in the world's largest developing country.

3.2 The Agro-ecological Village Sustainable Community Development Model

An agro-ecological village is described as a community that is largely self reliant through the creation of integrated and ecological food production and energy systems. Central to this approach is the conviction that ecological land management and sound community organizing forms the basis for sustainable community development. The AEV model involves building up the environmental and agricultural technical capacity of communities in a way that fosters gender equality and social development through improved information availability and an increased decision-making and problem solving skills. The successful implementation of this approach leads to economic prosperity through a diversified and more stabilized local market and improved environmental and agricultural conditions on rural farmsteads.

The general characteristics of an agro-ecological village are outlined and compared to conventional approaches in Table 1.

Table 1. An agro-ecological approach to rural development		
	<i>Ecological System</i>	<i>Conventional System</i>
	<ul style="list-style-type: none"> 1) Emphasizes self reliance & empowerment through maximizing on-farm resource utilization and increasing local production. 2) Market development oriented towards import displacement and local generation/consumption 3) Minimizes human impact on local 	<ul style="list-style-type: none"> 1) Emphasizes export markets to pay for imported goods 2) Approach leaves communities vulnerable to external forces through dependence on imports 3) Degrades natural resource base locally and increases greenhouse gas emissions

	environment & biosphere	
<i>Food Supply</i>	Local and plant based, emphasizing farm fresh production of in-season fruit, vegetables, cereals, corn, root crops, grains legumes and eggs; use of solar heated greenhouses	Much food and livestock feed imported into community
<i>Soil preparation and on-farm hauling</i>	Reduced tillage systems; power from donkeys, mules, and horses that reproduce naturally	Conventional tillage systems, power from tractors that need maintenance and replacement, and are fueled with diesel and gasoline
<i>N Fertility</i>	N fixation from forage and grain legumes; soil mineralization processes; household and animal manures	Purchased urea fertilizer
<i>Minerals</i>	Minimal erosion, recycling of household and animal manures, good soil structure	Purchase Potassium and Phosphorus fertilizer
<i>Seeds</i>	Community seed banking of open pollinated seeds; ongoing on-farm plant improvement from seed adaptability trials and on-farm plant breeding	Purchased hybrid seeds; no local adaptation trials; seeds derived from corporations; transgenic GMO seeds being developed
<i>Weed Control</i>	Mechanical weeding devices; crop rotation; cover crops; balanced soil fertility management; use of competitive varieties and composting of manures	Herbicides and tillage
<i>Insect control</i>	Biological control strategies; resistant cultivars; balanced fertility	Purchased insecticides
<i>Disease Control</i>	Resistant cultivators; diverse cultural management strategies	Purchased fungicides
<i>Irrigation</i>	Modest requirement and efficient usage; provided by alternative water supply options	Gasoline/diesel powered pumps
<i>Crop drying</i>	Uses solar or biomass energy	Fossil fuel powered crop dryers
<i>Marketing</i>	Emphasizes internal self reliance first, then import displacement in local markets and value added processing	Monoculture production emphasized and sold to distant markets in the country or exported
<i>Household cooking</i>	Efficient crop residue and wood stoves; solar and biogas cookers; all biofuels derived from the farm	LPG and coal burning fuel stoves, kerosene as fire-starter; fuelwood gathered off farm or purchased
<i>Electrical power</i>	Low requirement; renewable sources explored if feasible	High requirement and from fossil fuel based mega-projects
<i>Housing</i>	Rammed earth, straw bale and straw-mud composite housing	Cement block and brick housing
<i>Livestock</i>	Sustainable feeding practices from enhanced utilization of permanent pastures with drought resistant/productive C4 grass species	Feeding from crop residues or on over-grazed and steeply sloping lands.

The adoption of this approach will improve a community's understanding of agro-ecological processes. Over time, this will:

- Increase the capacity of local communities to manage their resource base in a sustainable manner;
- Provide farming families with food security, improved health and increased income and reduce their dependence on outside assistance;

- Enable more active participation of women on farms, particularly in decision-making, and increase employment opportunities to reduce outward migration;
- Reduce soil erosion and ensure the long-term capacity of the land for food production
- Improve surface and ground water quality and quantity;
- Reduce health risks to food producers and consumers;
- Help protect and restore biodiversity.

The Agro-ecological Village development model is distinctive in its ability to bridge the communication and information gap between the masses of rural farmers and the Chinese government. Through its participatory approach and holistic design, it innovatively integrates environmental, agricultural, economic and social development through capacity building, training, education and information exchange. It also demonstrates tangible development measures including farm planning, trial farms and seed distribution. It is a simple and effective model, proven both in the Philippines and in Western China, and in almost any rural agrarian community setting. Its participatory methodology allows for high levels of beneficiary ownership, creating long lasting and sustainable results in the community.

3.3 Four-Step Plan

Project activities have been broken down according to a four-step plan that leads communities through the development process:

Institutional building process

This involves communities strengthening their local infrastructure by building the capacity of Farmer's Organizations and improving their interaction with local governmental units. Other approaches, such as the use of surveys and the administration of a Participatory Rural Appraisal (PRA) and development of a Participatory Monitoring and Evaluation (PM&E) Program are also used to strengthen community ties, encourage participation in solving of common problems and increase local ownership of project activities so that they may continue after the project lifespan.

Capacity building and training

Communities improve their information transfer network through the development of farmer-to-farmer trainings in the communities. The local farmers are working with project staff to continually develop and modify the training modules and prepare training programs that are applicable to the local agronomic conditions. They also have selected local farmers to become farmer trainers and perform the trainings. Incorporated into the capacity building aspect of the project, but included in all other areas of the project is the promotion of gender equality through equal access for both genders to project benefits. This is evidenced in the training component of the project through the selection of women as farmer trainers and participants in all community meetings and farmer training sessions.

Farm planning

Through trainings and on the job coaching, farm planning provides farmers with the skills to improve their farm management and incorporate sustainable farming techniques into their daily activities. A focus has been put on sustainable soil fertility and fodder management and optimizing livestock production in response to new grazing policies. Farmers will also be encouraged to “weatherproof” their farms to enable them to withstand extreme weather events such as drought, sandstorms and floods.

Field level implementation

This component of the project involves the establishment of learning farms, which can involve the adoption of many approaches to introducing sustainable farming and on-farm research trials including: adaptability trials; Demonstration of (EFS) Ecological Farming Systems; soil and water conservation; seed banks and plant material multiplication; plant breeding; Appro-tech; livestock management; and farm weatherproofing. As well, the project will aid in the physical improvement of the local environment through such techniques as soil contouring, check-dam construction and slope revegetation.

4.0 Project Activities

Table 2: Summary of Project Activities and Associated Indicators	
<i>Project Activities</i>	<i>Indicators and outputs for activities</i>
<p>1. Baseline data gathering and surveys</p> <p>1.1 Collection and processing of required baseline data, initial site analysis (agroecological assessment of farming systems)</p> <p>1.2 Socio-economic survey: detailed analysis of 30 to 40 households per site</p>	<p>1.1 Baseline data collected and ecological community analysis results.</p> <p>1.2 Collected data and analyzed results from the socio-economic survey.</p>
<p>2. Institutional Building Process</p> <p>2.1 Perform participatory rural appraisal</p> <p>2.2 Strengthening the capacity of Farmer's Organizations</p>	<p>2.1 Completed PRA exercise, record of discussions, needs/objectives analysis, and action plan.</p> <p>2.2 Number of participants involved in community organizations, meetings and activities.</p>
<p>3. Capacity building</p> <p>3.1 Develop training modules</p> <p>3.2. Perform farmer-to-farmer trainings</p> <p>3.3 Develop individual farm plans to implement ecological practices learned in trainings</p> <p>3.4. Develop project gender strategy.</p>	<p>3.1 Completion of ecological farming training modules.</p> <p>3.2 Number of individual farmers attending the trainings, the trainers prepared to give trainings and the number of trainings including field activities (male vs. female).</p> <p>3.3 Number of individual agro-ecological farm plans developed and farmers participating in trainings.</p> <p>3.4 Number of women participating in community projects and activities</p>

<p>4. Field Level implementation</p> <p>4.1 Soil contouring</p> <p>4.2 Revegetation</p> <p>4.3 On farm trials and research (learning farms)</p>	<p>4.1 Amount of agricultural, degraded or environmentally sensitive land improved by soil contouring.</p> <p>4.2 Amount of re-vegetated agricultural, degraded or environmentally sensitive land.</p> <p>4.3 Number of learning farms established and the number of new varieties (germplasm) tested. The PMT together with the local partners are also currently identifying new indicators that can track the project with the communities, which may include the number of new varieties scaled up for mass production and the number of farmers accessing new varieties of crops and livestock.</p>
<p>5.0 Communications and public engagement</p> <p>5.1 Disseminate information to the public through conferences, publications, websites and presentations to interested parties</p> <p>5.2 Video documentary production and distribution</p>	<p>5.1 Development of the AEV development primer. Number of conferences and people reached through the public engagement process.</p> <p>5.2 Video documentary production</p>

4.1. Baseline data gathering and surveys

4.1.1 Collection and processing of required baseline data, initial site analysis (agro-ecological assessment of farming systems)

Background information was sourced on information networks and groups (research institutes, NGO's, community groups, etc.) working in China that are involved in ecological farming and participatory development work or have access to training materials that can be utilized at later stages during the project.

Additional baseline agro-ecological and socio-economic information on the selected communities was obtained before the project was initiated and during its initial stages through a survey of the farming practices used in communities. Project staff completed and analyzed an agro-ecological survey in Dingxi from 30 households and validated results with the households. The results of this assessment were analysed, compiled into a formal report and incorporated into the development scheme for the project and training programs in the communities. Data will continue to be collected during project implementation and also at the end of the project to assess indicators, outputs and accomplishments as well as providing feedback and future recommendations through which programming can be improved.

4.1.2 Socio-economic survey

Careful monitoring of performance indicators is an effective way to achieve desired project impacts and for that reason is an integral part of the Agro-Ecological Village development model. A detailed longitudinal socio-economic survey is being performed each year of

the project and also at the end of the project on 20-30 households in each Dingxi and Zhunger. It will be used to evaluate project indicators, outputs and accomplishments and to provide feedback and future recommendations through which programming can be improved. The survey will address the indicators identified in the original project concept and quantify them in a numerical or “grade” fashion so that differences in communities can be compared to measure project impacts over the life of the project and after it has been completed. Relevant socio-economic indicators that have been included in the survey and will be monitored annually include:

- Demographic conditions
- Family employment, income and expenditure
- Education
- Living conditions, healthcare and “quality of life”
- Food and nutrition, food security
- Household responsibility distribution and gender equity
- Priorities for future development and training needs

Survey data will continue to be used to evaluate project indicators, outputs and accomplishments and to provide feedback and future recommendations through which programming can be improved.

In October 2002, during the initial stages of first year of the project, a detailed Agro-Ecological survey was also performed of the local farming practices to evaluate potential ecological impacts and possible training interests of the community. The results of this assessment were analyzed, formally reported and incorporated into the development of the community through inclusion into the WCAEV Annual Workplan. The annual socio-economic survey also includes a supplementary Agro-Ecological component intended to provide a comprehensive and quantitative annual assessment of the local farming methods, as well as to monitor the agricultural development of the communities. Some of the indicators that have been incorporated into the Agro-Ecological survey include:

- Land use
- Crop, vegetable, fruit, livestock production
- Seed sourcing
- Composting, bio-residue utilization
- Farm records and planning

The same households will continue to participate in the survey every year until the end of the project in the long-term manner of a longitudinal study. Their individual answers will be statistically compared over the years in paired t-tests that will enable the determination of significant variance between years. The surveys from year 2003 will provide a baseline for comparison in the future. The 2003 survey will also be more detailed than in following years to provide a more comprehensive view of life in the watershed.

The original 2003 version of the combined agro-ecological and socio-economic survey was developed using important indicators identified during the PRA, with a shortened

version created for 2004. As noted in the 2003 annual report, the original administration of the survey was slightly delayed for several months by the epidemic of SARS, which restricted public contact. After collection of the original surveys in June of 2003, the PMT felt that the sample in Dingxi was not completely representative of the entire community or inclusive of all socio-economic brackets so several more had to be administered in February of 2004. This delayed the analysis for Dingxi until May of 2004. The data collection and analysis for the 2003 Zhunger socio-economic/agro-ecological survey was finalized in the fall of 2003. The 2004 administration of the socio-economic/agro-ecological survey is on schedule and will be administered in 2004 after the spring planting in June, with a comprehensive report to be completed in the fall of 2004.

REAP-Canada and the PMT also conducted a Participatory Monitoring and Evaluation (PM&E) Workshop with each of the two communities to assess the local progress of the project and how it is addressing local issues after one year and a half of project implementation (the midlife of the project). Stakeholders, including farmers, farmer trainers, local government officials, agronomists and members of the PMT established their expectations of project and questioned if the project was including activities that are addressing prevalent local issues. Participants also noted how these activities would affect the local communities, specific indicators of those effects and a action plan for who would be monitoring these conditions and how the monitoring would be carried out. The outcome of the PM&E workshop was successful in terms of assessing whether or not the project and its beneficiaries remain in agreement in terms of their objectives, expectations, indicators and monitoring system. A report on the PM&E process in each community was compiled by REAP-Canada in June of 2004, Please refer to Appendix 1 for a full copy of the report.

Participatory PRA techniques will continue to be used for monitoring by project staff to collect data from project beneficiaries and encourage group discussions on project and community issues. The issues and indicators identified in the PM&E workshop will be continuously used to validate the action plan, assess the direction of the project, make management adjustments, elucidate procedures and ensure the ongoing capacity building of the community. Participatory evaluations will continue throughout implementation and also at the end of the project to evaluate project indicators, outputs and accomplishments and to provide feedback and future recommendations through which programming can be improved.

4.2. Institutional Building Process

4.2.1 Participatory Rural Appraisal (PRA)

The participatory rural appraisal (PRA) approach was utilized to emphasize local knowledge and enable local people to make their own appraisal, analysis, and plans. It is designed to facilitate and strengthen the capacity of farmer associations in each community. The PRA techniques that were used included group animation and exercises to facilitate information sharing, analysis, and action among stakeholders to enable development practitioners, government officials, and local people to work together to

plan appropriate programs. It also increased the capacity of the local organizations to perform their own ongoing appraisals in a flexible and dynamic manner. The PRA also employed techniques to engage the farmers such as semi-structured interviewing and focus group discussions, preference scoring and ranking, mapping and modelling (resources, social positions, venn diagrams), activity profiles, time-lines and seasonal and historical diagramming. The purpose of these exercises was to identify the needs, constraints and opportunities of the community members, and to outline their vision, mission, goals and objectives (VMGO's), in a manner sensitive to community dynamics. Important in this process is the conceptualization of the roles for each stakeholder, including the farmer organizations and the local governmental groups, and integrating their goals into a common plan for action. The PRA exercises were also performed to establish what resources exist in the community, and what resources will be needed to implement the project. The PRA process also established community understanding of the indicators used to gauge the success of the project, and facilitated the creation of an ongoing Participatory Monitoring and Evaluation (PM&E) program to be maintained by the community members. This will be continuously used to validate the action plan, assess the direction of the project, make management adjustments, elucidate procedures and ensure the ongoing capacity building of the community.

PRA's for both Dingxi and Zhunger were completed in 2002. In Dingxi, participants averaged 104 per day, 32 of whom were women. In Zhunger, the pre-PRA training included 32 participants (6 women). Participants at the village meeting component of the PRA averaged 22 participants per day, 5 of whom were women. A record of discussions, and community needs/objectives was kept and analysis and the development of recommendations for an action plan were prepared in a formal report. The PRA involved a team of people working for approximately one week at each site completing workshop discussions, analyses, and fieldwork. The PRA team included three qualified development experts, Ms. Johanna Pennarz, Mr. Zong Huilai and Mr. Liu Xiaoying, working in conjunction with local partners and government officials working on the project. Upon commencement of the PRA, the PRA team prepared an in-depth report of their findings and recommendations that was incorporated into project activities and workplan. PRA techniques will continue to be used by project staff to collect data from project beneficiaries and encourage group discussions on project and community issues.

4.2.2 Strengthening the capacity of Farmers Groups

Capacity building should be understood as an ongoing process in this project and a cross-cutting issue in all components. The main aspects of the capacity building process are:

- Increasing farmers' capacity to analyse their local environment and apply ecological principles to their farming methods.
- Institutionalise approaches of mutual learning, support and information exchange within the community (local)
- Institutionalise approaches to network information and experiences outside the community (regional and national)
- Community Organization

One strategy of the agro-ecological village development model is to empower and more effectively use peasant and community organizations in rural development, which is increasingly possible in China. Rural areas are experiencing changes in local dynamics because of reforms enabling the participation of peasant farmers in local governance, through the establishment of locally elected positions in villages. These locally elected farmer leaders can link the project into local governance structures to encourage rural development.

Farmers groups are playing a key role in implementing the project and have some responsibility in managing the farmer trainers. Farmer organizations can help create a social infrastructure that brings activities into farming communities. Encouraging the efforts of farmers to work together to address local problems is critical for encouraging effective and low cost rural development. The groups link farmers in different communities in obtaining information on farming techniques and the latest agricultural trends, sharing equipment or post-harvest facilities and provide support and learning. They also facilitate cooperation with local government units, and support marketing efforts through the creation of farmer co-operatives.

Community organizers have also been employed to develop the ability of local institutions to take a more active role in the community's development process. Eight community organizers, 4 in each of Dingxi and Zhunger, are currently working and are actively involved in the existing trainer's training, farmers' training and developing the local community infrastructure.

The Project Implementing Teams (PIT's), composed of farmers, farmer trainers, local community organizers, village group leaders, local government extension personnel and other technical persons, have also been strengthened in Dingxi and Zhunger through a series of intensive trainings and consultancy services from technical experts. They continue to meet monthly to support the engagement of local farmers in project activities and provide guidance and local input to the project development.

4.3 Capacity Building and Training

4.3.1 Development of training modules

A variety of participatory learning approaches have been used to develop a comprehensive training program for the pilot communities. The program includes formal training manuals dealing with sustainable farming techniques and farm development, but will also involve applications and mentorship including cross-site visits, on the job coaching during the growing season and kitchen table roundtable discussions in the winter. For each training topic, an interactive training module has been developed under the direction of REAP-Canada and copies printed and delivered to farmer trainers and farmers in the communities. The modules describe all of the important concepts that should be conveyed to the peasant farmers, and will act as a guide for the trainers, to be delivered in conjunction with the on-farm test trials.

The basic introductory training modules developed in Canada and locally adapted for use in China and translated from English into Mandarin during the first year of the project include:

1. Introduction- Principles of ecology and sustainable agriculture
2. Soil Fertility Management
 - Organic Matter
 - Composting
 - Manure management
3. Cropping Systems
 - Crop Rotations
 - Multiple Cropping
4. Green manures and cover crops
5. Weed Management Control
6. Insect and Disease Control
7. Soil and Water Conservation

The following modules were developed during the 2003-2004 year and have also been delivered as trainings to the farmers:

8. Agro-ecological farm planning
9. Handbook for Project Management

These modules will continue to be updated and modified throughout the project according to the needs and developments of the farmers. Additionally, the Forage Production/Livestock Husbandry module is currently under development and will be completed and delivered to farmers during the upcoming year

Farmer trainers also participated in a workshop improving their outreach and training skills to assist them in becoming more effective trainers. The workshop included an evaluation of trainings taken place thus far as well as a critical evaluation of an actual training session; exercises to gain understanding of participatory processes; activities to assist in identifying reasons for problems and successes in programming and the development of solutions and future activities to improve skills of farmers. The workshop also included a segment on “How to become a better trainer,” which included tips and reminders of how to be more effective in front of an audience (hints involving eye contact, volume, positioning and discussion facilitation etc.).

Additionally, approximately 40 technical books, including topics such as Ecological Farming, Soil Fertility, Disease Weed Control, Sheep Raising, and Organic Food management were purchased in 2003/2004 and distributed to trainers in Dingxi and Zhunger. Further training materials are expected to be provided to trainers in the coming season.

Under the national strategy of Great Western China Development Strategy, the improvement of the environment has attracted great attention and become a development

priority. The practical solutions, both agronomic and other, that are offered in the introductory training modules are highly appreciated.

4.3.2. Farmer-to-farmer trainings

Training Programs

A “ladderized” training program is utilized in the agro-ecological village approach. Ladderized trainings are a series of training sessions presented in an order that gradually increases the technical level of information available to the farmer. Each community initially underwent a custom training needs analysis to determine which training sessions were most relevant to the farmers through the PRA process and one-on-one interviews with community members and local government extension agents. Ongoing monitoring of the applicability of the training programs will be done through feedback from participants and trainers. Initially, a sensitization of the communities is important to deepen the level of understanding of the social and economic situation the farmers are facing, both locally and nationally. This portion also provides a historical and ecological analysis of their situation, and examines key events that brought about their current situation. The problem-solving component of the exercise is designed to energize the farmers and encourage them into action in their communities. This is followed up by technical trainings on ecological farming, and includes modules on farm planning, diversified farming, input reductions, plant improvement, and advanced ecological farming techniques. Trainings also include “field trips” to model farms employing sustainable agriculture or in the process of conversion, and mentoring through farm visits and individualized on-the-job (OJC) coaching by trainers.

The farmer training program is on schedule and has been found to be successful in both communities. During the past reporting period in Dingxi, 250 individual farmer training days (including 120 training days of women) were conducted on farm planning, soil fertility, livestock raising and feeding and disease management. In Zhunger during the past reporting period, 383 individual farmer training days (including 68 trainings days of women) were conducted on ecological farming, soil fertility, fodder growing, livestock raising and feeding preparation, cropping systems, disease management, weed control, variety testing and local adaptability, water harvesting, soil conservation and livestock raising.

Development of trainers

The project utilizes ‘farmer-to-farmer’ training, a well-proven peer education training system utilized by farmer alliances in Canada and the Philippines. It is evident with millions of rural peasants in China, conventional training approaches using existing government extension positions will not adequately meet the enormous training needs of farmers in the nation. Farmer-to-farmer training is a core component of the WCAEV project. It is an approach that can help enable large numbers of farmers to have access to training using this effective and low cost learning method.

Fundamental to this approach is to develop experienced farmer trainers, known as "first liners" to lead training sessions. These individuals will be farmers having a sound understanding and skills in farming, understanding of social and ecological issues and effective organizational and facilitation skills. Other farmers undergoing the process of becoming an experienced farmer trainer, are being trained as "second-liners" to re-echo these lessons in their local areas to disseminate the information. During the session, these second liners will play a support role, learn through actual experience and gain confidence in the training process. Through this participatory peer education approach, trainers are continuously being developed, and groups are kept small as farmers are exposed to a diversity of farmer trainers and issues. This training approach is being adopted for instructing individuals how to employ organic farming, diversify their production, develop their farm in a holistic manner, and every other aspect of the agro-ecological village development.

It is essential that women are enlisted as trainers in the farmer-to-farmer training program. The purpose of this is threefold, first to build the capacity of these individual women as trainers, secondly, to have women engaged as active participants in the project and ultimate in the community, and finally because it is from women that other women will learn best. This is one of the most challenging aspects of the programming as the women in these communities may be poorly educated and painfully shy. However, we must recognize that the involvement of women in every aspect of the project is fundamental to the improvement of the quality of life for the farmers, for the cohesion of the villages, and for overall success.

The initial mentoring of the trainers was provided by project staff and by experienced farmer trainers from outside agencies. The farmer trainers have been developed with participatory methods, so as to actively engage all members of the community including the women and the shy farmers. Local professionals trained in participatory methodologies were sought to aid in the training process. Experts from the field of ecological farming and soil and water conservation will continue to mentor the farmers so that they can provide the more advanced trainings in the future.

In each of the pilot communities, 10-15 leading farmers in each community were selected by the PMT to undergo training as "first liner" farmer trainers. The "first liner" trainers are the ones to primarily deliver the trainings to the rest of the community and form the core of the training program, with other farmers selected to continue to develop as "second liner" trainers. First liner farmer trainers only work at a part time level so as to encourage them to maintain their farming livelihoods and enable them to further develop their own farms as "learning" farms.

Eight farmers from Dingxi, including 3 women, and 10 farmers from Zhunger, including one woman, were initially selected from the PRA as first liners to deliver the trainings. The Zhunger team has also recently enlarged to 12 members with 2 new female trainers enlisted in January of 2004. The 2 new trainers are now up to date after continuous technical training and review of the training materials.

During the past reporting period in Dingxi there were 30 individual farmer-trainer training days (including 10 women days) conducted on subjects including Farming Systems, Soil Fertility, Livestock and Disease Management. In Zhunger during the past reporting period there were 110 individual farmer-trainer training days (including 30 women days) conducted on subjects including Farm Planning, Organic Fertilizer, and Grass and Silage.

4.3.3 Develop individual farm plans to implement ecological practices learned in trainings

The communities are currently undergoing an extensive farm planning process. The farmers must first have an understanding of ecological processes and objectives before being able to plan their farm in a sustainable and successful manner. The farm planning process starts with the analysis of problem areas on individual farms and identifying areas for improvement, finally determining concrete actions. Individual plans have been developed and revised as necessary to implement agro-ecological measures and renewable energy systems for their farms and households and to identify livelihood opportunities to increase household income and employment opportunities. The local farmers support each other in planning their individual farms. Local project officers, farmer trainers and community organizers provide support to farming families to create detailed action plans for their farms. Technical experts are on hand to discuss technical details, but largely it is the individual farmers planning their own farms with trainers facilitating their planning through discussions (both group and individually).

The farm planning component of the project is also on schedule with a farm planning training module developed and translated into Chinese. Farm planning trainings have been provided to all 20 of the farmer trainers in Dingxi and Zhunger. Additionally, farmers in the Zhunger community have finished 66 new basic farm plans with the assistance of the farmer trainers. Earlier this year, 120 new basic farm plans were drafted by farmers in Dingxi with assistance of trainers and are now awaiting implementation. Upcoming plans include the development of sustainable livestock management plans.

To develop their farm plans, farmers have utilized seasonal calendars, transect maps, workplans, cropping systems and rotation information, green manures, 5 and 10 year land use goals, predicted expenditures for the proposed farm ecologization. Farmers have also incorporated strategies to conserve water and soil and minimize the use of fossil fuels and synthetic pesticides and fertilizers. Individual farm transformations include the implementation of more comprehensive crop rotations, and soil fertility management plan.

4.3.4 Project gender strategy

Women can play a significant role in confronting the environmental and economic problems present in households and rural communities today. This project proposes a participatory development process where individuals and communities are empowered to increase food and renewable energy production and create sustainable livelihoods. The project encourages innovative community organizing and capacity building in women to take active roles to improve their quality of life. Given the historical context of China, increasing the development of women in a community is an area of difficulty and getting

women involved is focused on in every project task. From a seasonal calendar generated in the PRA, we understand that women play a very important role in agricultural activities. Women are doing 2/3 agricultural activities with support from men and old family members and school children. However, men make most of the decisions. During an interview, women said that they always follow the instructions from their husband on farming activities because their husbands have more knowledge and received higher education than women.

Women in Dingxi have been actively engaged in recent project activities, including farmer's trainings (48% female participants). Furthermore, 3 women out of 8 remain as the "first liner" trainers. Women's engagement in Zhunger has also been improved, with an average of 18% participating in farmer training sessions. The farmer trainer team in Zhunger has also enlisted 2 additional women as trainers, ensuring 3 out of 11 trainers are now women. It was noted that, in Zhunger at the initial stages of the project, it was highly difficult to identify competent woman candidates to join the trainers due to their poor education and limited leadership and decision-making capabilities. However, a gender strategy was developed to encourage women's participation as trainers. As a result, some promising individuals were identified and enlisted as new female candidates to join the farmer training team.

The project partners continue to collect sex-disaggregated data to ensure effective reporting of gender-related activities and indicators. This data includes perceptions and actual experiences of women on their quality of life, and will report socio-economic indicators including income, livelihood, education, social status, daily activities, decision making, physical well being, and quality of life (access to medical care, quality of housing). Data and observations will be included in progress reports. All impacts, outcomes, and outputs will be analyzed with an emphasis on gender sensitivity. These methods of reporting will determine how effectively the project addresses gender issues and benefits for women.

A systematic approach during the implementation of the project has been important to ensure a high level of participation among women and encourage men to recognize the changing role of both men and women. Both sexes are being sensitized to understand the benefits they will acquire from such changes in their lives and appreciate the impact these will have on their community, economic status and environmental condition, both in the present and in the future.

4.4 Field Level Implementation

4.4.1 Soil contouring

It is of paramount importance that the landscape ecology of these regions is restored. Without cessation of soil erosion through field contouring and revegetation, fields will continue to lose their productive potential. Site remediation efforts will also help reduce the damaging impacts of intense summer rainfall events and help conserve the limited water resources of the region. Main activities have included the design and

implementation of soil conserving contours of the steeply sloped areas, and creating water conservation and catchment areas.

In Dingxi, active measures are being taken to control the extreme soil erosion occurring in the area, with a focus on the remediation of 423 ha of land extremely susceptible to soil erosion, including 60 ha of terracing over a 3-year period. The project also involves the construction of 100 check dams, 190 water-harvesting tanks and the construction of 13.6km of new road. In Zhunger, to reduce the annual soil erosion rate of 80%, and control sedimentation rates of 32,000 t/y, soil contouring and check dams are also being constructed to mitigate erosion in 61 ha of gully terrain. This activity is currently ahead of schedule with over 95% of the field level implementation in terms of check dams, water ponds, terrace and road-making already completed. In Dingxi, all of the engineering for soil conservation has finished with the remaining 5% of activities to be completed in the upcoming year. This work was completed under the programming of the local bureau of soil and water conservation.

4.4.2 Site Revegetation

Revegetation will help improve the quality of life for local residents by reducing the frequency and intensity of dust storms, retaining more water in the watershed, reducing siltation and greatly improving the quality, structure and stability of local soils. Presently, there are local efforts to introduce both Sea Buckthorn and *Caragana micophylla* to control soil erosion on steep slopes in this region. Sea buckthorn has been quite successful in alleviating soil erosion in gullies. Both caragana and sea buckthorn are being used on the severely eroded sloping lands. In gullies, sea buckthorn helps the recovery and enables the growth of perennial grasses and the naturalization of other tree species, which further helps stabilize environmentally sensitive areas. For the project, after the steeply sloped terrain has been adequately prepared and contoured, the land will be revegetated with grasses, shrubs and trees.

In Dingxi over the next 3-years, the project will involve the reforestation of 239 ha with shrubs and trees, and the revegetation of 126 ha with grass. To reduce soil erosion and control sedimentation In Zhunger over the next 3 years, 1543 ha of Seabuckthorn will be planted and permanently established. The majority of this work will be completed under the programming of the local bureau of soil and water conservation. During the last year in Dingxi, 270.7 ha of sloping land was prepared and re-vegetated by *caragana* and other appropriate species. In Zhunger, 600 ha of degraded land was re-vegetated by *seabuckthorn*. Each farm household is responsible to care for the afforested lands.

In Dingxi the project involves the reforestation of 239 ha with shrubs and trees, and the revegetation of 126 ha with grass over a 3-year period. At this time in Dingxi, all of the re-vegetation for soil conservation has finished. In Zhunger, to reduce soil erosion and control sedimentation, the project involves the planting and permanent establishment of 1543 ha of Seabuckthorn over a 3-year period. During the last project term in Zhunger, 300 ha of land was newly re-vegetated by *seabuckthorn* etc. This activity is currently ahead of schedule with the total re-vegetation complete for the project.

4.4.3 On-farm Research Trials

It was identified through several initial meetings with farmers, farmer trainers and local government extension personnel and through an agronomic survey of 30 rural households, that there exists a strong desire to assess new crops and improved varieties of existing crops under cultivation. There is particular concern amongst the farmers to identify more drought tolerant crops, as drought presents a serious threat to their livelihood with their current production systems. There is also concern about the need to harvest more forage from perennial grasses and fodder trees to provide feed for the livestock under the new grazing restrictions on sloping lands. The Dingxi Agro-Ecological farm survey indicated 88% of their farm income was from cropping. Not surprisingly, the community's main interests for farm development were in crop production. Generally their interest in crop improvement was directly related to the area under cultivation, with potatoes and alfalfa being of most importance to the community. Sheep were the highest priority for improvement due to the need for developing "in-house" rearing as result of changes in grazing policy.

Dingxi Priority Rankings, Spring 2003		
Crops	1	Potatoes and alfalfa
	2	Peas and lentils
	3	Corn and wheat
	4	Flax, buckwheat, millet,
	5	Bean and soybean
Livestock	1	Sheep
	2	Chickens, rabbits, cows and pigs

The communities in Zhunger were generally were interested in growing crops only for household food security. Most farmers felt increasing production of crops for market sale would leave them mired in poverty as the land was not generally well suited to annual crop production. They felt that their income base could be more securely developed by improving their quality of livestock and the quantity and quality of forage production. Most farmer trainers felt that buying male breeding stock of improved livestock for crossbreeding with their existing breeding stock was the most viable way to transform their breeds over to improved types adapted to in-house feeding.

Zhunger Priority Rankings, Spring 2003		
1	Livestock	Locally adapted to conditions and in house feeding
2	Forages	Improve quantity and quality of stored feeds with an emphasis on alfalfa, and secondarily perennial grasses and sorghum sudan grass
3	Food crops	Emphasis on food security crops such as potatoes, millet and corn. Introduce more grain legumes including soybean, kidney bean and peas.
4	Vegetables	Chinese cabbage, green beans, tomato, radish, carrots, cucumber and green pepper

5	Shelterbelt species	Drought resistant trees with economic benefits especially apricot and Chinese date
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Based on these interests, a number of possible new crops were selected to undergo further assessment during 2003-2005. These include:

1. Annual Crops: Sweet potato, chick peas, soybeans, winter cereals, faba-beans
2. Forage crops: warm season grasses including switchgrass, big bluestem and sorghum sudan-grass
3. Cool season perennial forages including brome grass, sheep grass, crested wheatgrass
4. Fruit trees: including Saskatoon berry, choke cherries, sand cherry, sour cherry, plums, apples, grape
5. Drought tolerant Vegetables: green beans, edible soybeans, edible peas, scorzonera, okra, lima beans, , amaranth and lentils

Research trials were established in the spring of 2003 by the local soil project staff, on land volunteered by local farmers. Initially, the plots are small which places the farmers at a minimal risk if the crops fail. The sites are generally on the farms of the farmer trainers, so as to establish a stronger connection between the test trials and the ecological trainings. This would also be ideal for farm visits and “out of class” field trips. The main methodology for testing the seeds is to establish adaptability trials at several locations in each watershed. Several specialists in annual crops and perennial forage crops with an understanding of the climatic conditions of Western China have been and will continue to provide assessments of possible new crops and variety introductions.

In Dingxi, 2003 saw the successful introduction of improved varieties of potatoes, alfalfa, millet and corn with some farmers experiencing up to 30% yield increase. In 2004, the emphasis was placed on identifying improved cultivars of other field crops including peas, lentils, flax, and wheat. A total of 43 varieties of improved crop, grass and vegetable were sourced and distributed among 34 experienced farmer households for trials in the 12 groups in Dingxi. These farmers are using adaptability trials to test for suitability of local conditions and ecological management. Subsequently, they will multiply the improved strains identified for further dissemination in the community next year.

In Zhunger, emphasis was placed on obtaining new sources of forage crops and food crops for sustenance (potatoes, millet) as well as corn for livestock feeding. A total of 40 improved varieties of crop, grass and vegetable have been sourced from seed distribution centres or obtained from local scientists. They have been distributed in 14 households. Seed from the previous year was also multiplied and distributed amongst members. This activity is highly appreciated by farmers in both communities. The trial results of the previous year were also thoroughly discussed and analyzed. Twenty-five corn silage silos were set up for demonstration and training in Zhunger to improve the quality of livestock feed. In the coming 6 months, some varieties of sheep, new crop varieties and new tree species will be purchased and distributed in Dingxi and Zhunger respectively.

The indicator for this project activity is currently the number of learning farms established and the number of new varieties (germplasm) tested. The PMT together with the local partners are also currently identifying new indicators that can track the project with the communities, which may include the number of new varieties scaled up for mass production and the number of farmers accessing new varieties of crops and livestock.

Learning Farms

Further evolution of the Agro-Ecological Village Development Model has led to the development of “Learning Farms” as tool for the introduction of sustainable farming into communities. Learning farms can combine several approaches including:

- Adaptability trials (new varieties/crops, drought/water/salt resistant)
- Demonstration of (EFS) Ecological Farming Systems (contouring, composting, intercropping, multiple cropping, green manures, soil fertility management etc.)
- Soil and water conservation (windbreaks, checkdams, drip irrigation)
- Seed banks (living gene bank) and plant material multiplication (tree nursery)
- Plant Breeding
- Agro-tech (farm equipment, on-farm energy management)
- Livestock (new varieties, sustainable fodder production)
- Weatherproofing farms (reducing vulnerability to vagaries of the weather)

Learning farms are coordinated by farmer trainers or other interested farmers that are willing to share their experiences and ideas with others. In this way, the farmer trainers can spend time working on maintaining and improving their own individual farms while strongly supporting community initiatives and the sharing of information and plant materials in the community. This also establishes a stronger connection between the test trials and the ecological trainings, and is ideal for farm visits and “out of class” field trips.

Learning farms can broaden development efforts by integrating several key ideas as techniques on one “regular” farm. They also avoid the concept of a terminal “Model Farm” with one model farmer, by placing the farmer and the farm at the center of learning in the community. Farmers feel the terminology “Learning Farm” is progressive as it does not create an image that a farm is “fully developed or perfect” or encourage arrogance in farmers. Farmers want to put the emphasis on farmer trainers creating a small commercial farm that is sustainable without outside support so that the development process can be feasibly replicated by other farmers.

The learning approach encourages the exchange and progression of ideas and the constant observation and assessment by the farmer trainer and others in the community. This process is greatly stimulates brainstorming sessions which can occur when the community gets together at the farm or during cross site visits that occur when from farmer trainers and farmers come from other communities. Overall we believe this concept to be an important new orientation that is a logical evolution for the development of farmer-led ecological farming systems research and extension as it enables scarce resources for rural development to be used as effectively as possible.

4.5 Communications and public engagement

Through a diversity of communication methods including public presentations, written articles, a short documentary video and web site, Agro-ecological Villages will be widely publicized in China. The WCAEV project has been the first to be selected by the Shell Foundation to be featured in a Shell China advertisement, which will be produced to demonstrate Shell's commitment to sustainable development in China. The promotion would be for Chinese public only and would be shown countrywide.

Project Manager, Mr. Henry Lu visited Canada in January of 2003 where he was involved in conferences, meetings and presentations. This coming summer there are plans to bring Mr. Lu back to Canada for further public engagement activities and partnership building activities.

In December, 2003, Mr. Roger Samson and Miss Claudia Ho Lem attended the CIEPEC (China International Environmental Trade Show and Conference) and directed several workshops and presentations on the WCAEV project as part of a program on environmental and climate change development in China.

As the project proceeds, a development primer on agro-ecological village programming is being created. This primer details specifically what is needed, and the methodology used to encourage rural communities to become more self sufficient through sustainable agriculture and ecological production methods. Background research on the chapters for the "AEV Primer" is currently being conducted with a detailed outline already established for its development. Major contributions to the "AEV Primer" will be made this coming year following the completion of the training modules.

REAP-Canada continues to engage the public in English and Mandarin through a variety of communications strategies including the production of various printed materials and our annual newsletter where several articles have been published detailing the development of the AEV model and its progress in China. REAP is also facilitating the development of our new website, currently under production to be completed this coming summer. REAP will continue its tradition of reporting on international projects and our holistic community development efforts at national and international conferences dedicated to ecological agriculture, development and food security, both in Canada and abroad, including a being a primary sponsor of Canada's largest organic conference held annually in Guelph, Ontario. The project is to be shared with others in the development and academic community in Canada so that any lessons learned and developmental techniques may be applied elsewhere.

5.0 Project Impact

The long-term impact this project intends to make is to improve the lives of farmers living in environmentally degraded environments through the widespread adoption of sustainable agriculture techniques and other capacity building activities at the community level. This includes the utilization of farmer-to-farmer trainings to improve the understanding and implementation of agro-ecological processes that restore the landscape

ecology, require minimal use of fossil fuel based energy inputs, and encourage diversified and integrated production systems. This can bring economic gains to communities and will also improve self-sufficiency, increase production, improve marketing opportunities, increase employment and income, and improve health from a fresh and more varied diet. The project aims to improve the lives and roles of women in communities through a participatory development approach that emphasizes gender issues. The project envisions the successful implementation of a sustainable community development model that can be replicated in other areas of China to reach the millions of peasant farmers who desire to improve their quality of life. The Agro-ecological Village Model has been implemented because it is locally adaptable and is based on the transfer of sustainable agriculture techniques to whole communities. As the benefits of sustainable community development are realized, the people will have greater household self-reliance through increased income and opportunities.

The Agro-ecological Village development model is distinctive in its ability to bridge the communication and information gap between the masses of peasant farmers and the Chinese government. Through its participatory approach and holistic design, it innovatively integrates environmental, agricultural, economic and social development through capacity building, training, education and information exchange. It also demonstrates tangible development measures including farm planning, trial farms and seed distribution. It is a simple and effective model, proven both in the Philippines and in western China, and in almost any rural agrarian community setting. Its participatory methodology allows for high levels of beneficiary ownership, creating long lasting and sustainable results in the community.

Over the long term, the project will result in an improved quality of life and a reduction in environmental degradation to the rural farmers targeted as the immediate beneficiaries. It will also develop their social and community networks, improving relations between government offices, technicians and farmers, and between men and women. It will improve the agronomic practices currently being used in remote rural areas and empower rural peasants to take a more active role in their development process through the PRA, farmer-to-farmer training and on-farm trials. Please refer to Table 3, which identifies how the project has progressed on these fronts during its second year of implementation, as measured by key project indicators.

Table 3: Overall Project Progress for Year 2 of the WCAEV Project		
Project Output	Key Project Indicators	Progress
		Dingxi
Increased capacity of farmers through	900 trainees trained by March, 2005.	Training modules have been developed printed and distributed to farmers. They include: Handbook for project management, introduction to ecological farming, soil fertility, cropping systems, disease management and weed control, soil conservation and agro-ecological farm planning.

establishment of training network		In Dingxi, 8 “first liner” farmer trainers (including 3 women) have been trained. To date there have been 30 individual farmer-trainer training days (including 10 women days) conducted on subjects including Farming Systems, Soil Fertility, Livestock and Disease Management.	In Zhunger, 12 “first liner” farmer trainers (including 1 woman) have been trained. To date there have been 110 individual farmer-trainer training days (including 30 women days) conducted on subjects including Farm Planning, Organic Fertilizer, and Grass and Silage.
		To date in Dingxi , 250 individual farmer training days (including 120 training days of women) were conducted on farm planning, soil fertility, livestock raising and feeding and disease management.	To date in Zhunger, 383 individual farmer training days (including 68 trainings days of women) were conducted on ecological farming, soil fertility, fodder growing, livestock raising and feeding preparation, cropping systems, disease management, weed control, variety testing and local adaptability, water harvesting, soil conservation and livestock raising.
	300 farm plans developed by March, 2005.	In Dingxi, 150 farmers training days (including 30 women days) have been conducted on the introduction to farm planning. To date 120 basic farm plans have been drafted by farmers in Dingxi with assistance of trainers and are now awaiting implementation.	To date in Zhunger, 190 farmer training days (including 23 women days) were held on agro-ecology. Farmers in the Zhunger community have completed 66 new basic farm plans with the assistance of the farmer trainers.
Increased economic activity	Household income increased by 20% by March, 2005.	Local information was collected and analyzed during 2003 in the administration of a socio-economic/agro-ecological survey. The data from these surveys was drawn up into a formal report that establishes the baseline socio-economic conditions in the communities of Dingxi and Zhunger. Data from subsequent surveys to be conducted in 2004 and 2005 will allow for the determination of a significant statistical change in the socio-economic conditions in these communities. Farmers in Dingxi have made an initial analysis of their current agro-economic situation. They have come up with several promising solutions including the identification of additional crops that would increase income, and crop rotation systems that would complement these products. As a result of the new government instituted land reclamation strategy, farmers in Zhunger have identified livestock as their most viable “cash crop.”	

Improved status and quality of life of women in rural communities	Women involved in 20% of project community activities by March, 2005.	Women in Dingxi have been actively engaged in recent project activities, including farmer's trainings (48% female participants). Furthermore, 3 women out of 8 remain as the "first liner" trainers.	Women's engagement in Zhunger has also been improved, with an average of 18% participating in farmer training sessions. The farmer trainer team in Zhunger has also enlisted 2 additional women as trainers, ensuring 3 out of 11 trainers are now women. It was noted that in Zhunger during the initial stages of the project, it was highly difficult to identify competent woman candidates to join the trainers due to their poor education and limited leadership and decision-making capabilities. However, a gender strategy was developed to encourage women's participation as trainers and promising individuals were identified and enlisted as new female candidates to join the farmer training team.
	Improved quality of life (housing, education, health) in rural communities by March 2005.	Both communities have begun the process of evaluating their current environmental and economic situation, with a focus on community based solutions aided by advances in education and technology provided by the project. Local information was collected and analyzed during 2003 in the administration of a socio-economic/agro-ecological survey. The data from these surveys was drawn up into a formal report that establishes the baseline socio-economic conditions and quality of life that people experience in the communities of Dingxi and Zhunger. Data from subsequent surveys to be conducted in 2004 and 2005 will allow for the determination of a significant statistical change in the quality of life in these communities.	
Landscape restoration to reduce soil erosion through contour farming, re-vegetation of sloping lands and controlled grazing	Improved environmental conditions and a 33% reduction in areas vulnerable to soil loss by March 2005.	A focus on degraded environmental conditions and practical solutions, both agronomic and other, has been included in the introductory training modules. Active measures are being taken to control the extreme soil erosion occurring in the areas of Dingxi and Zhunger. This will be done through the remediation of 484 ha of land extremely susceptible to soil erosion, including measures such as terracing, the construction of 100 check dams and 190 water harvesting tanks and the making 13.6km of new road. Additionally, to reduce soil erosion and control sedimentation, preservation measures by the local soil and water conservation bureaus have reclaimed 1908ha of sloping farm land by reforestation with shrubs and trees, and permanent establishment of grass and <i>seabuckthorn</i> . At this time the total area slated for re-vegetation has been completed for the project.	

6.0 Project Outlook

Project staff are continuing on with high enthusiasm as the project management and implementing teams are functioning effectively and embracing the project mandate and increasing local ownership of the project. Furthermore, the establishment of the learning farms, the introduction of new varieties of crops and seeds, and the training of the farmer trainers has been highly appreciated by community farmers, with the positive results

reaching many levels of community members. Farm plans have been developed and are currently awaiting implementation and farmers are anticipating upcoming trainings. During the upcoming 12 months the project activities will continue to be undertaken as outlined in the upcoming workplan for year 3.

Below are some details of the project objectives and difficulties that project staff have anticipated for the coming year:

6.1 Baseline Data Gathering and Surveys

Baseline data was collected and analyzed during 2003 in the administration of a socio-economic/agro-ecological survey. The data from these surveys was drawn up into a formal report that establishes the baseline socio-economic conditions in the communities of Dingxi and Zhunger. Data from subsequent surveys to be conducted in 2004 and 2005 will allow for the determination of a significant statistical change in the conditions in these communities. Survey data will continue to be used to evaluate project indicators, outputs and accomplishments and to provide feedback and future recommendations through which programming can be improved.

A Participatory Monitoring and Evaluation (PM&E) Workshop was also facilitated by REAP-Canada and the PMT in each of the two communities to assess the local progress of the project and how it is addressing local issues after one year and a half of project implementation (the midlife of the project). The PM&E workshop successfully assessing whether or not the project and its beneficiaries remain in agreement in terms of their objectives, expectations, indicators and monitoring system. Participatory PRA techniques will continue to be used for monitoring by project staff to collect data from project beneficiaries and encourage group discussions on project and community issues. The issues and indicators identified in the PM&E workshop will be continuously used to validate the action plan, assess the direction of the project, make management adjustments, elucidate procedures and ensure the ongoing capacity building of the community. Participatory evaluations will continue throughout implementation and also at the end of the project to evaluate project indicators, outputs and accomplishments and to provide feedback and future recommendations through which programming can be improved.

6.2 Institutional Building Process

The project implementing agencies are working to ensure a high degree of ownership by the project beneficiaries through the use of a community based, participatory development approach. Communities have already identified their constraints, opportunities and needs through a Participatory Rural Appraisal (PRA) process. The farmer-to-farmer training will allow local farmers to take the lead in the capacity building process. The investment in strengthening the farmers' institutions, and developing bottom-up training programs to complement the traditional top-down infrastructure are key features that will help continue the development process in communities beyond the project's lifespan. The investment in empowering and training farmers generates a high capacity to continue the development process. Increased farm income will allow farmers

to reinvest capital into newly identified opportunities. The emphasis on ecological farming systems, training and development, contour farming, and re-vegetation of sloping lands will also ensure the long term maintenance and improvement of the agro-ecosystems from which the rural communities economies can continue to evolve. The project is designed to ensure sustainability of the development intervention. The strong emphasis on capacity building in the project minimizes the risks that the process of sustainable community development will not be sustained.

Community organizers will continue to develop the ability of local institutions to take a more active role in the community's development process and will remain actively involved in the existing trainer's training, farmers' training and in developing the local community infrastructure. The Project Implementing Teams (PIT's), composed of farmers, farmer trainers, local community organizers, village group leaders, local government extension personnel and other technical persons, will also continue to support the engagement of local farmers in project activities and provide guidance and local input to the project development. The newly established Project Technical Team (PTT) continues to build its capacity through the inclusion of local experts on sustainable agriculture and livestock management into the project training structure. The PTT will continue to organize technical trainings and distribute information on topics relevant to the local farmers. The Project Management Team (PMT) continues to improve its capacity at project management with a participatory orientation, including participatory techniques regularly in project activities and developing a project management training module. The PMT will continue to provide guidance on the sustainable evolution of the project. Many of those helping facilitate the project at the local level will remain as resource people for the community. The farmers' institutions and local government resource people will continue to be in place and provide support services to the community to continue local development efforts.

6.3 Capacity Building

Farmer Trainings and Farm Planning

'First liner' farmer trainers have been trained and are effectively delivering both small and large scale trainings on the introduction to ecological farming to local villagers. They will continue to provide trainings, mentoring and on the job coaching to farmers in the village to assist with farm planning and sustainable agricultural systems management in the upcoming year. First and Second liner trainers in both Dingxi and Zhunger will continually undergo training and capacity building as required to prepare for the delivery of the training program to the rest of the village and community members. They will also further develop the training program and manuals to improve the complexity of the technical information as well as to improve the suitability for local farmers. Additionally, farmer trainers will further their understanding of participatory processes; develop their ability to assess problems and successes in programming and the development of solutions and future activities to improve skills of farmers.

The existing training modules will continue to be updated and modified throughout the project according to the needs and developments of the farmers. Additionally, the

Livestock Husbandry module is currently under development and will be completed and delivered to farmers during the upcoming year.

The farmer training program is on schedule and has been found to be successful in both communities. Farmers in Dingxi and Zhunger will continue to receive trainings on ecological farming, farm planning, soil fertility, cropping systems, disease management, weed control, variety testing and local adaptability, water harvesting, soil conservation and livestock raising and fodder production.

Basic farm planning sessions have been completed and will continue into the next season. More advanced sessions are also planned for the upcoming year. The ‘Introduction to farm planning’ training module will be modified to improve suitability for farmers and the local agronomic situation. Ongoing modifications to the farm-planning module will be made by the farmer trainers themselves. In year two, the farmer trainers will also become more comfortable in conducting “farm visits” and assessing farming systems and farm plans on site and assisting with “on the job coaching.” Farmers will spend time doing cross visits on each others farms and managing and discussing the adaptability trials and learning farms.

Food Footprint

In year three, the farm-planning training component of the WCAEV project plans to utilize a management strategy called the Ecological Food Footprint Analysis. The Food Footprint Analysis is a simple and effective tool that provides a relevant and clear representation of household food consumption. It is a simplified adaptation of the Ecological Footprint Analysis developed by Wackernagel and Reese and introduced in *Our Ecological Footprint: Reducing Human Impact On the Earth*. The Food Footprint quantifies the amount of land required to grow the main agricultural components of household food requirements. Land production rations (e.g. tonnes/ha) are defined for each crop and multiplied by annual consumption amounts (kg) to give the land requirements for each food component. The Food Footprint for each crop is then summed to give the total land area that is required to feed a household or an individual *sustainably*, meaning that the same plot of land must be available for production the following year for the same crop.

The Food Footprint is therefore extremely effective when assessing household food security. In order to secure basic dietary requirements, households must first assess existing land usage, looking at the planted area and the associated agriculture returns. The Food Footprint is also applied as a planning tool, encouraging farmers to reduce household Food Footprints while more efficiently managing farm land to produce higher and sustainable yields. When food energy content is also considered, Food Footprints can be transformed into energy efficiencies, encouraging farmers to seek out methods of increasing energy returns while reducing their household Food Footprints.

Gender Equity

Varied activities will continue to be undertaken to improve the status of women within the family and community to ensure they are not marginalized. In the first year this involved the sensitization of both men and women to gender issues through a participatory PRA/ training process involving men and women deconstructing gender roles in Chinese society. In particular, it has been noted through seasonal workload calendars that a major time-consuming activity for women on the farm is weeding. Furthermore, women don't receive any aid from men in this activity. The project aims to improve weed control on farms, as well as harvesting and plowing, to lessen the workload on women. Other ways the project aims to increase the quality of life of women is to increase the household income, education and awareness of local environmental and social issues, improved family health through the consumption of nutritious foods and a balanced diet, and encourage women to take their fate in their own hands by becoming community trainers and leaders. Opportunities for women in agriculture must also be enhanced by exposing them to sustainable methods of increasing productivity, and the important role farm management has in community development. Women may still take an active part in household chores while at the same time generating their own income and participating in community activities to improve their standard of living. As women are trained and developed as partners in the production and marketing of farm products, specific training programs will be conducted to develop their complex role in the community. These programs will also make them aware of the importance of participating in socially productive work geared towards improvement of living standards for themselves and their families.

6.3 Field level implementation

Efforts will be made to further the local understanding of the links between the farmers and the environmental conditions through the farmer training program and field trials. Preservation measures by the local soil and water conservation bureaus will continue. In Dingxi, the upcoming years will include the remediation of 423 ha of land extremely susceptible to soil erosion. The 3-year project also involves the construction of 100 check dams, 190 water-harvesting tanks and the making 13.6km of new road. In Zhunger, to reduce the annual soil erosion rate of 80%, and control sedimentation rates of 32,000 t/y, soil terracing and check dams will be constructed to mitigate erosion in gullied terrain. In Dingxi over the next 3-years, the project will involve the reforestation of 239 ha with shrubs and trees, and the revegetation of 126 ha with grass. To reduce soil erosion and control sedimentation. In Zhunger over the next 3 years, 1543 ha of Seabuckthorn will be planted and permanently established.

Activity at the trial farms will also continue with tests and records of the planted cultivars. Plant materials will be assessed by the project technical team and performance rankings made for various agronomic traits and yield. Promising varieties will then be increased into larger field strips through the crop verification process. Trials testing new varieties of interest and confirming characteristics of varieties that demonstrated high adaptability to local conditions will also be undertaken. Other on farm testing of plants and livestock systems will also be developed based on priorities identified by the community through the PRA process. The overall goal is to encourage farmers to take a more active role in

developing participatory on-farm research as a tool for accelerating their plant and farming systems improvement.

As a summary, some of the initial ideas for the development of learning farms in Dingxi and Zhunger that will be developed during the last two years of the project are:

- New plant materials and plant material/seed propagation
- Drought resistant vegetables and drip irrigation systems
- Water-conserving plants for steeply sloping areas
- Drought tolerant tree species that improve ground water availability
- Drought resistant animal fodder such as sorghum sudan grass or warm season grasses
- Improving soil fertility through green manures, improved crop rotations
- Reduced use of fertilizers by improving organic matter through minimal tillage, composting, growing crops with large root masses and crop residue utilization
- Multiple cropping systems
- Reduced use of pesticides, herbicides and fertilizers through weed, insect and disease control.
- Small scale soil and water conservation initiatives like mini-checkdams, permanent terracing, permanent pastures, cover cropping
- Management strategies for rats and other damaging pests
- Investigation of improved on-farm technologies such as threshing, weeding, hoeing, plowing and harvesting to reduce the work burden on women

Areas for On-farm research activities in the future include the following:

Sustainable Soil Fertility Management

It appears that soil fertility conditions have worsened in both communities due to intensive cropping of annuals such as corn, sunflower, potato, wheat and millet. In particular, row crops are seriously degrading soils. A number of new possible strategies need to be introduced to work towards develop farming systems which maintain or build up soil fertility on the farms. These include:

- Reducing soil tillage: Where possible, reduce fall soil tillage and eliminate the common practice of double plowing (fall and spring) used in the area. Minimum tillage systems should be tested and promoted to reduce soil erosion and the intensity of soil cultivation.
- Introducing drought tolerant grain legumes: Developing chickpeas, and higher water use efficiency field peas as new crops to expand crop rotations in the communities and enable a reduction in the acreage of annual row crops
- Introducing moderate to high yielding perennial forage crops on marginal lands to reduce cultivation of annual crops.
- Reducing the collection of field crop residues for livestock feeding and household energy use: Allow decomposition of residues in the field where possible to reduce soil erosion risks (by increasing residue cover) and for soil improvement.

- Composting: making compost from livestock manure and organic residues to help increase soil organic matter levels and increase soil biological activity. Turning manure into compost also helps facilitate application to more distant fields where manure is infrequently applied. These areas often have the most serious problems with declining soil organic matter levels.
- Weeding: new hoes and mechanical weeders are being introduced into the community to assess means to reduce the labour burden on women. Women are responsible for 98% of the weeding. A primary staple for the communities is millet. It requires 9 days per mu (or 135 days per hectare) for weeding and are an extreme burden on women.
- Introducing annual green manure crops periodically into the crop rotation. These can include sweet clover and black medic which can help maintain soil organic matter levels and improve overall soil fertility.

Optimizing Livestock Production in Response to New Grazing Policies

In China, much of the rural income has historically come from livestock rearing, particularly goats for the cashmere industry. The many years of excessive grazing from sheep and goats on the highly erodible soil has created severe gully erosion over much of the area. As a result, the Chinese government recently introduced new legislation stating that the grazing of livestock on steeply sloped land was no longer permissible. The new grazing regulations are greatly affecting the farmland and livelihoods of the farmers in the watershed. New livestock rearing practices need to be introduced to protect the fragile landscape and to raise the low income levels the farmers are currently experiencing. Several methods have been identified to create these opportunities for farmers. On sloping fields, soil conserving perennial forages can be introduced, which could enable farmers to continue their livestock raising activities while continuing to protect the soil resource from erosion. In particular, improved forage grasses from North America could be grown, including both cool-season (grasses and legumes), and warm-season species (grasses). Some of the species could include testing warm season grasses including switchgrass and big and little bluestem. Many of these species are used in the northern Great plains of the United States and in the southern Canadian prairies. This region has a similar semi-arid continental climate and latitude as northern China. New breeds of livestock and animal rearing practices also need to be demonstrated and trainings conducted.

Weatherproofing Farms

Water management remains a critical issue in increasing farm production and in providing more stable crop yields in the communities. A number of strategies can be taken to improve plant soil water relations and to “Weatherproof Farms” by improving water conservation and water use efficiency:

- Emphasize soil organic matter improvement, more water is held in soils with high soil organic matter content.
- Introduce more drought tolerant annual crops: Good possibilities for the communities are new annual crops like chickpeas and flat peas and more water use efficient semi-leafless field peas and soybeans. These can be tested in community trial farms.

- Introduce warm season grasses which are drought tolerant because of their high water efficiency and have deep root systems (2-3 metres deep).
- Introduce drought resistant animal fodder such as sorghum sudan grass or millets
- Increase reliance on the use of biological N sources through expanded use of grain legumes, improved manure management systems and soil mineralization processes as chemical fertilizer tends to increase water stress problems for plants from the salts present in the fertilizer.
- Continue to invest in water impounding, and irrigation systems
- Expand the use of trees in windbreaks to create a more favourable microenvironment for plant growth. Windbreaks reduce evaporation and can increase humidity levels. Fodder types of willow trees can be planted to also provide forage in dry periods for livestock. Species selected should improve ground water availability

Sustainable pest control

In year three of the project, management strategies for rats and other damaging pests will be examined. These were issues of importance as identified through the participatory process and working with the farmer trainers on farm sustainability. Presently in Western China, particularly in Dingxi, farmers have identified rats as the most problematic pest control problem they have. They mentioned that at some points during the year their fields were overcome by the rodents, which severely affected crop yield. The rats have become so profuse that they reach tremendous sizes and are all the more difficult to remove with cats even unable to eradicate them. Farmers currently use poisons, which are dangerous and expensive, or manual rat traps. They have also introduced housecats as a solution but the cats have experienced poisoning from the rat bait and generally are too small to successfully oppose a fully-grown rat.

6.4 Communication and Public Engagement

Project Manager, Mr. Henry Lu visited Canada in January of 2003 where he was involved in conferences, meetings and presentations. This coming winter there are plans to bring Mr. Lu back to Canada for public engagement activities.

The project outcomes will continue to be shared with others in the development community, both in the host country and abroad, so that any lessons learned may be applied elsewhere. The general public will be made increasingly aware of the project, promoting a better understanding of North-South issues and increasing support for international development. REAP believes that a free exchange of information is vital to the development process, and to this end the organization shares information gained from education and research projects whenever possible by way of published articles, public talks and the internet. REAP-Canada continues to engage the public in English and Mandarin through a variety of communications strategies including the production of various printed materials and our annual newsletter where several articles have been published detailing the development of the AEV model and its progress in China. REAP is also facilitating the development of our new website, currently under production to be completed this coming summer. REAP will continue its tradition of reporting on international projects and our holistic community development efforts at national and

international conferences dedicated to ecological agriculture, development and food security, both in Canada and abroad, including a being a primary sponsor of Canada's largest organic conference held annually in Guelph, Ontario. The project is to be shared with others in the development and academic community in Canada so that any lessons learned and developmental techniques may be applied elsewhere.

Agro-Ecological Village Development Primer

As the project proceeds, a development primer on agro-ecological village programming is being created. This primer details specifically what is needed, and the methodology used to encourage rural communities to become more self sufficient through sustainable agriculture and ecological production methods. The primer includes lessons on how to assess community needs, develop a custom training program, gender issues, energy use and biofuel consumption, and ecological means to achieve greater self-reliance. Background research on the chapters for the "AEV Primer" is currently being conducted with a detailed outline already established for its development. Major contributions to the "AEV Primer" will be made this coming year following the completion of the training modules.