THE WORKING GROUP ON SUSTAINABLE AGRICULTURE

1997 Annual Report

1. EXECUTIVE SUMMARY

This is the first annual report of the Sustainable Agriculture Working Group (SA WG). The main elements of the report are proposed terms of reference, a work plan for the next several years and results of our first study tour to eastern Inner Mongolia.

The SAWG was formed to focus Chinese and international expertise, advice and technology on issues related to the economic and environmental sustainability of agriculture in China. The SAWG fully realizes the enormity of this subject and will, therefore, be very selective in addressing key issues it feels will have a positive impact with regards to agricultural development.

2. INTRODUCTION

For much of China’s long history the dominant agricultural practices have been sustainable. This may no longer be the case. Food requirements have grown in response to population pressure and China’s national policy of food self sufficiency Since the 1950’s growth in agricultural production has become heavily dependent on the use of mineral fertilizers, pesticides, irrigation and other external inputs with attendant threats of adverse environmental consequences. Non-agricultural activities also impose environmental stress on China’s food production capacity. The environmental threats arising from agricultural and non-agricultural sources occur in the form of erosion, desertification, salinization, water scarcity, loss of land, pollution and others.

It is now questioned whether China can meet its long-term food needs and maintain the vital role that agriculture plays in overall economic and social development.

The sustainability of agriculture is a problem in most countries, yet there is limited international cooperation to share experience and technology and promote joint action. Given the similarities of China’s varied ecosystems with those of other parts of the world, it is reasonable to expect that there are numerous opportunities for productivity international cooperation in agricultural development.

The new working group on sustainable agriculture (SAWG) endorsed by CCICED in 1996 will focus on the policy and technical needs and options for further development and widespread adoption of integrated environmentally responsible farming systems. These systems should combine the ecologically sound features of traditional farming practices with the higher productivity possible with modern technologies. In particular the new working group will consider the place of agriculture within the framework of the integrated resources management called for in Agenda 21 and examine how to sustain food output at a higher and more stable level; prevent fertilizer and pesticide mismanagement; reduce or
compensate for the loss of farmland and labour to urban and industrial development; avoid the impending water shortage; and encourage international cooperation on sustainable agriculture. The working group will target its efforts in areas where they detect significant developmental opportunities that are not adequately addressed by other domestic and international initiatives.

The working group will make recommendations affecting the whole agricultural production cycle, including policy considerations that may affect input and product prices and institutional structures.

3. PRINCIPLES OF SUSTAINABLE AGRICULTURE

3.1 Sustainable agriculture requires integration of environmental sustainability with economic viability and social acceptability. Environmentally responsible production systems need to reconcile a number of physical, biological and environmental considerations including:

(1) The tightening of nutrient cycles to minimize the loss of nutrients from farmland and ensure efficient combination of on–farm and purchased inputs.

(2) Protection and enhancement of the soil’s ability to store applied nutrients and water and resist erosion.

(3) Effective use of crop rotations, cover crops, green manure, crop residue and animal wastes.

(4) Greater use of legumes and other sources of biological nitrogen.

(5) Efficient and balanced use of mineral fertilizers where nutrient needs cannot be met from organic sources.

(6) Natural suppression or control if insects, diseases and weeds through crop husbandry and cultural means, including integrated pest management or other forms of biological control.

(7) Use of pesticides when there is a clear threat to the crop identified by pest monitoring and the establishment of economic damage thresholds, and where other methods are clearly inadequate.

(8) Maintenance of crop and livestock diversity to enhance biological and economic stability.

(9) Use of pest resistant crop varieties that are adapted to local conditions.

(10) Greater multi–disciplinary research on ecological processes and more emphasis on the breeding of crop varieties resistant to pathogens, pests and micro–nutrient deficiencies and toxicity.
(11) Improved land management and water consternation through appropriate mechanization and adoption of effective tillage and cultural practices.

(12) Improved water use efficiency through water saving irrigation techniques, fertilizer management, erosion control and efficient water transport systems.

(13) Protection and efficient utilization of fragile landscapes through agroforestry, grassland management and ruminant livestock production.

3.2 Economically viable agricultural systems are characterized by:

(1) Knowledgeable farmers and their advisors who understand the available technology options, old and new, for development of sustainable systems within the physical, economic and political environment in which they live.

(2) Input and product markets that facilitate choices of input combinations and production systems that are profitable while maintaining the resource base.

(3) Marketing institutions and functions (storage, transportation, processing, grades and standards) that allow market forces to determine comparative advantage and facilitate resource allocation decisions.

(4) Policy and regulatory framework that ensures secure tenure, manages externalizes and establishes a government role in areas of market failure and public welfare.

(5) Access to financing to facilitate long term investment in infrastructure and provide short term operation capital to facilitate management of the spatial and temporal differences between production and consumption patterns.

4. TERMS OF REFERENCE

4.1 Review recent work on eco-agriculture in China and other countries to assess its potential to supply China’s long-term needs by combining the ecologically sound features of traditional farming practices with the higher productivity possible with some modern technologies.

4.2 Determine the state of existing surface and groundwater supplies including rates of groundwater depletion. Assess present and projected water shortages in China in relation to agricultural sustainability, water subsidies, the increasing cost of new irrigation and the possibilities for increasing water-use efficiency.

4.3 Determine rates of degradation on arable land and grassland, and the scope for rehabilitation of damaged lands.

4.4 Investigate the economic and social tradeoffs between labour intensive agricultural systems and the growing demand for qualified labour for urban and industrial development.
4.5 Conduct integrated evaluations on the potential role of alternative production systems in important, but contrasting, agricultural areas.

4.6 Examine the multi-sectoral changes in policies and planning processes that are needed to obtain a wider implementation of environmentally responsible production systems in China.

4.7 Review current international projects supporting the development of sustainable agriculture in China.

4.8 Identify opportunities for greater international cooperation in the development of sustainable systems through networking, collaborative research and mechanisms to communicate the findings from such arrangements.

4.9 Identify appropriate indicators or benchmarks of sustainability intensification from which to measure or evaluate the impact of policy and technological changes.

4.10 Identify priority needs for R&D, education, technology transfer and communications for sustainable agricultural development in China.

5. WORK PLAN

5.1 Operating Procedures

The SAWG was formed to focus Chinese and international expertise, advice and technology on issues related to the economic and environmental sustainability of agriculture in China. The SAWG fully realizes the enormity of this subject and will, therefore, be very selective in addressing key issues where it feels it can have some unique positive influence on agricultural development. The SAWG is fully cognizant of the resource constraints and time frame within which it operates. The SAWG is aware of the myriad of international institutions, county development agencies, NGO’s and domestic agencies that are involved in initiatives that have some bearing on agriculture. The SAWG will attempt to complement those activities as well as those of other CCICED working groups that have some common interests (e.g. Environmental Economics and Biodiversity).

The SAWG will have three main products:

(1) Policy recommendations for consideration by the CCICED and beyond.

(2) Recommendations and supporting rationale for demonstrations pilots and research on selected priority topics.

(3) Commissioned and SAWG member analyses and studies on selected priority topics and target regions.

The SAWG will maintain a minimum core of members, especially on the international side, and supplement that expertise with additional ad hoc or short term experts on an as
needed basis to address topical issues. The SAWG will supplement it expertise by establishing a group of corresponding members willing to provide advice on topics of current interest. The work plan of the SAWG will be regarded as a living document and will be reviewed and revised annually.

5.2 Sustainable Agriculture Issues

Agriculture in China is extremely complex. This complexity arises from geographic diversity in soils, climate, topography and other physical attributes; cultural and political history; and economic considerations related to supplying food to a large and growing population where food demand is changing rapidly in response to urbanization, industrial development, rising incomes and international exposure. While China has enormous food production capacity and high level of food output despite a small arable land base relative to population, there is growing concern about the capability of the land, water and labor resource base to supply China’s agriculturally based food and fibre needs in a sustainable manner.

The SAWG suggests that sustainable agriculture issues can be characterized under three problem areas, as follows:

1. Education
   - formal education and technical knowledge
   - technology transfer systems

2. Institutional Framework
   - laws and regulations (such as land tenure)
   - markets (such as price controls)

3. Investment
   - R&D
   - macro infrastructure (such as transportation)
   - micro infrastructure (such as farm mechanization)

The SAWG suggests that technology is not the primary constrain to a more sustainable agriculture sector. This is not to suggest that there is no need for more R &D, but rather that there is a great deal of appropriate technology available in China and internationally to address sustainability issues. Sustainability problems commonly arise from inadequate knowledge of sustainable practices on the part of farmers and their advisors, from policy and institutional structures that result in disincentives to the adoption of appropriate farming methods and limited investment in R&D and infrastructure on farms, transportation systems, storage facilities, processing plants and institutional support. The
solutions to sustainability issues can be found within these same categories through education, policy changes that create an economic and institutional environment conducive to development of sustainable systems and greater investment in R&D and in an array of infrastructure needs on farms and in the input and product market chains.

5.3 Target Regions

Agricultural development initiatives in China by internal agencies and international participants have concentrated their efforts on cultivated lands – grains, oilseeds, vegetables and fruits. Livestock farming has received less attention as a potential sustainable contributor to China’s growing food needs, although it is widely accepted that income growth will lead to a major increase in the demand for livestock products and feedgrains. The SAWG proposes to devote much of its attention to sustainability issues and development potential of livestock farming, reflecting its views that this sector has not received adequate attention to date and that there is enormous potential for sustainable increases in food output from this source. This is fully compatible with the projected food preference shifts toward more meat and livestock products as consumer incomes rise and with environmental concerns on large parts of the Chinese landscape.

The SAWG plans to conduct workshops and study tours in areas where livestock production is important now and where development potential is considered to be high. SAWG member input will be supplemented by that of invited Chinese and international experts with appropriate disciplinary expertise and experience. Study areas selected to date include Northwest China (including Loess Plateau and Dryland are a like Xinjiang), North China Plain, Yangtze River Delta, South China Red Soil Area, and North and South Grassland.

5.4 Key Issues

Study tours and associated workshops will focus on specific regions and development opportunities therein as outlined above. In addition, a number of key issues in sustainable agriculture will be addressed over the life of the working group. These key issues include:

(1) land Resource Inventories

Early observations of the SAWG indicate that the data on China’s land resources is limited in some respects. The SAWG will attempt to provide a comprehensive analysis of aspects of land resources that are vital to agricultural sustainability. These include detailed estimates of cultivated and grassland areas for the major agroecological zones, stratification of these areas into categories that reflect productive potential and relative risks for sustainable use, development potential of some underdeveloped areas, nature and extent of land degradation, and loss of land to urban and industrial uses. Work will be initiated as soon as possible on this issue drawing on the 1996 agricultural census.

(2) Water Resources

The objectives of the SAWG here are analogous to those in above. The analyses will
provide estimates of spatial and temporal aspects of water supplies for agriculture, analyze competing demands for water among user categories, assess trends in quality of surface and groundwater across agroecological zones, examine opportunities or increased water use efficiency and re-use of industrial, urban and agricultural wastes. Work will be initiated as soon as possible in concert with other agencies and institutions with expertise and interests in this topic.

(3) Livestock Industry Development

The SAWG’s observations in this area suggest some lack of attention in China to issues related to further development of the livestock industry. Growing food demand, changing food preferences, rising consumer incomes and imminent changes in trading relationship point to a need and perhaps opportunity for substantial future growth in livestock production, both ruminants and non–ruminants. This suggests some opportunities for further development of China’s vast grasslands and need for improvement of animal and land and water management for efficient and sustainable production and marketing of meat and livestock products. As livestock production increases it is likely that a growing proportion of it will emanate from commercial, rather than backyard, enterprises. This will bring with it the attendant environmental problems related to water supply and waste disposal. There is great scope for bringing international technology and experience to bear on the problems and opportunities in this area. The SAWG will complement the efforts already underway.

(4) Integration of Information

There is a virtual plethora of international organizations, country development agencies and internal Chinese national and provincial institutions that are involved in several manners, directly or indirectly, in agricultural development – rural education initiatives. R&D projects, joint venture livestock development projects, poverty alleviation programs, etc. The SAWG believes that there is a great deal of useful data in these various programs that can provide valuable information to a much broader spectrum of communities than the original target groups. The SAWG is aware of some initiatives of this nature that are now underway. These will be reviewed to determine the value–added potential of SAWG activity in this area.

(5) Technology Transfer

The SAWG has heard repeatedly and observed itself that extension services and agricultural education are inadequate to properly serve a dynamic industry that is responsive to economic and environmental imperatives. These observations are being made by international experts, Chinese scientists, local government officials, farmers and others. The knowledge gaps are evident in the production practices and technologies used by farmers. Several studies to assess technology transfer systems and technologies used by farmers. Several studies to assess technology transfer systems and agricultural education services have been completed or are in progress in China. These will be reviewed by the SAWG to determine policy implications of study findings.
(6) AGRICULTURAL Systems

There is an apparent need for better understanding of interdependent and interrelated agricultural production and marketing systems. The SAWG has already observed numerous examples where single policy instruments or single components of production systems have been changed without due consideration of other important system considerations needed to ensure economic and environmental sustainability. The SAWG will investigate this situation with a view toward policy recommendations in the areas of education, institutional structures and investment.

6. 1997 WORKSHOP AND FIELD SURVEY

6.1 Workshop

The SAWG held a workshop in Beijing, 1–2 September 1997, to provide its members with a common background on a number of issues including food security, international trade, land and water resources, rural poverty, environmental concerns, development opportunities, investment needs and policy perspectives.

Invited speakers and participants included representatives from international organizations like FAO, UNDP and World Bank, from OECD countries like USA and Canada, and from internal institutions like MOA, MOFTEC, MOW, NEPA, CAS, China’s Agenda 21 and CAAS and so forth.

There was substantial agreement among workshop participants on most issues. Proceedings of the workshop will be available in the near future.

6.2 Field Survey

The SAWG conducted a field tour in the area surrounding the city of Hailar in eastern Inner Mongolia. The field tour covered extensive grasslands of varying productive capacity, including forested areas, and cultivated lands producing cereals and oilseed crops and permitted extensive contacts with local government officials.

Key observations in the grassland area include the following:

(1) substantial potential for increased productivity in meat and livestock products;

(2) significant overgrazing and grassland degradation, especially in areas surrounding permanent communities;

(3) animal populations exceeding the carrying capacity of grasslands under current technology and management practices;

(4) lack of institutional support in the form of R&D, extension services, and technology demonstrations;
(5) land tenure systems and resultant management practices that are not conducive to sustainable use of the resource (recent changes in tenure arrangements may be helpful);

(6) high degree of similarity of the region to others in various parts of the world and thus very good potential for transfer of appropriate technology;

(7) low level of investment in transportation, storage and processing facilities and other aspects of marketing systems.

Key observations from the cultivated land area include the following:

(1) substantial potential for increasing productivity in cereals and oilseeds;

(2) highly productive soils that are deteriorating rapidly under current management practices such as excessive tillage, frequent summer fallow and straw burning;

(3) low level of investment in field mechanization and product storage and handling facilities;

(4) high degree of similarity in soils, topography and climate to North America n prairie areas and thus very good potential for transfer of appropriate technology apparent loss of opportunity by burning a large proportion of surplus straw rather than integrating it into the regional feed supply.

The SAWG recommends the establishment of demonstration projects on both grasslands and cultivated lands to facilitate transfer and testing of available technologies for more efficient, profitable and environmentally sustainable agriculture in this similar regions.

7. RECOMMENDATIONS TO THE COUNCIL

7.1 The SAWG recommends acceptance/approval of its membership, terms of reference and work plan as described in this annual report. The main elements are analyses of a number of key issues affecting agricultural sustainability and specific examination of the potential for and requirements of increasing sustainable livestock production.

7.2 The SAWG recommends the establishment of demonstration projects to transfer dryland crop production technology to areas like the Hailar region of eastern Inner Mongolia Autonomous Region (IMAR). The main components would be demonstrations and evaluations of reduced tillage methods, longer crop rotations, straw management options, alternate crops and new seeding technology. The SAWG has relevant expertise and specific Canadian prairie experience within its membership to develop appropriate project proposals should the Council approve this recommendation.

7.3 The SAWG recommends the establishment of demonstrations and applied research projects in grassland management in the Hailar region of IMAR. The elements of interest would include examination of water development schemes to facilitate better management of grassland, demonstration of fencing technology to improve animal distribution and
management of grazing intensity and testing of grassland improvement technologies such as re-seeding and rotational grazing. The SAWG has relevant expertise and extensive grassland experience in China and Mongolia within its current membership to develop appropriate proposals for research and demonstration initiatives.

7.4 Regarding to food production, processing and marketing chain, we recommend:

7.4.1 a thorough examination of current marketing systems in grassland areas, which is needed to identity the critical constraints to their improvement;

7.4.2 a shift away from the current bias for market integration studies concentrated on the grains sector. Little attention has been paid to the livestock product markets even at the national level although in the long-term they are likely to make a much greater contribution than grains to GDP;

7.4.3 greater support to marketing and distribution of grass-fed livestock products. Livestock producers in grassland areas are commonly too dispersed and too mobile to be able to form effective marketing bodies. Local authorities need to recognize this constraint and help develop appropriate cooperative or other marketing systems.