

Kellogg International Fellowship Program in Food Systems



Fellows' Final Reports

September 1989

**End-of-Program Seminar
Holiday Inn, University Place
East Lansing, Michigan U.S.A.**

Kellogg International Fellowship Program in Food Systems

Fellows' Final Reports

TABLE OF CONTENTS

Forward		iii
I. Interest Group I		
Comprehensive Food And Agriculture Policy		1
Cox, Maximiliano		2
Ledesma, Antonio		5
Lipumba, Nguyuru (not available at press time)		
Luiselli, Cassio		11
Matus-Gardea, Jaime		15
Tyagi, Davendra		19
Wen, Simei		22
II. Interest Group II		
Agricultural Marketing, Price Policy and Trade		25
Blandford, David		26
Carter, Colin		29
Paz-Cafferata, Julio		32
Piggott, Roley		35
Quezada, Norberto		39
Silva, Alvaro		42
III. Interest Group III		
Programs and Policies to Feed the Poor		47
Bapna, Shanti		48
Campino, Antonio		51
Dall'Acqua, Fernando		55
Konjing, Chaiwat		59
Mtawali, Katundu		62
Muchnik de Rubinstein, Eugenia		65
Pinnaduwege, Sathyapala		68
Sampaio, Yony		71
Syarief, Hidayat		74
Uribe-Mosquera, Tomas		79
Vial de Valdes, Isabel		83
IV. Interest Group IV		
Technology for Food Production and Processing		87
Badi, Sitt El Nafar M.		88
Duwayri, Mahmud		91
Makau, Boniface M.		93
Sefa-Dedeh, Samuel		96
Teri, James M.		101
Whingwiri, Ephrem		105
Yan, Rui-zhen		111

FORWARD

This volume is a collection of the final reports of the Kellogg International Fellows in Food Systems on their individual project activities over the past three years. It provides an overview of the substantial accomplishments of the Fellows in the expansion and application of knowledge to improve food systems in their respective countries and regions. Equally important has been the growth of the Fellows themselves in the broadening and deepening of their understanding of food systems and expanded leadership capabilities through sharing of their experiences with each other.

Projects pursued by the 31 Fellows covered a wide range of subjects from study of community level problems of increasing food production and low nutrition levels to macro-level issues of price policy for farmers, government intervention in food systems, and international trade. Early in the fellowship program the Fellows self-selected themselves into four subject interest groups for the purpose of closer interaction among themselves in their project activities. These included:

- Comprehensive Food and Agricultural Policy
- Agricultural Marketing, Price Policy and Trade
- Programs and Policies to Feed the Poor
- Technology for Food Production and Processing

Organization of the reports in this volume are presented under these four headings in alphabetical order by author (see Table of Contents). Each Fellow's report includes a title, objectives, accomplishments and summary observations section. Principal outputs, including completed and planned publications are listed, also travel study activities during the fellowship.

INTEREST GROUP I

Comprehensive Food and Agricultural Policy

Maximiliano Cox
Centro de Estudios del Desarrollo (CED)
Santiago, Chile

Title of Project: Agricultural Policy-Making in a Heterogenous Society: The Case of Chile

Project Objectives

Major project objectives were:

- 1) to determine the importance of the peasant subsector in Chilean agriculture;
- 2) to examine this sector's position in the Chilean Food System, determining its share in recent agricultural development; and
- 3) to determine factors of success and failure in peasant producers and through this, design policies that would promote a successful integration of peasant producers into modern agriculture and food systems in Chile.

Activities/Accomplishments

A major activity undertaken was the delineation of the peasant subsector starting from the 1975/76 census data at the district level. It indicated that this sector produced some 30% of total agricultural production in those years and held a similar proportion of arable land, yet held only 20% of the total agricultural land. These peasant groups are located in the more marginal areas of Chilean agriculture, mostly the coastal dryland and Andean piedmont.

A second major undertaking was the implementation of a study of peasant integration in the Chilean agricultural sector. The study included 30 case studies in two districts (communes) of minifundio concentration in the coastal range and a survey conducted (approximately 195 farm families were interviewed) in three communes in the Central valley where the target population were former land reform beneficiaries. Results indicate major difference between the minifundista group and the family farms. The former receive a large part of their family income from subsistence consumption and public and private assistance. Less than 10% of family income comes from labour wages. In contrast the family farmers show a very low proportion of income from subsistence consumption, market a high proportion of their production as well as have access to technical advice and formal credit. They have in general experienced an important degree of capitalization. The major factors explaining success of family farms were obtained from the survey data through a step-wise regression model. This explained some 40% of family agricultural income variation. Credit access was the most important factor, followed by entrepreneurial capacity and attitude and the supply of family labor. A fourth factor incorporated in the equation was labour history (degree of complexity of past jobs) of the family head, probably another indicator of embedded entrepreneurial capacity. A fifth explanatory variable incorporated in the equation was investments made by the farmer after he received the plot from the land reform process. Finally, technical assistance was incorporated. These results highlight the relevance of credit and technical assistance policies, especially of adding entrepreneurial training in traditional technical assistance programs.

A third result of the project was the review of major transitions in Chilean Agriculture, with special reference to the forced modernization period imposed by the Military Government since 1973. The review shows that after an excessive reliance on broad macroeconomic guidelines following a naive neo-classical model which took agriculture and, indeed the whole economy to a severe economic crisis, a more pragmatic approach has rendered important fruits in terms of economic and agricultural growth. In fact, the period of orthodox introduction of a neo-classical economic model, which lasted

from 1973 to 1982, was characterized in the agricultural sector by lack of a specific policy towards the sector, which was forced to follow broad macro guidelines. The result was erratic productive performance, lack of technological improvements and concentration of growth in a small number of activities (namely, fruit production and poultry raising) mostly located in the areas near Santiago. The peasant groups received a very small proportion of this growth. The period ended with a severe economic crisis that lasted between 1981 and 1983. A more pragmatic policy emerged with specific measures to reactivate production of the sector. This policy was highly successful from a productive point of view, which increased at a rate of between 6% and 7% per year.

A fourth result was the construction of a model to determine the distribution of benefits of agricultural development during the period 1977- 1987. Despite severe information constraints, we were able to determine that, of the total growth of 26% experienced by the sector during the period, the peasant subsector was only able to capture about 11%. The performance of the peasant subsector was minimal during the orthodox period: while the sector grew between 1977 and 1981 at almost a 9% rate, the peasant subsector only grew 0.9%. While, during the pragmatic period (1983-87) the difference between overall growth and peasant growth was reduced. Thus, while total sectorial production grew by 29%, peasant production grew by 19%. This would indicate that even where no specific peasant development policies are implemented, the establishment of an agriculture growth promoting scenario has a favorable effect on peasant development. However, the gap between peasant and commercial agriculture continues to widen, especially the technological gap. In fact, while peasant yields were 86% of commercial agricultural yields in 1977, they dropped to 76% in 1987. This mainly is a result of lower growth rates in the peasant subsector, since both yield levels increased substantially.

Finally, the main conclusion of the study reveals the need of establishing a balanced policy framework which is both conducive to productive growth, as well as more equitable sharing of the benefits of this growth. Our empirical work (survey and model), as well as past country experience shows that this is best done through the following policy mix:

- a) A rate of exchange and commercial policy that both provides adequate profitability to agricultural (tradable) production as well as protects internal markets from the high instability and distorted character of most international food markets.
- b) An internal price and marketing policy that ensures stability and competitive market conditions for the leading crops (in Chile, the price band policy implemented for wheat, oil seed and sugar beet are enough).
- c) A focussed policy package to promote peasant production and improve its integration into modern agriculture, including the following:
 - i) expand agricultural credit and extension activities, especially to the more marginal areas of the coastal and Andean piedmont dry lands;
 - ii) provide managerial assistance to the more advanced peasant producers of the Central Valley;
 - iii) improve access and communications in remote rural areas through infrastructure investment, which will also raise employment opportunities and better relate urban and rural labour markets;
 - iv) reorient investment incentives towards areas of peasant concentration; and
 - v) improve the bargaining position of the landless labourers through the easiest formation of farm labour unions, as well as reduced restrictions for strike action.

All these findings are being published in a book to be circulated among the academic community, politicians, and peasant and farm leaders.

Presentations and Publications

The results of the study have been presented partially in the following seminars and conferences:

World Bank-IICA: Macroeconomic and Sectorial Policies for Agricultural Development; Santiago, March 6-17, 1989.

PREALC (ILO Latinamerican Program): Policies for an Equitable Development; Santiago, July 1989.

Talca Bishopry: Social Week: Equitable Development for the Agricultural Sector (Panel), Curico, July 1989.

Social Action Department: Chilean Bishop's Conference: Panel with Farm and Peasant Leaders on "Policies for Future Agricultural Development," Santiago, July 1989.

Contribution of the Chilean Case to the book, *Ajuste Macroeconomico y Sector Agropecuario en América Latina*, published by IICA in Buenos Aires, 1988.

Chapter on Chile for Interest Group I book: "Food Systems in Transition. Lessons & Challenges."

These findings are also being discussed in the Chilean Democratization process. In fact, the major issue being discussed is: "How to keep a dynamic growth process, improving decentralization and more equitable sharing of benefits of the growth process." This, in the agro-rural sector, is epitomized by the results of the study.

**Antonio J. Ledesma
Xavier University
College of Agriculture
Cagayan de Oro City, Philippines**

Title of Project: Agrarian Reform in the Philippines

Project Objectives

- 1) To examine and evaluate past agrarian reform efforts of the Philippine government.
- 2) To work with non-government organizations (NGOs), including small farmer organizations, in lobbying for a genuine agrarian reform program.
- 3) To help formulate policy guidelines for the Aquino Administration in drafting and implementing an agrarian reform law.
- 4) To collaborate with a research network and to carry out research projects in Northern Mindanao on agrarian reform and rural development issues.
- 5) To prepare a compilation of readings and a textbook on agrarian reform.

Activities/Accomplishments

In February 1986, Cory Aquino became President of the Philippines through a People Power Revolution that, compared to other recent demonstrations of people power in neighboring Asian countries, was unprecedented and unique. The countryside was mired in poverty, the economy was heavily indebted to foreign banks and the nation was bleeding from internal wars.

The issue of agrarian reform was once more raised. Under Marcos' martial law administration, agrarian reform was a popular issue used to justify an unpopular regime. Under Aquino, with a restored democratic process, agrarian reform became a highly controversial issue being promised by a popular though constantly besieged regime.

It was in this context that I started the three-year KIFP/FS fellowship period which was roughly coterminous with the first three years of the Aquino Administration and its publicized espousal of agrarian reform as its "centerpiece program."

My fellowship activities revolved around three overlapping areas of involvement in agrarian reform issues: working with non-government organizations (NGOs); interacting with government agencies; and speaking at engagements and doing research activities.

1. NGO Activities

Public opinion and lobbying activities by farmers' organizations and their support groups for a "genuine" agrarian reform program focused on various pressure points in successive phases:

- during the first year (1986 to mid-1987) on the Constitutional Commission to draft a new Constitution, and on President Aquino herself to issue an Executive Order on a Comprehensive Agrarian Reform Program (CARP);

- in the second year (July 1987 to June 1988) on both houses of Congress for the passage of a meaningful law;
- for the past year (July 1988 to June 1989) attention has focused on the Department of Agrarian Reform (DAR) to implement the Comprehensive Agrarian Reform Law (CARL).

My NGO involvement has been principally with the Philippine Partnership for the Development of Human Resources in Rural Areas (PhilDHRRA), a major network of 50 non-government organizations throughout the country involved in agrarian reform and rural development. As Chairman of the PhilDHRRA National Board over the past five years, I have been able to guide PhilDHRRA's support role for agrarian reform.

From May to August 1986, PhilDHRRA initiated a series of national and grassroots consultations on agrarian reform and rural development, involving practically all the major peasant organizations, support NGOs and academic, as well as church-related institutions. Only 2-1/2 months after the People Power Revolution, this consultation process constituted the first major call to place agrarian reform on the development agenda of the new government. It also enabled farmer representatives to present their views on key provisions related to agrarian reform being discussed by the Constitutional Commission.

In May 1987, PhilDHRRA helped convene the Congress for a People's Agrarian Reform (CPAR), a coalition of twelve major peasant organizations, which would become the formal lobbying voice for peasant expectations regarding agrarian reform.

In June 1988, after Congress had passed a diluted agrarian reform measure, CPAR and support groups including PhilDHRRA issued its own alternative legislation, called the People's Agrarian Reform Code (PARCODE). A signature campaign was launched to gather support for the "people's legislative initiative" provided for by the new Constitution. On August 4, 1989, Secretary of Agrarian Reform Miriam Santiago herself supported PARCODE as a "superior piece of legislation."

In addition to PhilDHRRA activities, I was invited in 1987 by the Bishops-Businessmen's Conference (BBC) to be Vice-Chairman of its Agrarian Reform Committee. As an influential organization comprising church and business leaders, the BBC's stand endorsing agrarian reform carried considerable weight.

At the annual meeting of the Catholic Bishops' Conference of the Philippines (CBCP) in July 1987, I was invited to explain the implications of the pending Executive Order on agrarian reform. Afterwards, the bishops came out with their own pastoral letter endorsing an agrarian reform program that would be comprehensive and realistic. Likewise, In January 1988, I was asked to prepare a discussion paper for a group of bishops and senators to push for a meaningful legislation on agrarian reform.

At the regional level, my College of Agriculture at Xavier University set up a Mindanao Support Center for Agrarian Reform and Rural Development (MINCARRD) in mid-1988. Included in its operations are *Mindanet* newsletter for NGOs on the island, a Mindanao data bank, and some village-level research undertakings in nearby provinces. A workshop on information exchange was also conducted in June 1988 to assess the needs of information linkages among NGOs in Mindanao.

2. Government Agency Activities

My second area of involvement in agrarian reform has included interacting with government agencies through participation in policy workshops and providing some training programs. From December

1986 to May 1987, I was invited to three consultative workshops to help draft an Executive Order on a comprehensive agrarian reform program. My own focus in these workshops was to push for a community-based agrarian reform program that would depend primarily on local village councils for its implementation. In April 1988, I presented a position paper on the formation of these village committees at a DAR workshop on the implementation of agrarian reform.

Increasingly, government offices, particularly the Department of Agrarian Reform, have approached our College of Agriculture and its affiliate unit, the South East Asia Rural Social Leadership Institutes (SEARSOLIN), for training programs in participatory research and planning, cooperative formation and communication skills. In April 1989, we offered a four-week "Summer Institute for Agrarian Reform Trainers" for DAR personnel and some NGO participants. This was well-received and a second institute was offered in August 1989. Earlier in August 1987, SEARSOLIN had also offered a 12-day workshop for NGO participants from all over Mindanao on community-based agrarian reform.

In general, the Department of Agrarian Reform through its Bureau for Agrarian Reform Information and Education (BARIE) and Bureau for Agrarian Reform Beneficiaries' Development (BARBD) has welcomed the assistance of NGOs in the implementation of government programs.

3. Speaking and Research Activities

The issue of agrarian reform aroused heightened public interest, particularly during the first 2-1/2 years of the Aquino Administration when key provisions for the new Constitution, the Executive Order, and finally the proposed legislation were being debated. During this period I was invited to talk on agrarian reform more than two dozen times in a dozen places before varied audiences--students, farmer leaders, clergy, sisters, government personnel and the general public. This was also a learning experience for me to be able to listen to various views on agrarian reform during the open forums.

Research activities have principally taken the form of supervising graduate student fieldwork research on agrarian reform and rural development concerns. Research topics include: small farmers and landless workers in lowland rice, coconut, sugarcane and upland mixed cropping areas. Industry-wide studies on palm oil, rubber and coffee in Mindanao were also conducted. Land tenure problems and a study of cooperative structures were special areas for observation.

In October 1988, I convened a round-table discussion on agrarian reform issues in Mindanao. This was attended by social science researchers, social action directors and some government representatives. The findings were presented at the Second Philippine Social Science Congress the following month.

Other research linkages were made in October 1987 with a national network coordinated by the Institute for Agrarian Studies (IAST) of the University of the Philippines in Los Banos, and in May 1987, with the Association of Colleges of Agriculture of the Philippines.

At the individual level, I have continued to write some articles on rural poor groups and agrarian reform issues and am currently preparing for the press a compilation of some updated articles on agrarian reform in the Philippine context.

Summary Observations

Looking back at the past three years, I am indebted to the fellowship program for enabling me to interact more frequently with NGOs, government agencies and fellow researchers in various places

in the country. Although my original plan was to concentrate on research activities, the exigencies of an impending legislation on agrarian reform linked my activities more closely with lobbying and efforts to influence public opinion.

Agrarian reform under the Aquino Administration started in 1987, but is by no means completed. Already amendments to the current law have been proposed after a widely-publicized land valuation scandal involving DAR officials.

It is in this sense that continued vigilance by NGO networks like PhilDHRRA and lobbying coalitions like CPAR will be crucial. Working with government line agencies and improving their capabilities through training modules will also be critical for a meaningful implementation of the Comprehensive Agrarian Reform Law. And lastly, research findings that are being collated and will be disseminated soon should have their own impact on agrarian reform as an ongoing process for the nation's transformation.

Publications Completed

Voices from the Culture of Silence: The Most Disadvantaged Groups in Asian Agriculture, I. P. Getubig & A. J. Ledesma (Eds.). Kuala Lumpur, Asian and Pacific Development Centre, 1988.

Retention Limits and Just Compensation in the Light of the Land-to-the-Tiller Principle. PhilDHRRA, 1987.

Publications Planned

Perspectives on agrarian reform in the Philippines (a compilation of eight articles). In press; to be completed by December 1989.

Monographs of village-level studies on agrarian reform and rural development. Currently being edited; to be published October 1989.

Seminars/Workshops/Presentations

KIFP/FS Orientation seminar, East Lansing: Washington, DC: June 29-July 12, 1986.

Second National Consultation on Agrarian Reform and Rural Development (NCARRD II), Diliman, Q.C.: August 7-8, 1986.

Co-sponsored Workshop of Researchers' Network on Agrarian Reform, Los Banos: October 16-18, 1986.

Coordinated Workshop of IMA Researchers on Agrarian Reform, Manresa, Cagayan de Oro: October 28-30, 1986.

Presented paper at Policy Workshop on Agrarian Reform, Los Banos: December 4-6, 1986.

KIFP/FS annual seminar in Brazil and travel studies in Brasilia and Mexico: January 8-31, 1987.

Congress for People's Agrarian Reform: member of organizing committee: May 29-31, 1987.

Talked on agrarian reform at the Annual Convention of the National Secretariat on Social Action (NASSA) in Cagayan de Oro: June 16-19, 1987.

Talked on ten strategic goals of agrarian reform at annual meeting of the Catholic Bishops' Conference of the Philippines (Tagaytay): July 13, 1987.

Study trip on land reform programs in Taiwan, South Korea and Japan (with team from IAST and DAR): July 27-August 12, 1987.

Twelve-day workshop on Community-based Agrarian Reform through Village Cooperatives and Participatory Research at SEARSOLIN: August 17-28, 1987.

Discussed agrarian reform in Mindanao at PhilDHRRA-Mindanao Political Symposium (CDO): December 13-15, 1987.

Tri-partite Conference on Agrarian Reform among GO-NGO-Donor Agencies (AIM, Makati, M.M.), gave invocation prayer: January 22, 1988.

Prepared position paper for dinner discussion with bishops and senators on CARP: January 24, 1988.

KIFP/FS annual seminar in Zimbabwe and travel studies in Kenya and Tanzania: February 3-23, 1988.

IRRI-Winrock seminar-workshop on "Policy Considerations for Structural Changes and Development in Philippine Agriculture" (discussed agrarian reform issues): March 29-30, 1988.

Presented a paper on "Community-based Agrarian Reform Through the BARCs" at DAR workshop on Implementation of CARP, Tagaytay: April 17-20, 1988.

Workshop on "Information Exchange in Mindanao (MINANET)," Cagayan de Oro: June 7-9, 1988.

Planning meeting for KIFP/FS annual seminar, Bangkok: June 17-18, 1988.

CPAR Multi-Sectoral Conference on Agrarian Reform (Q.C.), supported PARCODE: June 25-26, 1988.

Philippine Agrarian Reform Seminar at Land Tenure Center, Madison, Wisconsin (participated with DAR and IAST members: discussed PARCODE): July 13-15, 1989.

KIFP/FS Asian Regional Seminar in China (Guangzhou, Xian, Beijing): October 4-15, 1988.

Convened round-table discussions on agrarian reform issues in Mindanao, co-sponsored by the Philippine Social Science Council and MINCARRD, Cagayan de Oro: October 28-29, 1989.

Reported on Mindanao round-table discussion on agrarian reform at Philippine Social Science Congress II, Quezon City: November 24-25, 1988.

Gave a comparative talk at the National Secretariat for Social Action Workshop on CARL and PARCODE, Cebu: December 5-6, 1989.

KIFP/FS annual seminar in Thailand and study travel to India: January 30-February 14, 1989.

Directed Summer Institute for Agrarian Reform Trainers, co-sponsored by DAR and SEARSOLIN, Cagayan de Oro: April 3-29, 1989.

Drafted position paper on PARCODE and CARL for PhilDHRRA Annual General Meeting, Tagaytay: May 21-24, 1989.

In addition to the above, I have presented approximately 43 talks and attended approximately 20 workshops on agrarian reform over the three years of the fellowship.

Cassio Luiselli
Economic Commission for Latin America and Caribbean
(July to December 1986)
Inter-American Institute for Cooperation on Agriculture
(January 1987 to June 1989)
San Jose, Costa Rica

Title of Project: Agricultural Policy and Food Security in Mexico

Project Objectives

To conduct a survey of agricultural policy and food security in Mexico with special emphasis on poverty alleviation and macro-sectorial linkages. The research is intended for policy making in Mexico rather than academic purposes. (This work could be useful to other Latin American countries served by IICA.) A book and several published papers will be also a major output from the project.

Activities/Accomplishments

My activities evolved around a core policy research: Food Security and Agricultural Policy in Mexico. I have completed a series of papers, book chapters and activities in this regard and I intend to complete a book from this work. The following are the main activities and accomplishments:

First, I have been able to assist the new government of Mexico with direct advice and to present short policy papers to the Ministry of Agriculture and Hydraulic Resources (SARH). I have had direct policy discussions on the new plan for agricultural development with Secretary Jorge de la Vega, Undersecretaries Gordillo and Reyes Osorio and Senior Technical Advisers Gustavo Orpinel and Alfonso Cebreros. I first discussed the original campaign plans of the Salinas de Gortari team. Special attention was given to its weaknesses, poor macro-micro connection, unrealistic prices and growth targets given the present macro constraints and vague antipoverty connection, especially in the rainfed areas.

In November 1988, I had a formal briefing session with the transition team of President Salinas which was very useful. We discussed, at length, the broad lines of Salinas' agricultural program. Mr. Gordillo chaired the session attended by 15 officials.

Once the new administration took office I was able to participate in more detailed discussions in SARH mostly in two other policy areas: First, price policy dilemmas which are very much connected with my major research publication. Through IICA, I was able to get good advice and assistance from KIFP/FS Fellow Julio Paz-Cafferata. I wrote a lengthy price policy paper: "Lineamientos para una nueva politica de precios de garantia." The macro constraints were fully considered, as well as the needs derived from a more open economy and prices somewhat more consistent with international or "border" prices. One basic feature of the paper was to provide advice and ideas to Minister de la Vega in his policy discussions with the so-called "macro" ministers: Treasury (SMCP) and Budget and Planning (SPP), as well as the Central Bank. Secondly, I have had discussions with respect to **trade policies and agriculture**. These were held with the Directorate of Foreign Relations of SARH, with Mr. Guillermo Funes and his staff. I wrote a brief book with Carlos Vidali (published by IICA) on Mexico's agriculture and the GATT and it was reported very useful for those purposes. The book was also formally requested by the Governments of Venezuela, Bolivia and Costa Rica to use in their own negotiations on access to the GATT.

I have also participated in other policy-related activities such as technology generation and diffusion, with INIFAP, international assistance for the SARH and preliminary talks on land tenure and policies to combat minifundia.

In April 1989 I was appointed as a member of the President's Commission for National Solidarity (PRONASOL) which is the body of experts, businessmen and intellectuals who advise the President on his antipoverty programs. I attended the monthly sessions in Mexico City and participated in the discussions. I have also written a short policy paper on attacking rural poverty and enhancing food security. Mr. Carlos Tello, the Chairman of the Commission, will use it for several policy guidelines, especially for a UNDP financed antipoverty program.

I have also been in contact with Mexico City authorities (Mr. Manuel Aguilera) and DICONSA (CONASUPO-affiliate) on food subsidies and distribution in poor urban slums. The work done with Antonio Alfonso Concheiro and his staff at the Javier Barros Sierra Foundation was very useful for these purposes (a publication is forthcoming). I have also had a direct responsibility in the Mexico chapter of the "Strategic Plan of Action for Agricultural Recovery in Latin America and the Caribbean" (PLANALC) prepared by IICA after a mandate given by the agro/rural Ministers of the hemisphere at their meeting in Ottawa in 1987.

In September 1988 I attended a seminar in Punta Tralca, Chile on the Latin American crisis and the agricultural sector. I delivered the opening lecture, which will be published in the proceedings book of the seminar.

The U.S. Senatorial Commission on Central American Peace and Recovery (chaired by Senator Sanford) invited me to write a paper on "Macroeconomic Adjustment and Agriculture in Central America." The paper was used by the commissioners as background for their final report and was also in a book edited by Prof. William Asher, published by Duke University Press, 1989. The paper will also be published in a Spanish version of the book and in a Mexican journal "Investigacion Economica" (forthcoming). Finally, I will be attending and chairing the closing session of a seminar on the future of Brazilian agriculture.

Since my appointment in January 1987 as Deputy Director General for Operations at IICA I have organized and participated in many activities that were either related or facilitated by my KIFP/FS fellowship. Mainly, my participation in IICA seminars and workshops throughout Latin America and the Caribbean: Cartagena, Colombia on Agricultural Trade; Montevideo, Uruguay on Biotechnology; and, Brasilia, Brazil on Agroindustry and Rural Development.

I was also very much involved in the conceptual development of the Plan of Action for the Agricultural Reactivation of Latin America and the Caribbean mandated to IICA by the Agricultural Ministers of the hemisphere in Ottawa 1987. Besides the Mexican chapter (which is a small book on its own), I took direct responsibility in the Haiti chapter as well as in the final revision of the whole plan, which consisted of 18 documents, some conceptual and some regional. The plan will be presented for final approval at San Jose, Costa Rica at the Minister's Board Meeting in October 1989. The plan concepts and recommendations were very much related with my KIFP/FS work. I feel it addresses issues such as poverty and food security, macro-micro linkages, etc., very much in the same way as my fellowship work.

Lastly, I have, of course, attended the three annual seminars of the KIFP/FS: Latin America (Recife, Brazil), Africa (Zimbabwe and Tanzania) and Asia (India and Thailand). I've benefitted a lot from them, not only intellectually but mostly by the interaction with the Fellows and by knowing new countries and looking at problems in many different ways. I am coordinating (and editing) a Fellows book on "Food Systems in Transition." We are analyzing on a common set of hypotheses the options and challenges of the food systems in China (Simei Wen), India (Davendra Tyagi), Philippines (Antonio Ledesma), Tanzania (Ngyuru Lipumba), Chile (Maximiliano Cox) and Mexico (me). We are committed to have the final draft ready by December 1989.

At this point I am completing a first draft of my book that has not changed in a fundamental way since the original idea. It has somewhat evolved along the development of my fellowship. I expect to

have a draft ready the end of 1989 and to publish it in 1990. Other publications out of this work are also being prepared (see "Publications Planned").

These have been three years of great productivity and personal and professional growth for me. My KIFP/FS fellowship permitted me to perform well in my own job and to keep in close touch with issues and technical matters useful for policy formulation in my own country and Latin America.

Publications Completed

Lineamientos metodologicos para una politica de seguridad alimentaria. CEPAL, 1988: U.N. Publication.

Mexico en la Ronda Uruguay: El caso de la agricultura (with Carlos Vidali). Published by IICA, 1988.

Seven Dilemmas of Mexican Agriculture. Published by University of California at Berkeley, Iberoamerican Studies Program, 1987.

Macroeconomic Adjustment and Agriculture: The Cases of Mexico. Published by IICA and KIFP/FS, Buenos Aires, 1988.

Several policy papers and seminar presentations, including work on the "Plan de Reactivacion."

Publications Planned

Main book: "Agricultural Policy and Food Security in Mexico."

"Food Systems in Transition", Editor. Written with other KIFP/FS Fellows; Draft, December 1989.

Agricultural chapter in the book "Mexico: From Boom to Crisis and Adjustments." To be published by the Fondo de Cultura Economica, Mexico, 1990.

The food supplies and security chapter in the book "El futuro de la ciudad de Mexico", Foro Rojo, Fundacion Javier Barros Sierra.

Seminars/Workshops/Presentations

I attended several seminars and workshops and gave several presentations. The list that follows are only those related to KIFP/FS activities.

I presented a paper, "Seven Dilemmas of Mexican Agriculture" at a workshop at the University of California, Riverside. This work is somewhat integrated in my intended book.

I attended the Orientation Seminar in East Lansing in September 1987 and the annual seminars in Brazil, Zimbabwe and Thailand. I also attended a workshop at Cornell University in July 1987; and, Mexico City, Oaxaca, Buenos Aires (2 separate times) and Punta Tralca, Chile in 1988.

I participated in the organization of a Latin American KIFP/FS Fellows seminar on macro-economic adjustment and agriculture held at the IICA office in Buenos Aires, August 1988. I contributed a paper dealing with the Mexican case. IICA published the papers in a book which has been in great demand throughout the region. An improved edition is now being prepared. The paper I've prepared

is a crucial part of my own book and was very useful for the policy discussions I had with the Mexican government.

I participated in a seminar organized by Per Pinstrup-Andersen on Poverty and Macro Adjustment (July 1987) and the International Meetings of Agricultural Economists in Buenos Aires, August 1988. Both were very useful for my KIFP/FS work and activities.

I have participated in different seminars and workshops in Mexico: July 1988, "Policy Options in Face to the Crisis"; Agricultural Policies for Depressed Rural Areas, Oaxaca, February 1988.

Other Significant Outputs

I wrote papers for ECLA on methodological guidelines for a good security policy for Mexico and Central America. This work, too, is integrated into my intended book.

Travel Study and Hosting of Fellows' Activities

Besides the KIFP/FS seminars, I have made frequent visits to Mexico. In all of them I have held several workshops and supervision sessions with the research assistants working on my project.

I actively participated in organizing, with CONASUPO and CEICADAR (Colegio de Postgraduados, Puebla), the January 1987 visit of some of the KIFP/FS Fellows to Mexico.

**Jaime Arturo Matus-Gardea
Department of Economics
Colegio de Postgraduados
Chapingo, Mexico**

Title of Project: Government Participation in Food Systems: Mexico

Project Objectives

The Mexican government's participation in the food market attempts to elevate the levels of production and consumption of several agricultural products. These products are corn, dry beans, wheat, rice, soybeans, carthamus which are produced for human consumption and sorghum which is used as a feed grain. These seven products are covered by support prices and their end products have maximum selling prices.

The two main objectives of my project were:

- 1) to characterize the structures of government participation in such a way as to contrast the changes which have occurred in recent years with the structures of previous years;
- 2) to quantitatively measure the effects of government participation on production, consumption, import or export and prices received by producers and paid by consumers.

Activities/Accomplishments

Interviews were conducted with government officials and government publications were reviewed in order to characterize the government participation in the food system in Mexico. It was concluded that the same set of policies has been in use for the last 20 years. However, the emphasis of the policy instruments has changed over time, as well as the way that they have been used.

My own econometric results and the results of several Master of Science theses that I directed, indicated that government support prices affect the levels of production and that the selling prices of the government marketing agency has an impact on consumer prices which in turn affects consumption levels. Therefore, government intervention in the food system in part determines import levels of some of these agricultural products.

A study related to my Kellogg project was carried out on the grain trade in Mexico. A book is being written by several KIFP/FS fellows on North-South grain trade; the chapter on Mexico will be published as a part of this book.

Summary Observations

Of the reports that deal directly with my research project on government participation in food systems, five documents deal with the most important of the crops in terms of area, production, consumption and trade: maize. Two of the reports deal with a relatively new crop and a crop that is a direct competitor for production resources of maize: sorghum. Two of the reports deal with a crop which is a direct substitute for consumption of maize: wheat. Three other crops form along with maize and wheat, the basic agricultural food basket of the Mexican population: beans, rice and soybeans.

One of the reports in preparation deals with the consumption of bread (wheat) and tortilla (corn bread). This model is an improvement over previous analyses because it incorporates the final demand for wheat and corn. Regarding policy issues, it is an improved model with respect to the previous

ones. After several interviews with officials of agencies that deal with the formation of the support price policies, the Ministries of agriculture (SARH), programming and budgeting (SPP), the governmental agency that operates the support price program (CONASUPO) and the presidential advisory committee on agricultural policy (Gabinete Agropecuario), it was my conclusion that there is a component of "market reaction" on the setting of the sale price by CONASUPO and of the maximum consumer prices of bread and tortilla that is fixed by the government. Therefore, an econometric model is being tested where the sale price and maximum consumer price are considered as endogenous variables, i.e., both prices are determined within the model.

Another improvement of this model is that it takes into account some policy changes that have occurred in the period analyzed. The impact analysis of these changes was accomplished using dichotomous variables. Therefore, some sort of structural change is estimated. The idea is that by incorporating these structural changes it will be possible to analyze some policy changes that have been taking place in the last 4 to 5 years. We will have to wait and see if this purpose is accomplished.

Some of these reports are derived from M.S. theses. My conclusion is that a lot of time and effort has been devoted (by myself) to directing these theses. In the same way, a lot of data has been collected, a lot of knowledge and experience has been gained by myself and the students, and I have helped prepare young people that now are working for the Economics Department.

At the Seminar on Agriculture and Food Systems held in Recife, Brazil, a paper was presented to Interest Group II, "Agricultural Trade and Food Perspectives for the Year 2000: Mexico." The purpose of this paper was to present specific issues on Mexico's agricultural price and trade policies in order to establish possible conditions that Mexico is likely to face with regard to its trade and agricultural policies in the 1990's and the year 2000.

Publications Completed

1. Salazar, R., J. A. Matus G., J. J. Brambila P., H. Herrera R. "Some Economic Policies and Mexican Corn Imports: 1960-1983." *Agrociencia* 66 (1986): 7-24.
2. Fernandez P., Dulce B., R. Garcia M., J. A. Matus G., M. Portillo V. "State Intervention in the Regulation of the Mexican Rice Market." *Agrociencia* 70 (1987): 19-32.
3. Sanchez S., Jose L., J. A. Matus G., R. Garcia M., M. J. Santiago C. "Effects of Government Policies on the Trade Balance of Soybean Meal and Oil." *Agrociencia* 70 (1987): 33-44.
4. Lases Z., Raul O., J. A. Matus G., J. A. Leos R., R. Garcia Mata. "Substitution Between Corn and Sorghum in Mexico." *Agrociencia*
5. Aguirre M., Vicente J., J. A. Matus G., R. Garcia M., R. R. Saez. "The Effect of Government Buying and Selling Policies on the Trade Balance of Corn and Sorghum." *Agrociencia*.
6. Garcia D., Gustavo R., M. Garcia, J. A. Matus G., F. Burguete H. "State Intervention on the Regulation of the Mexican Beans Market." *Agrociencia*.
7. Garza C., Arturo, J. A. Matus G., R. Garcia M., J. L. Sanchez S. "An Econometric Model of the Government Market Intervention: The Mexican Wheat Case." *Argociencia*.

Sent for publication and in the process of being reviewed:

8. Matus G., Jaime A., R. Bierlen. "Grains in Mexico." In *North-South Grain Markets and Policies*.

In Preparation:

9. Matus G., Jaime A., J. S. Mora E. "Government Intervention in the Mexican Food System." (to be determined)
10. Documents 1, 2, 3, 4, 5, 6, 7, 10 and 11 are related to my research project but no KIFP/FS funds were used on them.
11. Vega V., Dixia D., J. A. Matus G., R. Garcia M., F. Burguete H. "Government Intervention on the Bread and Corn Bread Markets in Mexico." *Agrociencia*.
12. Torres B., Mario A., J. A. Matus G., J.A. Leos R. "Effects of Support Price Policies on Corn Production: A State by State Analysis." *Agrociencia*.

Other Documents

13. Matus G., Jaime, S. Salcedo B., J. L. Sanchez S. "Agriculture Trade and Food Perspectives for the Year 2000: Mexico." Presented at the Seminar on Agriculture and Food Systems. KIFP/FS: Recife, Brazil. January 11-15, 1987.

Seminars/Workshops/Presentations

1. Seminar on "Food Systems." KIFP/FS. Michigan, U.S.A., June 29-July 6, 1986.
2. Seminar on "Food Systems." (Latin America). KIFP/FS. Recife, Brazil. January 11-25, 1987.
3. Symposium on "Elasticities in International Agricultural Trade." International Agricultural Trade Research Consortium (IATRC), Dearborn, Michigan, U.S.A. July 30-August 1, 1987.
4. Workshop on "North South Policies and International Trade." KIFP/FS and Cornell University, Ithaca, NY, E.A.U. September 13-18, 1987.
5. Seminar on "Food Systems." (Africa). KIFP/FS. Harare, Zimbabwe. February 6-17, 1988.
6. Workshop on "Policy Effects of Macroeconomic Adjustments on the Food and Agricultural Sectors in Latin America." IICA and KIFP/FS. Buenos Aires, Argentina. August 22-23, 1988.
7. XX IAAE Conference. "Agriculture and Governments in an Interdependent World." IAAE. Buenos Aires, Argentina. August 24-31, 1988.
8. Seminar on "Food Systems." (Asia). KIFP/FS. Bangkok, Thailand. February 5-15, 1989.

Some other seminar/workshops were attended. No KIFP/FS financing was involved in these activities, but surely, one's participation becomes more relevant in these group discussions when he can draw from his experiences and knowledge gained visiting other countries and participating in discussions of food systems in developed and less developed countries with well qualified people.

Travel Study and Hosting of Fellows Activities

1. Washington, D.C., U.S.A., July 10-12, 1986
2. Petrolina, Brazil, January 8-10, 1987
3. Sao Paulo, Brazil, January 22-25, 1987
4. Mexico City, Mexico, January 25-29, 1987
5. Washington, D.C., U.S.A., July 29-31, 1987
6. Washington, D.C., U.S.A., September 21-23, 1987
7. Nairobi, Kenya, February 18-24, 1988
8. Arusha, Tanzania, February 18-24, 1988
9. Delhi, India, January 29-February 4, 1989
10. Sydney, Australia, February 15-19, 1989

All of the travel study activities were organized and financed by KIFP/FS. I was a coordinator of the KIFP/FS visit to Mexico.

These travel studies and the regional seminars on food systems, have been my richest sources of information, knowledge, and understanding of the structure and workings of government interventions into the food systems and in the broader aspects of agricultural and rural development policies on less developed countries. In the process, some insight was gained with respect to the same issues in Canada, the United States, and Australia.

One last comment is that we can see the KIFP/FS as an orchard investment, where the fruits do not come immediately, they even may come slowly, but later on they keep coming for several years.

Davendra Singh Tyagi
Commission for Agricultural Costs and Prices
Government of India
New Delhi, India

Title of Project: Managing India's Food Economy: Alternatives in a Self-sufficiency Environment

Project Objectives

With the changing supply-demand scenario from that of persistent shortages to a near balance in a block of 4-5 years, some new problems have started emerging in the management of India's food economy. The market arrivals are getting increasingly concentrated within a few weeks period. The difference between economic cost at which public sector agencies could be able to distribute the foodgrains without incurring any loss and the producer price is getting enlarged year after year. As a consequence of widening differences between economic costs and issue prices (price at which the Government distributes foodgrains) on the one hand, and size of distribution getting enlarged year after year on the other, subsidy burden has been escalating. These developments raise an important question: namely, can a system primarily designed to cater to the needs of a food deficit economy cope with the problems that would emerge in a changed supply-demand scenario? The main objectives of the project were:

- 1) to examine achievements and failures of the present system of managing India's food economy;
- 2) to study the problems emerging as a consequence of near supply-demand balance being achieved;
- 3) to ascertain whether India has emerged or is likely to remain a self-sufficient economy as far as cereals are concerned during the next decade;
- 4) to find out what are going to be the major problems if the present system of food management remains unchanged even in a self-sufficiency environment;
- 5) to study why a distrust in the free market developed in the country and can complete free trade be relied upon in the changed scenario; and
- 6) to explore some alternatives which would reduce substantially Government intervention and associated subsidy burdens yet would not adversely affect the achievement of major goals of food policy.

Activities/Accomplishments

For achieving the objectives listed above, studies were initiated on different aspects. Detailed information available through Government and private sources was collected and compiled. In-depth analysis of data so collected was undertaken. Discussions with experts within the country as well as with those working elsewhere were held. Analysis of data was completed more or less on schedule on different aspects. As the study progressed and as a consequence of discussions with knowledgeable persons and the experience gained, the scope of the study was widened and consequently some new studies had to be initiated which earlier were not planned for. For example, on the issue of subsidies, the scope had to be enlarged and therefore analysis not only of subsidies incurred by the Government on the distribution of foodgrains, but also on encouraging production of foodgrains in the form of fertilizer subsidy, subsidy on electricity for agricultural purposes and on distribution of canal water had to be undertaken. On all aspects, the work was completed as scheduled. For the final year of the project, discussions on the draft project report were held with 10-15 academicians working in the field

of food policy as well as with 10-15 top administrators at different levels. These discussions were planned not only to get comments and suggestions for improving the quality of the project report but also to disseminate results of the study. Two workshops on the project report were also held as per schedule.

Analysis of the data revealed that two major achievements of India's food policy have been: (a) a perceptible increase in physical and economic access to food, and (b) prevention of occurrence of famine in the country despite domestic production decreasing sharply in years of drought. However, the achievements of other goals of food policy have not been that successful. The genesis of the Government intervention in the marketing of foodgrains was primarily on account of its desire to ensure equitable distribution of available supplies even in periods of scarcity. The public distribution system was to ensure availability of cereals to consumers, particularly to the vulnerable sections of society, at reasonable prices. The analysis of the available information revealed that despite considerable emphasis placed by the Government on these goals, the policy has not succeeded in ensuring equitable distribution in different states and in making food available to the really poor. This apparent success in ensuring reasonable prices to the coarse grains producers have been below the desired levels in most of the years. The Government's food policy has been successful in arresting undue rise in foodgrain prices despite a substantial reduction in output, but in some cases the price rise could not be contained within limits despite Government having sufficient stocks.

The main emerging problems, some of which have arisen primarily from the present system of management, are: (a) markets getting choked, (b) increasing difference between economic cost and producer prices; (c) escalating budgetary subsidies on the distribution of foodgrains; (d) as a consequence of near self-sufficiency being achieved in the case of cereals in some years, the demand from PDS was not only less than the quantity procured but was even less than what it was in the previous year; and (e) the degree of responsiveness with which different states participate in the management of the food economy seems to be declining.

An analysis of underlying trends, ongoing projects and improvements in the production technology of different crops indicated that India is likely to remain a marginally self-sufficient economy as far as cereals are concerned in the next decade. If the present system of management of India's food economy remains unchanged then the total quantities purchased and distributed by the public sector agencies on Government account are likely to double in a period of 8-10 years. The budgetary subsidy burden may increase even at a faster rate. Fixation of prices at a uniform level for the entire period may result in inefficiencies developing in the marketing system.

Analysis also indicated that despite India emerging as a self-sufficient economy, complete free trade in the marketing of foodgrains is unlikely to be of help in achieving the major goals of food policy and it is doubtful whether such a switch-over will even lead to increased efficiency on the grounds of which a case for complete free trade is often made. Given the size of the country, the degree of instability in production and nature of price elasticity of demand for foodgrains and low per capita income, the Government will have to continue to intervene in the marketing of foodgrains. Having ruled out the possibility of complete free trade in the marketing of foodgrains, alternatives which in the present stage of economic development of India appear feasible and which are likely to be less costly than the present one have been suggested. These include a distinction between minimum support and procurement price, staggering of market arrivals through offering higher price to producers in the off season, allowing forward trading in cereals, encouraging greater involvement of private trade in the marketing of cereals and restricting distribution of foodgrains only to really poor people, changing the present policy of holding entire buffer of foodgrains in physical terms to that where a significant part of it is held in the form of foreign exchange reserves, and lastly to improve the information system for efficiently managing India's food economy.

Principal Outputs

"Economic and Physical Access to Food: The Indian Experience" will appear as a chapter in the Asia Fellows Book in late 1989.

"Foodgrain Trade Policies: A Case Study of India" will appear as a chapter in the KIFP/FS Interest Group II book *North-South Grain Markets and Policies* being edited by David Blandford for final publication in early 1990.

A chapter on India to appear in the Interest Group I book, *Food Systems in Transition: Lessons and Challenges*. Publication planned for early 1990.

A comprehensive final KIFP/FS project report entitled, "Managing India's Food Economy: Alternatives In a Self-sufficiency Environment" has been drafted and reviewed. It will be published as a monograph or book in late 1989.

Travel Study and Hosting of Fellows' Activities

Made arrangements for travel study of KIFP/FS Fellows to India in January 1989. Took major responsibility in organizing the Asia Regional Seminar and also producing a book based on papers discussed in that seminar. As Chairman of the Interest Group for two years, I was responsible for organizing meaningful discussions in the Interest Group meetings.

I also took travel study tours to Brazil, Mexico, Tanzania, China and Australia.

Simei Wen
Department of Agricultural Economics
South China Agricultural University
Guangzhou, China

**Title of Project: Governmental Food Policies and Policy Alternatives
Needed to Improve Food Production in China.**

Project Objectives

The project intended to evaluate and analyze the changes in the government food policies of China, and to find out how these policy changes could be converted to a setting by which the food system would be improved.

Specifically, the fellowship project was designed to: (1) compare the institutional framework in China's food sector before and after 1978, the year when rural economic reform was introduced, and the functional implementation of the government's food policies; (2) examine the evolutionary changes in China's food policies and analyze their impacts on food production, consumption and marketing; and (3) assess China's food production capacity and identify policy alternatives needed to improve China's food system, particularly the production capacity to feed a billion people.

Activities/Accomplishments

During the fellowship period, my in-country activities related to the fellowship have focused on:

1. Data Collection. This consists of two major aspects. (a) Data collection and sorting in relation to national and regional (provincial) production, consumption and marketing in China's food economy since 1949, and information related to government food policies. This part of the work was extremely time-consuming because the Chinese had not published detailed data before 1979. Tremendous time was spent on visiting related institutions and understanding the food system so that a workable database could be established. (b) A rural household survey and price data collection related to major food crops in free markets in major provinces. The rural household survey was designed to develop a multi-year database for the purpose of analyzing the effects of policy changes on farmers' behavior in production, consumption and marketing. This work has been associated with my institutional migrant project and will continue in the next three years. The price data collection has been done with "correspondent surveys" for major food crops in selected free markets in major provinces in order to capture price variations over time and among regions. The data will be used to write a paper or a book (see "Publications Planned") on "Planning and Markets in China's Economic Reforms: Theory and Evidence."
2. Data Analysis. This work included the statistical description of the data and the preliminary econometric analysis. Econometric analysis using multiple regression models with various policy variables and alternative specifications has obtained some basic results, but the proposed final analysis was interrupted by the recent social unrest in China. It is hoped that the final results of the project can be incorporated into a book in the near future either in Chinese or in English, depending on the timing and funding.

Summary Observations

The results from the analysis done so far conform with the original hypotheses. China's food economy moved into a transition period since 1978 when the rural economic reforms were introduced. Before 1979 China's food system development was biased towards a few staple grains (rice in the South and

wheat in the North), which was caused by both the need to feed a growing population and the misconception of the government policies. During this period the increase in food supply was made available through frequent institutional changes, infrastructural construction such as rural roads and irrigation, technological advances such as high-yielding varieties of crops, as well as depressing demand for food by rationing in the urban areas and promoting self-sufficiency in the rural areas. The government used pricing policy mainly for the purpose of balancing economic welfare among groups within the population not for allocation of resources. However, this created an unhealthy structure of the food economy, in particular, and caused huge costs to the economy in general.

A major policy employed by the government after 1979 was to place greater reliance on the market in allocating resources. Control over the private sector was relaxed to a certain extent, and pricing policies for inputs and outputs were more actively used to influence production, consumption and marketing activities.

The food purchasing and selling system is still dominated by the government. The dual pricing system (or "double-track" pricing as it's called in China) created new problems: huge subsidies on foods, high inflation, corruption by those people who hold power to allocate state-controlled commodities and inequalities. Because the food markets are still controlled largely by the government with administratively low pricing and regionally disarticulated pricing structures, while relaxation of controls over other markets provides opportunities to farmers, the incentive structure is still unfavorable to food producers. This has discouraged producers' decision in improving food productivity and also jeopardized the establishment of a favorable market environment, because analysis shows that both producers and marketers are very responsive to food price changes.

When formulating China's food policies, there are several key issues and constraints that should be taken into consideration: (a) whether grain self-sufficiency is a viable strategic objective given China's resource constraints. If so, at which level should the strategy be defined; (b) links between food pricing and inflation--evidence shows that food price increases in the past two years contributed significantly to the current inflation; (c) the balance between table and feedgrains; (d) the balance between markets and planning (the recent political events in China may mean more planning than has been observed and expected); and (e) the food subsidies and urban discontent: not a pure economic issue. All these issues must be appropriately addressed before we can make a sound judgment about the future of China's food system. However, what the government will do has become more uncertain since the recent social unrest.

Publications Completed

The 'Wenzhou Model': Food or Income? (in Chinese).

Technical Change and Agricultural Development in China: Retrospect and Prospect. (in Chinese).

Some Theoretical Issues in Agricultural Production and Efficiency. (in Chinese).

A Study on the Appropriate Planning, Layout, and Structure and Policy Issues in Establishing an Integrated Trade-Oriented Agriculture System in the Pearl River Delta Region. Co-authored. (in Chinese, English abstract).

An Economic Analysis of Peasant's Behavior in a Changing Environment. (in Chinese).

The Relationship Between Agricultural Marketing and Pricing Policy. (in Chinese).

"The Role of Government Policy in Meeting the Challenge of Increased Food Demand: The Chinese Experience." A contributed chapter to the book by Asian Fellows.

A contributed chapter (co-authored with Colin Carter) to *North-South Grain Markets and Policies*.

A textbook printed in China, *Agricultural Marketing and Price Policy*, used for the China International Center for Agricultural Training.

Publications Planned

A contributed chapter to Interest Group I's proposed book *Food Systems in Transition* (projected 1990).

A co-authored book with Colin Carter *Chinese Grain Marketing and Pricing Policy* (projected 1990).

A proposed book or research report on "Planning and Markets in China's Economic Reforms: Theory and Evidence" (may cooperate with Dr. Terry Sicular, Harvard University). This is related to both my fellowship and minigrant project. It can be either in English or in Chinese, depending on the funding.

Seminars/Workshops/Presentations

In the past three years I attended or organized several seminars, workshops and presentations. The following are related to KIFP/FS activities:

Participation in the Interest Group II minigrant project workshop at Cornell University (September 1987). Colin Carter and I presented a paper on China.

Organized a workshop in Guangzhou to discuss my project (April 1988).

Presented a paper, "Marketing, Markets and Price Policy in China's Grain Economy" at the XX IAAE Conference, Buenos Aires (August 1988).

Presented a paper at the Annual Meeting of Guangdong Association of Agricultural Economics, based on my project findings (January 1989).

Presented paper in the Asian Regional Seminar of KIFP/FS in Guangzhou (October 1988).

Travel Study and Hosting of Fellows' Activities

Travel study to Cornell University following the Orientation Seminar in East Lansing to finalize a paper (Cornell International Agriculture, Mimeo 111, November 1986).

Travel study to Mexico and Stanford University after the Brazilian Seminar in January-February 1987, to observe the CONASUPO and Mexican food system and to work with Terry Sicular at Stanford University.

Field trip to Kenya and Tanzania before and after the Zimbabwe Seminar.

Field trip to India and Australia before and after the Thailand Seminar to observe the food systems.

Assisting Professor Yan Rui-zhen to host the Group IV China Trip in June 1988.

Organized the October Asian Regional Seminar in Guangzhou, Xian and Beijing, October 1988.

Interest Group II

Agricultural Marketing, Price Policy and Trade

David Blandford
Department of Agricultural Economics
Cornell University
Ithaca, NY

Title of Project: Dynamics of the International Feed/Livestock System

Project Objectives

To evaluate the causes and implications of changes in production, consumption and trade in grains, livestock feed, and meat and livestock products; with particular emphasis on the economic relationships between the developed and the developing countries.

Activities/Accomplishments

This project has focused on analyzing changes in food consumption patterns in the developing countries, particularly the demand for meat. It has analyzed the implications of changes in the demand for livestock products for the consumption of grain in developing countries, and for international trade in grains. Much of the work has been carried out in conjunction with the ongoing activities of the Pacific Economic Cooperation Conference (PECC) working group on livestock, grains and feed. Using some of the financial resources made available through my project, I was able to become an active member of this group in 1987 and presented a paper on livestock product demand in the Pacific region at their annual meeting in New Zealand in October of that year. Further work was conducted on grain demand in the Pacific region, and the implications of domestic policies on agricultural trade. This work has been carried out in conjunction with Cornell students hired using project funds, colleagues in the Department of Agricultural Economics at Cornell University, and economists at the Economic Research Service of the U.S. Department of Agriculture.

The work on the Pacific countries revealed the importance of income growth and the macroeconomic environment which underpins this growth in changing food preferences and influencing agricultural development. As a result of the Kellogg project, I was able to explore these issues further by becoming involved in a study in Cameroon. This project focusses on macroeconomic policies and their implications for the poor. It is being funded under a USAID grant to Cornell University through the Cornell Food and Nutrition Policy Program established by Per Pinstrup-Andersen.

I have made two visits to Cameroon thus far, with a third planned. I have been working in conjunction with two graduate students at Cornell on an analysis of household survey data to determine a poverty profile for the country, and consumption characteristics. This information is being used in the development of a computable general equilibrium (CGE) model to evaluate the impact of structural adjustment programs, and the effects of macroeconomic policies on poor and vulnerable groups. The Cornell team has been working closely with the Ministry of Plan in Cameroon, and has been involved in training several Cameroonians in the Ministry to use the data and models which are being generated.

The final activity which has been a major part of my KIFP/FS project has been editing the book entitled *North-South Grain Markets and Policies* which is being authored primarily by Kellogg Fellows. The book grew out of the meetings of Group II (Marketing Group) of the Fellows who decided to hold a symposium at Cornell on the topic of grain markets and policies in the Fall of 1987. The papers presented at this symposium have undergone two major revisions and are now being finalized in a manuscript to be submitted for publication to Cornell University press.

Summary Observations

My Kellogg fellowship project and the entire program has been an enormously enriching experience for me, both professionally and personally. By working with the other Fellows on the book project, I have become more sensitive and sensitized to the problems of the developing countries and the way in which different countries attempt to deal with agricultural development and food security. The annual KIFP/FS seminars have been an invaluable experience which have substantially improved my performance as a professional. For example, I make extensive use of the knowledge which I have gained from the programs at the KIFP/FS annual meetings and the many color slides I have collected from my visits to three continents in a course which I teach on international agricultural development. I doubt whether I would have been able to teach this course with the depth of knowledge that the subject deserves without the experience that the KIFP/FS has provided me.

The personal relationships which I have established with the Fellows will be another enduring result of the fellowship program. Already, I have had several opportunities to recommend a number of the Fellows to my colleagues as sources of information, participants in meetings, and potential co-collaborators in professional activities. I hope to be of similar service to them in the future.

The KIFP/FS has required a substantial personal input of time and effort, but this has been matched equally by the efforts of the other Fellows, and the administrators of the program. This personal investment has been fully justified. I shall carry away not only many happy memories and tangible professional accomplishments, but also a feeling that these three years were a landmark in my personal and professional development.

Publications Completed

Estimates of the Income Elasticity of Demand for Meat in the Pacific Region and Consumption Projections for 1995. Published in the 1988 Proceedings of the PECC Workshop on Livestock/Feed (with H. Guntz).

Income Growth and the Demand for Grain the Developing World. (Preliminary results from my KIFP/FS project; with H. Guntz).

Alternative Methods for Agricultural Income Support in the Pacific Region. Published in the 1989 Proceedings of the PECC Workshop on Agriculture (with H. de Gorter).

The following chapters for the North-South Grains Book:

"The International Grain Economy: Markets and Policies"

"The European Community" (with Madeleine Gauthier)

"The United States"

"Cameroon" (with Sarah Lynch)

"North-South Grain Markets and Policies: A Synthesis" (with the other authors)

Publications Planned

The major publication planned is the final edited volume of the North-South grains book (publication date: late 1989 or early 1990). If time permits, a monograph may also be prepared on changes in international feed/livestock economy and their implications.

Seminars/Workshops/Presentations

Apart from participation in the KIFP/FS annual seminars, the following have been conducted:

- 1) Participation in the Kellogg Fellows review of the activities of CONASUPO (Mexican Food Agency), following the 1987 annual seminar in Brazil.
- 2) Seminars presented at the University of New England and the Bureau of Agricultural Economics, Australia; Lincoln College and Massey University, New Zealand; and the University of California, Davis following the 1987 annual seminar in Brazil.
- 3) Presentation at the 1987 Workshop of the Livestock and Feeds Group of the PECC in Napier New Zealand, October 1987; also a seminar given at Lincoln College, New Zealand.

Travel Study and Hosting of Fellows' Activities

Hosted Kellogg Fellows seminar on grain markets and policies in Ithaca, NY; September 14-18, 1987.

Attended the China study program following the meeting of the Asian Fellows in Guangzhou, China; October 1988.

Visited the University of California, Davis to prepare, with Colin Carter, an initial draft of the synthesis chapter of the North-South grains book; January 1989.

Colin A. Carter
Department of Agricultural Economics
University of California, Davis
Davis, California

Title of Project: A Study of Reforms in China's Grain Marketing System

Project Objectives

The overall objective of my project was to study the economic impact of China's recent policy reforms. I concentrated on the reforms that were implemented in the grain production, marketing and distribution system. The 1978 economic reforms in Chinese agriculture are recognized as being highly successful because grain yields increased dramatically and rural incomes rose by more than three-fold over the 1978-86 period. This nine year jump in incomes was greater than the total increase for the previous thirty years, since the People's Republic of China (PRC) was founded. My research has aimed to study the significance of these reforms for the grain markets in China and then to trace the impact onto world markets.

Activities/Accomplishments

During the past three years I have worked toward my project objective through: (a) writing four research papers on individual topics, (b) completing a book (with Fu-Ning Zhong) *China's Grain Production and Trade* (Boulder: Westview Press, 1988), (c) writing two book chapters for the KIFP/FS "North-South Grain Marketing Project," (d) presenting three conference papers, and (e) preparing material for a book with Simei Wen on Chinese Agricultural Pricing Policy.

Before the KIFP/FS began in 1986 I had been working on my book *China's Grain Production and Trade* and the fellowship provided me with funding to finish the project. I was able to attend two conferences in China in 1987. Each of these conferences provided me with valuable information to write additional chapters in the book. The first of these conferences was held in Beidaihe, China from July 19-24, 1987 and it was sponsored by the Food and Agriculture Organization of the United Nations (FAO) and the Chinese Ministry of Commerce. The theme of the seminar was on food marketing and I presented a paper on "Grain Grading in Theory and Practice." I spent ten days in China and, in addition to the meetings, the conference organizers sponsored field trips to visit markets, dock facilities, food shops and grain processing facilities. The Ministry of Commerce is responsible for grain procurement and distribution in China and therefore they were able to provide me with some unique insights into food marketing problems and issues in China.

The second conference which I attended was sponsored by the International Association of Agricultural Economists (IAAE) and the Chinese Association of Agricultural Economists. The theme of the symposium was on rural development strategies and it was held on October 25-29 in Huairou, which is near Beijing. There were approximately forty international economists invited to this conference and a similar number of Chinese participants. I presented a paper on "Regional Comparative Advantage in Chinese Agriculture." John Longworth has published some of the conference papers in a book and he included my paper. There were several high ranking Chinese policy-making officials attending this conference and it was an excellent opportunity for me to interact on a professional level with these individuals.

The KIFP/FS Fellows working on the minigrant supported "North-South Grain Marketing Project" met at Cornell University from September 14-18, 1987. I attended this workshop where I presented drafts of two chapters. One was on the Canadian grain marketing system and the other I co-authored with Simei Wen and it provides an overview of the Chinese grain marketing system. The workshop gave us an opportunity to discuss, in depth, grain marketing problems which exist in each participant's

home country. These two chapters are now complete and the book will be published in 1990. David Blandford is the editor.

In November 1986 I employed two student research assistants at South China Agricultural University. They collected detailed data at four of the Yangtze grain markets. Unfortunately, the data was subsequently lost in the mail. This problem forced me to reorganize some of my project objectives. Instead of studying the Yangtze markets in-depth, I decided to complete some more general marketing research papers on Chinese agriculture and to begin to write a book with Simei Wen. Simei has made arrangements to carry out case studies of the Yangtze grain markets. I have also employed a Chinese graduate student in Davis to work on this book. She assisted me in the collection and translation of information on grain pricing policy and the history of grain marketing in China.

Summary Observations

My study trips and research on China have given me a great opportunity to sharpen my understanding of Chinese agriculture. This experience has allowed me to study how developments in China interact with the global food system. The other KIFP/FS group activities in Africa, Latin America and Asia were also unique educational experiences.

The course of events in Chinese agriculture will have a very significant impact on the international food equation in coming years and I plan to continue studying this topic. Having been part of the KIFP/FS will allow me to pursue this goal because the KIFP/FS has given me the occasion to establish a close working relationship with several scholars in China, especially Professors Wen and Yan. Their mutual research interests will continue to strengthen and I anticipate there will be many professional future "by-products" from my KIFP/FS experience.

Publications Completed

Carter, Colin. 1989. "Regional Comparative Advantage in Chinese Agriculture." In *China's Rural Development Miracle with International Comparisons*, J. Longworth (ed.), University of Queensland Press.

Carter, C. A. and F. Zhong. 1988. *China's Grain Production and Trade*. London and Boulder: Westview Press.

Publications Planned

Carter, C. and Simei Wen. "Chinese Grain Marketing and Pricing Policy." To be published in 1990.

Carter, C. and Simei Wen. "China's Grain Economy." Chapter completed for KIFP/FS book, *North-South Grain Markets and Policies*. To be published in 1990.

Carter, C. "Canada's Grain Economy." Chapter completed for KIFP/FS book, *North-South Grain Markets and Policies*. To be published in 1990.

Carter, C. and F. Zhong. "China's Past and Future Role in the Grain Trade." *Economic Development and Cultural Change*. To be published in 1990.

Seminars/Workshops/Presentations

"Grading in Theory and Practice." Paper presented to Ministry of Commerce/FAO Conference on International Food Marketing Policies, Beidaihe, China, July 1987.

"Regional Comparative Advantage in Chinese Agriculture." Paper presented at IAAE/CSAE/CAASS Conference on Rural Development Strategies, Beijing, China, October 1987.

(with E. Brandstetter). "Impact of Weather on Wheat Yields in the People's Republic of China." Paper presented to conference on Impact of Weather on Agricultural Production in Pacific Rim Countries, University of California, Davis, June 1989.

Travel Study and Hosting of Fellows' Activities

1. In November 1986 I travelled to South China Agricultural University for two weeks. Simei Wen was my host.
2. I attended the KIFP/FS annual seminar in Brazil (February, 1987).
3. In February 1987 I hosted Simei Wen at the University of California at Davis for one week.
4. I attended the Ministry of Commerce/FAO Conference on International Food Marketing Policies, Beidaihe, China, July 1987.
5. In September 1987 I attended the KIFP/FS meeting of the "North-South Grain Marketing Project" at Cornell University for one week.
6. I attended the IAAE/CSAE/CAASS Conference on Rural Development Strategies, Beijing, China, October 1987.
7. I attended the KIFP/FS annual seminar in Africa (February 1988).
8. I attended the IAAE conference in Buenos Aires, August 1988.
9. I attended the KIFP/FS annual seminar in Asia (February 1989).

Julio Paz-Cafferata
Peruvian Ministry of Agriculture and
Grupo de Analisis para el Desarrollo (GRADE)
Lima, Peru

Title of Project: Agricultural Price Policy in Peru

Project Objectives

- 1) To evaluate the influence of macroeconomic and sectorial policies on agricultural prices in Peru during the period 1975-1985, and its impact on production, consumption, trade and government budget.
- 2) To evaluate the macroeconomic and sectoral impacts of alternative agricultural pricing policies.
- 3) To derive policy recommendations for efficient government intervention in agricultural prices.

Activities/Accomplishments

The first stage of the project was the estimation of effective protection coefficients for agricultural and non-agricultural products. The study seeks to measure the incentive/disincentive effects of the various policy instruments that have affected the relative protection in Peru and its influence over resource allocation between agriculture and non-agricultural activities.

Net effective protection coefficients were estimated for 69 product categories, among which 18 correspond to non-processed agricultural products. Estimations were made using available data on import duties, export taxes and subsidies, and exchange rate for each category and for each year 1979, 1981 and 1984. Methodological procedures, analysis and output results were included in publication #1, specified under the "Publications" section of this report. Further efforts on this line were made during the present year in order to incorporate up-to-date estimations of effective protection coefficients.

Qualitative analysis of the impact of macroeconomic and sectorial policies on agricultural performance has been presented in various papers, prepared as part of the KIFP activities (publications #2, #3 and #4).

To achieve the second objective of my project it was considered imperative to construct a simple econometric model which allows the analysis and measurement of the macroeconomic and sectoral impacts of alternative pricing policies.

The cornerstone of the model is a group of supply and demand functions of key exportable crops (coffee, cotton and sugarcane), importable crops (wheat, rice and yellow corn) and one non-tradable crop (potatoes). The net gap between domestic supply and demand for tradable is assumed to be covered by foreign trade (exports or imports). In the case of the non-tradable crop the market is cleared through price movements.

The model includes reaction functions when modeling key consumption prices. In fact it is assumed that governments intend to isolate domestic markets from international markets. Its maneuver capacity depends on the availability of foreign exchange. At the same time, the rise of domestic subsidies puts pressure on government marketing-enterprises, and pushes up controlled prices.

The model quantifies the impact of agricultural pricing policies on the distribution of sown hectares and on production, consumption, export and import levels of the main crops. It also quantifies the effects of pricing policies on the fiscal and exchange deficits.

A central element incorporated in the model is the evolution of relative prices for each of the analyzed crops: relative prices of products which are substitutes at the production or consumption levels, as well as the relationship between internal *vis à vis* border prices.

At the present time a paper summarizing the theoretical framework in the context of multi-market models and a first estimation of all functions is at its final draft stage (publication #5). At GRADE there is firm intention to continue developing the model, improving it through better estimation techniques and improving the project's output. GRADE will undertake the analysis of various alternative scenarios on relative price structures of Peruvian agriculture and their impact on the main macroeconomic and sectorial variables.

The main objective of the project was to derive policy recommendations from the analysis made in the previous stages. In this respect various papers, dealing with alternative ways of improving current agricultural pricing policies, have been produced within the KIFP project. The first one was focussed on the current procedures to set guaranteed prices for agricultural producers and the need to link them to international relative prices (publication #6).

A second paper developed a more comprehensive policy alternative to reduce domestic agricultural price variability while at the same time connecting its medium and long term evolution to their opportunity costs. With this purpose research has focused on the implementation of a price band mechanism for tradable products, specifically for wheat and yellow corn. The paper develops theoretically a price band, deducting it from the existing trade-off between minimizing the present value of governmental intervention costs and the minimization of domestic price fluctuation. It discusses specific intervention policies consistent with this price band mechanism, connecting relevant border prices with domestic guaranteed prices for the products under analysis. Using information on output and demand price elasticities, the paper gives an estimation of the first round effects on production and consumption of the price band mechanism suggested (publication #7).

Finally, in order to mitigate the adverse impact of the proposed price policy adjustments on the real living standards of the poorest groups, changes in food subsidies policy out from generalized subsidies to targeted subsidies, have been recommended (publication #8)

Summary Observations

The goals established for the project have had a high degree of achievement. The main issues included in the original project proposal submitted to the KIFP/FS have been extensively analyzed and the results presented in the papers mentioned above. However, more work has to be done in the near future to integrate the results contained in the various papers into a single comprehensive policy proposal. The information and data assembled and the macroeconomic model constructed will be used in further research projects by GRADE and by me.

During the various stages of the project, the assistance of highly qualified Peruvian economists has been used, especially during the last year.

Publications

1. "Evolution of Effective Protection for Peruvian Agriculture." Nov. 1987, mimeo. (Spanish)*
2. "Linkages between Agricultural Policies and Macroeconomic Policies in Peru: 1980-1987." May 1988, mimeo. (Spanish)

3. "Effects of Macroeconomic Adjustment Policies on the Agricultural Sector in Peru," included in the book "Macroeconomic Adjustment and Agricultural Sector in Latin America" KIFP/IICA, Buenos Aires, 1988. (Spanish)
4. "Performance and Prospects of the Agricultural Sector in Peru" June 1989, mimeo. (Spanish)
5. "Macroeconomic Policies and Agricultural Growth: An Evaluation of Alternative Options" July 1989, mimeo.*
6. "Applying a Policy of Administered Prices to Agriculture" included in "Estudios Agroeconomicos" number 1, Jan. 1988. Min. of Agriculture/GAPA, Lima. (Spanish)
7. "Targeted Subsidies and Food Assistance Program" April 1988, mimeo. (Spanish)
8. "A Price Band Mechanism for the Peruvian Agricultural Sector," July 1989, mimeo.

*To be published in the Research Papers Series of GRADE during the second semester of 1989.

Seminars/Workshops/Presentations

Outputs of the project have been presented at:

Annual Meeting of the Permanent Seminar on Agrarian Research (SEPIA), June 1987, Ayacucho, Peru.

Special Meeting of the Permanent Seminar on Agrarian Research (SEPIA), Nov. 1987, Piura, Peru.

Seminar on "Effects of Macroeconomic Adjustment Policies on the Agricultural Sector in Latin American Countries," held in BULOG, Jakarta, Indonesia on Feb. 17-18, 1989.

Seminar on Agricultural Price Policy in Peru held in GRADE in May 25, 1989.

Travel Study

Participated in the KIFP/FS travel studies in Nairobi (1988) and India and Indonesia (1989). Also attended the KIFP/FS regional seminar in Buenos Aires, Argentina (August 1988).

**Roley Piggott
The University of New England
Armidale, New South Wales
Australia**

**Title of Project: Price Policies for Rice and Secondary Food Crops in
Indonesia: Evaluation and Implementation**

Project Objectives

To enhance my professional skills in the area of food policy analysis in developing countries by undertaking (a) an evaluation of Indonesia's current food price policies and alternative future policies and (b) gaining an understanding of the food policy making and implementation process in Indonesia.

Activities/Accomplishments

Project objectives were pursued through (a) reading from professional literature, (b) data collection and analysis, (c) collaboration with Indonesian colleagues, particularly those employed at Indonesia's Center for Agro-Economic Research, (d) presentation of seminars and workshops, and (e) writing. A two-thirds time research assistant (Mrs. Elaine Treadgold) and a colleague, Dr. Kevin Parton, have assisted in all of these activities.

In addition to the above, I participated in the activities of an interest group having a special concern with international grain markets and trade. Those activities were complementary to my own project activities and included attendance at a one-week workshop at Cornell. Also, complementary to my own project activities was attendance at a one-week KIFP/FS workshop in China where the Asian experience with respect to increasing food supply was examined.

In addition to these activities, I convened a two-day workshop in Bogor on Indonesian rice price policy which was attended by senior staff of Indonesia's Center for Agro Economic Research and representatives from the International Food Policy Research Institute (Washington); the Coarse Grains, Pulses, Roots and Tubers Center (Bogor); Bogor Agricultural University; Bulog (Indonesia's agency responsible for implementing rice policy); and the Australian Centre for International Agricultural Research (Canberra).

A model for analyzing Indonesian rice price policy was developed and transferred to computing facilities at the Center for Agro Economic Research. Indonesian staff were also trained in use of the model. I supervised the work of a senior staff member from the Center for Agro Economic Research during my three month visit to the University of New England.

Various papers related to my project and contributed chapters to books being prepared by KIFP/FS interest groups were also written. I am currently drafting further manuscripts for publication.

Summary Observations

1. Over the past 20 years the Indonesian government has intervened heavily in the rice market. It has used a combination of output price support and input subsidies as the main price policy instruments to help achieve rice self-sufficiency. The government has also sponsored research and extension activities. Indonesia achieved rice self-sufficiency in 1985. Government initiatives with respect to secondary food crops, and expansion of their production, have been much less notable.

2. Achievement of self-sufficiency in rice has resulted in substantial budgetary costs for the government. The fertilizer subsidy alone accounted for over 3 percent of the development budget during the early 1980s and reached 9 percent of the development budget in 1987/88. The government is involved in other forms of subsidization (e.g., storage) partly as a result of having forced private firms out of these activities.
3. If 1985 is taken as the base year and the effects of policies in place at that time are compared with outcomes under free-market conditions, then the net social cost of those policies (in 1985) were in the order of Rp 235 billion. This estimate is on the low side because it does not take into account the spillover effects of rice policy into other markets.
4. The effects of rice price policy on the production and consumption of secondary food crops are small provided one examines marginal changes in rice price policy (e.g., a 10 percent reduction in producer prices for rice). However, the possibility remains that the total incentives package for rice may have resulted in substantial distortions in the markets for secondary crops.
5. Indonesia is delicately poised in terms of its rice self-sufficiency status. Based on modelling on the 1985 scenario, a 20 percent increase in fertilizer prices without a rise in the floor price of rice would have been sufficient to make Indonesia a net importer of rice again. Reducing population growth would be the obvious way of reducing pressure on the demand side but this needs to be accompanied by efforts to diversify the dietary base away from rice. In turn, this would require changes in consumers' preference structures. The establishment of the Coarse Grains, Pulses, Roots and Tubers (CGPRT) centre in Bogor should assist in this regard.
6. Rice price policy in Indonesia is decided in an obscure way. It is by no means clear that models of policy making processes which agricultural economists in western countries have constructed have relevance to Indonesia. Agricultural price analysts from western countries working in Indonesia for the first time will notice several differences between what happens in Indonesia and what happens elsewhere.
7. An understanding of Indonesian culture is central to understanding the policy making process in that country; but understanding Indonesian culture is made difficult by the diversity of the population. Nevertheless, some important elements can be identified: (a) deliberation and consensus (as opposed to voting to decide an issue); (b) mutual assistance (helping one another as, for example, exemplified in community participation in the rice harvest); (c) smoothness, subtlety, refinement and civilized behavior (the ideal is to control the inner-self so that the outer-self is exhibited as sensitive in performing any social or professional role); (d) importance of not losing face; (e) patron-client relationships; and (f) the Javanese concept of "power."
8. These cultural considerations alone would explain various differences in the policy-making process between Indonesia and, say, Australia or the U.S. For example, the "rough and tumble" of policy debate observed in Australia is not observed in Indonesia--it would be inconsistent with cultural tradition (c) above. But the cultural traditions manifest themselves in a number of ways (e.g., it is rare to express disagreement with one's superiors; there is a tendency to say "yes" even when "no" is the real intent; one reports what one's superiors wish to hear; negative feedback is avoided).
9. While the Indonesian cultural background is of central importance, there are a number of other important influences on the policy making process, including: (a) the constitution and state philosophy of "Pancasila", (b) the military, (c) political parties, (d) structure of government and the civil service, and (e) informal power groups.
10. It is already appreciated by agricultural policy analysts in western countries that, if one wishes to influence policy, much has to be done beyond the research phase. Moreover, tendering of policy advice is an "art form"--in Indonesia it would be more aptly described as a "fine art." The

chances that an expatriate will be effective in influencing Indonesian agricultural price policy will be zero unless he or she is cognizant of the factors mentioned in (7) through (9).

Publications Completed

Piggott, R. R., E. M. Fleming, and V. E. Wright. (1986). Relative effectiveness of private and public organisations in postharvest handling of grain. In B. R. Champ, E. Highley and J. V. Remenyi (Eds.), *Technological Change in Postharvest Handling and Transportation of Grains in the Humid Tropics*. Australian Centre for International Agricultural Research, Canberra.

Publications Planned

Piggott, R. R. and B. S. Fisher. (1990). Australian country paper in *North-South Grain Markets and Policies* (Blandford editor).

Piggott, R. R. and K. A. Parton. (1990). Indonesian country paper in *North-South Grain Markets and Policies* (Blandford editor).

Piggott, R. R. and E. M. Treadgold. (1989). Indonesian case study in the book dealing with the Asian experience in expanding food supply (Tyagi editor).

A book dealing with analysis and implementation of price policy for rice and secondary food crops in Indonesia. This will be authored jointly by myself, Parton and Treadgold with a complete draft to be ready for review by December 31, 1989.

Seminars/Workshops/Presentations

Piggott, R. R., E. M. Fleming, and V. E. Wright. (1986). "Relative effectiveness of private and public agencies in postharvest handling of grain." Paper presented to symposium on "Technological Change in Postharvest Handling and Transportation of Grains in the Humid Tropics," sponsored by Australian Centre for International Agricultural Research, Thailand Department of Agriculture and ASEAN Food Handling Bureau, Bangkok, September.

Parton, K. A. (1986). "A partial equilibrium framework for analysing price policy for food crops in Indonesia." Paper presented to Center for Agro Economic Research, Agency for Agricultural Research and Development, Bogor, Indonesia, September.

Parton, K. A. and R. R. Piggott. (1987). "A structural model of markets for rice and secondary food crops in Indonesia for food policy analysis." Contributed paper to the Annual Conference of the Australian Agricultural Economics Society, Adelaide, February.

A variant of the above Parton and Piggott (1987) paper was presented by both authors at a symposium on Indonesian agricultural development issues held in the Department of Agricultural Economics and Business Management at the University of New England in April 1987. The other speaker was Professor A. T. Birowo, an advisor to the Minister for Agriculture in Indonesia.

Parton and I made several presentations on some results of the project at a two-day workshop conducted at Indonesia's Center for Agro Economic Research in January 1988.

I presented seminars in Ithaca (September 1987) and Guangzhou (October 1988) on materials being prepared for KIFP/FS books.

I presented a seminar on "Communicating Policy Advice" at the KIFP/FS Annual Seminar in Recife, February 1987.

Travel Study and Hosting of Fellows' Activities

I participated in the Mexico, Kenya and Sudan field trips which were held as part of the KIFP/FS Annual Seminar activities.

I participated in the Asian Regional Seminar in Guangzhou, October 1988.

The Australian field trip which followed the Bangkok Annual Seminar was arranged and hosted by me.

**Norberto Quezada
Instituto Superior de Agricultura (ISA)
Santiago, Dominican Republic
and
Sigma One Corporation
Research Triangle Park, NC**

**Title of Project: Pricing and Marketing Roles of the Dominican State
Marketing Agency: Price Stabilization Institute (INESPRE)**

Project Objectives

- 1) To describe the marketing system for the agricultural commodities handled by INESPRES.
- 2) To document INESPRES's roles in the trade and domestic marketing in terms of the instruments used and the impacts.
- 3) To assess INESPRES's performance in marketing and its financial viability.
- 4) To explore alternative state regulation of trade in agricultural commodities.
- 5) To recommend changes to improve marketing and trade efficiency.

Related fellowship objectives but directly connected to my personal project were:

- 6) To observe and understand food systems in other countries with particular reference to the marketing arrangements for cereals.
- 7) To interact with other professionals doing applied research and development work in food systems.

Activities and Accomplishments

Objective number 1 was accomplished in the "Marketing Modernization" paper (item number 1, pp. 2-6 of "Publications Completed") and the paper presented in Honduras (item number 8 of "Seminars/Workshops/Presentations").

Objective number 2 was accomplished in the "Marketing Modernization" paper (item number 1, pp.6-10 of "Publications Completed") and the chapter in the "Grain Trade" book (item number 4 of "Publications Completed").

Objective number 3 was accomplished in the "Marketing Modernization" paper (item number 1, pp.6-10 of "Publications Completed") and the chapter in the "Grain Trade" book (item number 4 of "Publications Completed").

Objective number 4 was accomplished in the "Marketing Modernization" paper (item number 1, pp. 11-18 of "Publications Completed").

Objective number 5 was accomplished in conjunction with objective number 4 above and as I pursued the following activities:

- a) I visited Chile twice to get a first-hand look at the operation of their "Additional Specific Levy and Tariff Reduction" wheat policy known as the "price band" policy by the people that have

written about it. This policy implies the establishment of 1) a minimum price of entry (the band's floor) of foreign wheat to Chile accomplished by way of a specific levy, 2) a maximum price of entry (the band's ceiling) accomplished by return of tariff charges, and 3) the use of international prices to determine the minimum and maximum prices. This policy operates without the trade monopolistic role assigned to marketing agencies like INESPRES. A paper by the author due in September 1989 will consider Chilean wheat policy and its application to rice and corn in the Dominican Republic.

- b) I commissioned the drafting of the statutes and by-laws of a proposed Dominican Agricultural Commodities Exchange. Dr. Julio G. Campillo, the Dominican lawyer contracted for this purpose was given similar documents for two other exchanges: the Colombian Agricultural Exchange, provided by the Kellogg fellow Alvaro Silva, and the Vercelli (Italy) Rice Exchange. The documents prepared by Dr. Campillo are compatible with the Dominican commercial code and are cited as numbers 5 and 6 in "Publications Completed."

I participated with other fellows in two important activities:

- 6) The migrant to Latin American fellows to organize a workshop on the impact of structural adjustment on Latin American agriculture held in Buenos Aires, Argentina, just before the International Association of Agricultural Economics (IAAE) meetings in August 1988. I wrote a paper for that workshop describing the case of the Dominican Republic. The proceedings were published by IICA in late 1988.
- 7) The preparation of a book on North South Grain Trade by the members of Project Interest Group II. I prepared the chapter on the Dominican Republic; the second draft of the chapter has been returned to the editor, Mr. David Blandford. I joined this effort late in its development since I was unable to participate in the organization meeting held at Cornell University in September 1987.

I also visited several institutions in searching for alternative marketing arrangements that responded to the government goals in establishing institutions like INESPRES but were more sustainable in the long run. This of course included the visits to marketing agencies and markets during the annual meetings in Africa and Asia, and the trip to China.

I visited:

- a) The European Economic Community (EEC) in Brussels,
- b) The National Rice Institute in Milan, Italy,
- c) The Ministry of Agriculture and the Central Bank of Chile,
- d) The Grains Exchange in Buenos Aires, Argentina,
- e) The Rice Exchange in Vercelli, Italy, and
- f) The Grains Exchange in Milan, Italy.

Summary Observations

The participation in the fellowship provided me with an excellent opportunity to understand food systems in very diverse situations worldwide. These observations extended well beyond the interests of the individual project proposed when I applied to the Kellogg fellowship program in 1986.

In relation to the project objectives the main conclusions are:

- a) INESPRES yielded a great deal of power that was used to distort domestic prices. This power included demand for an overvalued currency to dampen domestic prices with cheap food imports. At the realized exchange rate, INESPRES's gross margin on import acted as an ex-

post variable levy that had the effect of helping stabilize prices. INESPRES's domestic activities prevented the development of an efficient marketing system with profitable private operation. In the end, INESPRES proved not to be sustainable because of heavy losses.

- b) The state goals of price stabilization and domestic protection can be achieved with a modernization of the marketing system (as outlined in my "Modernization" paper), including a Chilean type of trade intervention with *ex-ante* specific levies and without state trade monopoly.

Publications Completed

- 1) Modernización del Sistema de Comercialización. In Consejo Nacional de Agricultura. *Seminario 25 Años de Políticas Agropecuarias*. Santo Domingo: June 1988.
- 2) República Dominicana: Ajuste Económico y Sector Agropecuario. In Garramon, C. et al. *Ajuste Económico y Sector Agropecuario en América Latina*. KIFP/FS Workshop, IICA, Buenos Aires, Argentina, 1988.
- 3) "Crisis Económica y sus Efectos en la Producción Agropecuaria" (abridged version of 2 above). Published by Instituto Superior de Agricultura (ISA), Santiago, Dominican Republic.
- 4) Dominican Republic Grain Trade. In Blandford, D. (Ed.) *North-South Grain Markets and Policies*. Cornell University Press, Ithaca, NY, forthcoming 1989.
- 5) "Bolsa Privada de Productos, Inc: Estatutos." In collaboration with Dr. Julio G. Campillo.
- 6) "Bolsa Privada de Productos, Inc: Reglamento." In collaboration with Dr. Julio G. Campillo.

Publications Planned

- 7) Chile: Franja de Precios de Importación de Trigo (Con una Aplicación a la República Dominicana). Forthcoming, September 1989.

Seminars/Workshops/Presentations

- 8) Evolución del Rol del INESPRES en la Comercialización Agropecuaria Dominicana - Implicaciones de Interés para Honduras. Seminario sobre Ajuste Agropecuario, Tegucigalpa, Honduras, 26-28 April 1989.

Alvaro Silva
Colombian Society of Agriculturists (SAC)
Bogota, Colombia

Title of Project: New Marketing Institutions for Price Formation in Colombia

Project Objectives

The main objective of the project was to promote mechanisms that improve price discovery. The project combined research and actions. Initially the actions that the project intended to promote were (1) the establishment of an "arbitration unit" closely associated to the Colombian Commodity exchange, mainly for the trading of grains, (2) the use of overseas futures markets to facilitate external grain trade, and (3) the establishment of an auction system (pilot project) for perishables.

Objectives (1) and (2) were accomplished but activities leading to the attainment of objective (3) had to be cancelled in order to perform migrant tasks that were not initially planned. I participated in two networking migrants: the first one supported a workshop on macroeconomic adjustment in Latin America and its influence on agricultural sectors, realized in Buenos Aires. A book in Spanish was written by all participants. The second one, supported the elaboration of a book on North-South Grain Policies for publication by Cornell University Press.

Activities/Accomplishments

In order to attain the proposed objectives, a complex set of activities had to be developed.

1. Arbitration Unit

A commodity exchange was set up in 1979 and the conciliation of problems that arose from grading or financial differences was performed by the exchange administration in an informal way. Considering that the marketing system needed a formal organization to deal with these problems, the establishment of an arbitration unit closely related to the exchange was proposed and promoted.

The steps followed to build up this new institution can be summarized as follows:

- a) A diagnosis and pre-investment study was elaborated to establish the nature and magnitude of the problem. A work-team was formed and several technical meetings took place with the administrators of the commodities exchange and IDEMA's managers because this latter institution played an important role in the project as one of the main stockholders and users of the exchange. By this time I became Planning Manager at IDEMA and this event was finally decisive in the success of the project.
- b) A feasibility study was then performed.
- c) A strong promotional effort was necessary in order to change the misconception of the main opponents to the project, namely, the brokers at the exchange. Several conferences and seminars were held and a travel study to Argentina was made to confer with the managers of a large, well-established grain exchange.
- d) Several discussions took place with the Board of Directors of the exchange where I occupied a place on the Board in the name of IDEMA. These debates served to interact with the leaders and to assist them in designing a new dimension in the grain exchange, namely an arbitration unit.
- e) The project was approved in 1987 and the implementation then began.

- f) A first director of the arbitration unit was elected with the responsibility of organizing and supervising the arbitration unit.
- g) A set of regulations for the arbitration unit was elaborated and submitted for the approval of the Superintendents as the main state control agency. These regulations were approved in 1988.
- h) On the basis of the feasibility study, grain grading laboratory equipment was imported in July 1988.
- i) The members of the arbitration unit (eight principals with their substitutes) were elected after a careful selection process.
- j) Finally, the organization began operations in 1989. Up to the present time, the arbitration unit has resolved approximately 16 conflicts, most of them organized on differences about quality specifications, delays in physical delivery, and financial conditions. Almost all of these conflicts have been solved in the first stage, namely "Conciliation Phase" without appealing to the second stage of the process, the so-called "Arbitration Phase." Hence, the mechanism is proving its efficacy in resolving these types of problems.

2. Use of Future Markets: Price Fixing Date

The commodity exchange has been operating since 1980 but its progress is slow and the use of local future markets have not evolved.

For imports of grains (mainly wheat) and oilseeds (mainly soybeans) IDEMA used a tender system in such a way that the closing date of the tender became the price fixing date. Thus, the system involved a strong rigidity that ultimately was reflected in higher costs and transactions were not always performed in a satisfactory manner.

In order to improve these grain importing decisions a study was proposed to determine alternatives for establishing the price fixing date.

The steps of the study can be summarized as follows:

- a) A technical group, with the participation of the main managers of IDEMA, was organized in order to discuss the foundations and to generate a favorable environment for the work.
- b) By May 1988 a seminar was held as a first approach to conceptualize the problem and also to establish some preliminary alternatives to the use of future markets by IDEMA to set the price fixing date. Some of the world's main grain companies represented in Colombia (Cargill, International Grain, Nova Trading Company, Marc Rick & Co., Colombian Ltda., Garnac Grain, Co Union Equity Cooperatives, Louis Dreyfus Corporation) were invited to this meeting.
- c) The main result of this seminar was a recommendation to IDEMA's administration to automatically extend the period of the public bidding for 20 or 30 days. Any time, along this period, IDEMA could fix the price according to both the evaluation of prices in international markets and the need of imports in the domestic market. This eliminates the rigidity that characterized the former mechanism.
- d) This recommendation was approved by the Board of Directors of IDEMA and since June 1988 the new system has been in operation.

- e) A brief evaluation of this method made in 1988 showed favorable results in purchases of soybeans specifically. Then, the mechanism gained in the process of institutionalization.
- f) On July 9, 1989 a new seminar was held in Ginebra (Valle, Colombia) with the participation of the technical group and a specialist of Cargill. The objective of this meeting was to discuss three specific alternatives to improve the buying of IDEMA: (i) continuing the actual system modified in May 1988, (ii) introducing the bidding on the Basis, and (iii) introducing the Options. A Chicago Board of Trade video was observed, several documents were analyzed and a broad discussion took place about the alternatives. The Fellows' travel to Australia in February 1989 was useful because it provided important information about Australian experiences on Basis negotiations.
- g) The seminar group recommended that IDEMA's administration negotiate the Basis and combine it with the present method on an experimental project. The use of Options may have legal problems in implementation. At the present time, managers of IDEMA are studying this new mechanism.
- h) Finally, a document is going to be delivered to IDEMA's Board of Directors by August 1989. The document defines the nature of the "Basis." Different alternatives are analyzed; the necessity of training and improvement of information services are also discussed to conclude finally with a set of recommendations.

I participated in a minigrant activity suggested by the Latin American Fellows consisting of a workshop held in Buenos Aires in order to present and discuss a basic document on macroeconomic adjustment in several Latin American countries and its effects on the agricultural sector. I presented a document on the Colombian experience that concluded: (a) The macroeconomic adjustment has taken place in two phases. The initial one was characterized by drastic taxation, imports control and a rapid depreciation of the real foreign exchange in order to avoid a deep recession and bankruptcy of public, financial and industrial sector enterprises. In the second phase the velocity of depreciation of the real exchange was reduced, and a gradual liberalization of the external trade was pursued; (b) The Colombian economy has gained rapid economic growth. However, some of the basic problems still remain and hence, austere measures continue being applied; and (c) The fiscal and credit policies during the adjustment period resulted in higher production costs for the major food items and lower capital investment. Hence, food prices have increased.

The second networking minigrant was to develop a document about North-South grain policies. The first draft relating to Colombian experiences was revised according to the editor's suggestions and on January 1989 a second version was sent to Cornell University. After the travel to China, further adjustments were taken into account and hence the final document (including my comments on the conclusion chapter) was finished and sent in April 1989. This document concluded that the Colombian urban and rural sectors are ill-equipped to handle price and income fluctuations. There aren't any future markets; crop insurance is just beginning; drying and storing facilities are insufficient; marketing flows and transactions channels may reach some degree of development in the Andes region but seem backwards elsewhere. Hence, a project like the creation of an Arbitration Unit can contribute to provide greater confidence in spot market transactions and forward contracting through the Commodity Exchange. On the other hand, the improvement of the decision making by IDEMA using the Basis for international purchases can also contribute to reducing the risk involved in these transactions.

Summary Observations

The Colombian marketing system has evolved slowly and, to some extent, it has become a constraint for faster economic development. The modernization of the system and the improvement of its

performance concern not only policy makers but also researchers and other food system leaders that have become "change agents" to assure that a strategic reform finally takes place.

Within the project I tried to combine in each task the research with the implementation of the suggested recommendations. Principles about "building institutions" were the main approach we used throughout the project.

Publications Completed

The decision of the shareholders of the commodity exchange about the creation of an "arbitration unit" was supported by a feasibility study performed by the work-team financed with KIFP/FS funds. This document titled "Proyecto - Camara Arbitral" was published by the Colombian Society of Agriculturists (SAC) and the Commodity Exchange in March 1987 and was delivered to the Board of Directors of the Exchange, the Minister of Agriculture and the Board of Directors of SAC.

The document titled "Ajuste Macroeconomico y Sector Agropecuario en America Latina" was published by the Interamerican Institute for Agricultural Cooperation (IICA) in December 1988.

The document titled "Institutions and Grain Policies of the South: The Case of Colombia" was sent to Cornell University and will be published in the near future as part of the North-South Grain Markets and Policies book.

Publications Planned

The document about future markets and its use by IDEMA will be finished at the end of August 1989.

With the financial support of the KIFP/FS and SAC we planned to publish a special edition of SAC's journal including the following documents: a Spanish version of the chapter prepared for the North-South Grain Markets and Policies book, a summary paper on the "Arbitration Unit" and a Spanish version about the improvement of IDEMA's buying mechanism in international markets. This edition of the SAC journal will be finished by September 1989.

Seminars/Workshops/Presentations

Several seminars were performed for the purpose of promoting the "arbitration unit" among its main users. These meetings took place in Paipa (Boyaca, Colombia) in April 1987 and in Santa Marta (Magdalena, Colombia) in December 1987. They also contributed to have broad discussions with the broker companies at the exchange who were strong opponents to the project.

With the purpose of improving the knowledge about future markets and to examine the different alternatives to improve the buying mechanisms by IDEMA, we organized and performed several seminars, with the participation of commercial grain company representatives and managers of IDEMA.

Travel Study and Hosting of Fellows' Activities

In February 1987 after the KIFP/FS annual seminar in Recife, Brazil, I traveled to Buenos Aires to visit the Camara Arbitral of the Bolsa de Cereales de Buenos Aires to understand its organization, facilities and results.

In November 1987 I invited Dr. Kelly Harrison, an international marketing expert, to visit with me in Bogota. We held a very interesting meeting in which we discussed and analyzed the characteristics of Basis negotiation in future markets and derived the key elements for its further implementation by IDEMA.

On March 18, 1989 Fellow Eugenia Muchnik visited Colombia, invited by a private University. Jointly with SAC's and IDEMA's managers we held a social meeting in which we had the opportunity to discuss some basic topics on macroeconomic and agricultural policies in both countries, Chile and Colombia.

Finally, on June 23, 1989 Dr. Harold Riley visited Colombia and we had the opportunity to present him a brief summary of the activities and results. He talked with the General Manager of the Commodity Exchange and the Director of the Arbitration Unit and also with the managers of SAC. He also talked with a group of IDEMA's managers.

Interest Group III

Programs and Policies to Feed the Poor

Shanti L. Bapna
Indian Institute of Management
Ahmedabad, India

Title of Project: Management of the Public Distribution System for the Ultra-Poor in Rural India

Project Objectives

Poverty and undernutrition in India, particularly in rural areas, continues on a large scale (about 50% of the population are below the poverty line) despite four decades of planned efforts. Even special public programs such as creating opportunities for self-employment, employment programs and direct income transfers did not help much because of leakages, inadequate funds and ill-conceived design of programs. In this context the Public Distribution System (PDS) as a way of direct subsidy is considered more appropriate because not only does it transfer income but it also makes food accessible and improves chances of food intake.

However, despite the huge subsidy cost of Rs. 30 billion on PDS, the program did not help in achieving the objective of significantly increasing the nutritional status of the poor. A few available studies indicate that this was mainly because of an ill-designed PDS, a general instead of a targeted subsidy, and leakages.

My study was undertaken with a view to evolve an alternative design of PDS keeping in mind the profiles and needs of the ultra-poor so as to achieve food security at the household level at a lower cost than the present general food subsidy. The study involved an examination of the existing structure of the PDS and its workings in terms of goal achievement.

Activities/Accomplishments

In order to achieve the study objective, the following activities were undertaken:

1. A Field Study

Major typologies of the PDS in India were examined. The experience of income targeting in Andhra Pradesh and geographical targeting in Maharashtra was studied and the management of the PDS in Rajasthan state, where uncertainties in food production was extremely high, was examined. The study also examined the working of the system at the Central Government level, the State level and the district and village levels. Further, forty consumers in each of four villages were selected by stratifying on the basis of land and occupation. Households were visited six times over a period of 14 months to document their consumption and purchase behavior. Based upon the field study, a report analyzing consumer buying behavior and the interface with the PDS system was prepared and several aspects of redesigning the system have been brought out in the report.

2. Study Tours

In order to interact with knowledgeable people in food policy and acquaint myself with literature and people in this field, I visited IFPRI in Washington, DC for one month. This gave me the opportunity for close interaction with people like, Michael Lipton, J. von Braun and Harold Alderman who have done considerable work in this field. Also during this period I received an orientation to the use of computer software at Michigan State University. A second study tour was made in May-June 1989 in order to exclusively work on the analysis of project data. This was done at the Institute of Development Studies at Brighton, England and at Cornell University. During this period consultations with Professor Per Pinstrup-Andersen, Hans Singer, Robert Chambers and Simon Maxwell were very

useful. KIFP/FS sponsored study tours of countries such as Brazil, Mexico, Chile, China, Indonesia and Ghana gave different perspectives about the management of food policy.

3. Conferences

Participation in a workshop organized to develop methodology for food and nutrition policy analysis at Cornell, and other workshops to sharing experiences with other Fellows in Brazil, Zimbabwe and Thailand were very useful. A paper on food security was presented at the Asian Fellows seminar in Guangzhou, China. I also participated in the International Conference of Agricultural Economists in Argentina in 1988.

The visible outcomes of the above activities are three: (a) a paper on food security in India, (b) a paper on household level food security, and (c) a comprehensive project report. Two of these are to be completed by August 1989 and the other one will be available later.

The invisible outcome is my better understanding of food security issues, PDS and policy formulation and implementation. The project also broadened my horizon with respect to food systems and food security measures taken in different countries and the relevance of the experience in India. The project has strengthened my motivation to devote myself to household food security because I understand the issues better now.

Summary Observations

The main conclusions for redesigning the PDS in India that have emerged from the findings of the study are:

- a) Income targeting attempted in Andhra Pradesh was not very successful as 70-90% of the people could enroll as poor; one needs to apply criterion of eligible households more strictly.
- b) Off-take by consumers was substantially less than entitlement in Maharashtra and Rajasthan. This was particularly true for the laborers and marginal farm households. The reasons for lower off-take were:
 - i) poor quality of foodgrains;
 - ii) supply of wheat and rice which are not important staple foods of the poor;
 - iii) irregular supply;
 - iv) lack of purchasing power with several poor households; and,
 - v) difference in market prices of the commodity or substitute commodity and price charged in PDS.
- c) The margins of the fair price shop (FPS) owners were not very high. However, in view of small turnover, the FPS business was only a 3-4 days/week job. This restricted access to the poor.
- d) The cost of administration was the major element in the subsidy for foodgrains. Only a small proportion of the subsidy actually went to the consumer.
- e) In view of the above, an effective design would include a strict targeting, increase in per capita subsidy for the poor, supply the subsidy in the form of coupons as is done in Sri Lanka or to supply foodgrains through normal retail outlets. Keep the price of foodgrains low and make efforts

to supply coarse cereals, the major staple foods of the poor. These efforts would reduce subsidy amounts, would have less leakages and would be more effective in helping the poor.

Seminars/Workshops/Presentations

I gave a seminar on the PDS in May 1989 at IDS in Brighton, England. I also gave seminars in July at the IIMA and at the Indian Department of Food in August 1989.

Planned Publications

A chapter entitled, "Public Distribution System and Food Security in India" will be published as a chapter in the Asian Fellows book, "Increasing Economic and Physical Access to Food: Experience of Selected Asian Countries."

A chapter on "Subsidized Food Thru Fair Price Shops in India" will be published in Interest Group III's book "Food for the Poor."

A comprehensive report on my KIFP/FS project research will be completed and published early in 1990.

Travel Study and Hosting of Fellows' Activities

In April and May 1988 I visited Michigan State University and learned to use an SPSS package. I also spent four weeks at IFPRI in Washington, DC.

In May and June of 1989 I spent four weeks at IDS. During this time I drafted three chapters and interacted with researchers. I also spent two weeks with Dr. Per Pinstup-Andersen consulting with him about the analysis of household consumption and FPS off-take behavior.

**Antonio Carlos C. Campino
Fundacao Instituto de Pesquisas Economicas (FIPE)
Sao Paulo, Brazil**

**Title of Project: Nutrition Interventions in Brazil: The Possible Impact of
Food Price Subsidies**

Project Objectives

The main objective of the project was to assess the feasibility of a food coupon system in Brazil.

When I undertook this task I also had the objective of contributing to the ongoing discussions of nutrition policy in Brazil and in this context to call attention to the effectiveness of a coupon program versus direct food distribution.

Activities/Accomplishments

The study included the following activities:

- 1) A review of the food and nutrition programs in Brazil, with respect to the total volume of resources allocated to them and their efficiency and effectiveness.
- 2) A review of the literature about food stamp programs in the United States and other countries. The main aspects reviewed concerned the reasons for the institution of a food stamp program in the U.S., its economic impact within the productive sector, its efficiency and effectiveness and the implications of different forms of food aid (stamps vs. cash).
- 3) A case study of a food stamp program, specifically for milk, administered by the Secretary of Health in the State of Sao Paulo.
- 4) An assessment of the lessons learned from the case study.

A Summary and the Lessons Learned:

The case study consisted of 413 interviews, 219 with families of undernourished children and 194 with families of normal children.

The children whose families were interviewed were located in the counties of Santa Isabel and Sorocaba. The population of these counties presented the following characteristics which were relevant for the study:

Santa Isabel: Mainly rural population; milk exchanged for coupons only at a central facility owned by the county authority.

Sorocaba: Mainly urban population; the interviews were conducted in districts whose population was formed by workers. Coupons were exchanged for milk at any grocery store.

The lessons learned from the study were:

Product Suitability: Milk was a suitable product for a specific food subsidy program aimed at children under 5 years of age.

Target Group Specification: The target group for this intervention were children under 5 years of age whose weight for age was below the 10th percentile of the "Santo Andre Pattern"

(a Brazilian weight age pattern). Allowing for a margin of error of 50%, we observed a "leakage" (represented by aid to children not belonging to the target group) of approximately 20%.

Project Efficiency: No significant suggestions were made for changes in program management, except for the request (by 26.5% of the mothers) that the number of liters of milk be increased. Distance from distribution outlets was not perceived as a problem by the mothers.

Program Effectiveness: It was not possible to assess program effectiveness on the basis of anthropometric measures, since it was not possible to specify an adequate control group.

The lists of differences of means applied to the distribution of the percentiles indicated that only in the case of boys aged 12-24 months, was there an increase in the average percentile during the year. Also it was observed that the proportion of children below the 10th percentile was reduced from 73.3% to 62.3%.

Using economic criteria and the composition of the caloric and protein intake as measures of effectiveness, the following results were obtained:

- The fluid milk program was responsible for 10% of the calories and 21.7% of the protein available at the household level.
- The average daily caloric intake was 1,727 calories, from which 27% were supplied by food distribution programs (PSA + FMP).
- The average daily protein intake was of 46.73 g, from which 35.1% was supplied by food distribution programs (PSA + FMP)
- Each family spent an average of US \$67.2 for food, receiving US \$15.00 from food distribution programs; the FMP distributed US \$10.43 in milk per family per month, on the average.

Cost Effectiveness: We compared the cost of the 1,000 calories and 100 grams of protein distributed by the FMP with the equivalent measures for a basket of food distributed by PSA and the basket of goods bought by the consumer. The conclusions were:

- The cost of 1,000 calories distributed by the FMP (US \$0.42) was higher than the cost of the same amount of calories bought by the consumer (US \$0.33) or distributed by PSA (US \$0.10).
- The cost of 100 gms of protein distributed by FMP (US \$0.75) was smaller than the cost of a similar amount of protein bought by the consumer (US \$0.75), but the PSA program was more effective than the FMP, as it cost only US \$0.46.

Discriminant Analysis: The analysis made indicated that the variables which discriminates the group of undernourished children from the group of normal children are as follows:

- Weight at birth
- Expenditure for water and light
- Expenditure for cigarettes

- Food expenditures
- Total number of persons living in the household
- Caloric availability per capita per day
- Family income
- Expenditure for cleaning and hygiene products
- Daily per capita availability of animal protein

The paper presents a discussion of the meaning of these results and contains a discriminant analysis made without information on weight at birth and the mother's years of schooling.

Publications Completed

"Nutrition Interventions in Brazil: The Possible Impact of Food Price Subsidies." Research report sent to the KIFP/FS Program Director.

"Nutrition Interventions in Brazil: The Possible Impact of Food Price Subsidies." Paper submitted for publication as a MSU working paper.

"The Food Coupon Alternative." Paper (in Portuguese) presented at the seminar, "Food and Nutrition Policies in Brazil: 1985/1989 Perspectives for the Next Decade" held at FIPE in Sao Paulo, August 1989.

Publications Planned

I plan to publish a paper entitled, "Missed Chances: the Food and Nutrition Programs in Brazil" with information collected during the KIFP/FS project and using resources from the project.

The Brazilian Fellows intend to publish the papers presented at the August 1989 seminar, "Food and Nutrition Policies in Brazil: 1985/1989 Perspectives for the Next Decade."

Seminars/Workshops/Presentations

With resources from a KIFP/FS minigrant I organized, together with Yony Sampaio and Fernando Dall'Acqua, a seminar on "Food and Nutrition Policies in Brazil: 1985/1989 Perspectives for the Next Decade." The main purpose of the seminar was to disseminate the results of our research among the academic community and policy makers working in the area of nutrition.

During my study trip to MSU in December 1988, I presented a seminar on "Nutrition Policies in Brazil."

Travel Study and Hosting of Fellows' Activities

I was engaged in the following activities regarding to hosting Fellows:

I have participated in the programming of the first annual KIFP/FS seminar held in Recife, Brazil. I organized the Sao Paulo part of the Brazil seminar and arranged Boniface Makau's travel study in Sao Paulo.

I administered the Brazil Fellows' Seminar held at FIPE in Sao Paulo in August 1988. The seminar was organized by Yony Sampaio, Fernando Dall'Acqua and myself.

Travel study activities:

One week study trip to London, including visits with Dr. Philip Payne at the London School of Hygiene and Public Health and Dr. John Waterlow (on my way to Zimbabwe).

Study trips to China, India and Indonesia in 1988-89.

Study trip to MSU in December 1988. This was a very important activity for me because I had the opportunity to work on my research report, learn computer techniques and interact with professors in the Institute of International Agriculture.

KIFP/FS annual seminars in Brazil, Zimbabwe and Thailand.

From the experiences on these study trips and seminars I wrote two small articles, one on Zimbabwe and one on China, both published at FIPE's bulletin, *Informacoes FIPE*. In these articles I reported observations I made in both countries which were relevant for economic policy matters being discussed in Brazil.

Other Significant Outputs

I would like to emphasize that the project had an important training component. I selected as interviewers several students from the Department of Economics who, through this activity, had an opportunity to get in touch with the living conditions of poor families in Sao Paulo, as well as to get acquainted with the economic aspects of food and nutrition.

The work performed in the project by Sociologist Alair Molina; by Professor of the Department of Statistics, Dr. Walter Canton; and his research assistant Patricia, also acquainted them with the economic aspects of food and nutrition.

**Fernando M. Dall'Acqua
Pao de Acucar Company
Sao Paulo, Brazil**

Title of Project: The Impact of a Food Aid Program in Brazil

Project Objectives

To investigate the impact of the Free School Lunch Program on the level of food consumption and nutrition of low income families, and to investigate the impact of food aid programs on the working of the Brazilian food system.

Activities/Accomplishments

A survey was conducted in Campinas, Sao Paulo State. In Campinas there are 21 city-sponsored kindergartens with about 5,000 children, some of them part- and some full-time. These kindergartens serve mostly low income children whose mothers want to get a job. There are 35 elementary schools with about 19,000 students.

During March/April 1987 a screening survey was conducted to provide the basic information for designing a stratified random sample of 2,000 children in the kindergarten and elementary school from six different sites in the city. The basic criteria used in selecting the final sample of families were income, number and age of the children.

The intensive survey started in May, 1987. The baseline sample was narrowed to 253 selected households that:

- a) represent the bottom 70-80% of household income levels.
- b) had children who stayed in the school:
 - i) full-time from 8 a.m.-5 p.m. and get breakfast, full meal at noon and lunch at 3 p.m.;
 - ii) part-time and get only a small lunch, and
 - iii) part-time but not receiving the benefit of the free school lunch program.

In the final sample, 79 families had children receiving three meals at the school, a group which allows a clearer insight into the impact of the program on the budget and food consumption of low income families; 103 families had children who received only a full meal at school with probably smaller impact on their food expenditure and consumption; and, finally 71 families had children of school age but they were not receiving the benefit of the free school lunch.

A pilot study was carried out in early April 1987 with a small sub-sample in order to evaluate the main questionnaire. This study did not reveal any major problem or difficulty with the questionnaire.

The interviews started at the beginning of May 1987 and were planned to go through the beginning of July 1987. In the first month of the interviews no major problem or difficulty occurred. On June 12, 1987 the Brazilian government decreed a new wage and price freeze. As a result, the food inflation rate which was about 26% in June dropped to 3% in July. The reduction of inflation was accomplished by mixed signals with respect to the level of demand and production. For this reason I decided to extend the field research through the end of July 1987 to analyze the impact of the new wage and price policy on the food consumption of the family sample. At the end of the field research

all questionnaires were evaluated. Then 23 questionnaires with problems were reapplied. That procedure was conducted by the field coordinators and finished in the middle of August 1987.

The process of entering data into the computer and preparing the files took about seven weeks and was carried out by the field coordinators supervised by the statistical adviser. The data analysis was carried out from October 1987 to March 1988 under the supervision of the econometrics adviser. Some of the main conclusions are presented below:

- a) The participation in the Free School Lunch Program does not vary much among the income classes. The survey reveals that this program benefits equally the families which represent the bottom 70-80% income levels.
- b) The Free School Lunch Program covers only 72% of the households in the research population.
- c) Among the low income families, the benefit of free lunch is considered a fundamental element for the parents' decision enrolling their children in the school.
- d) The program has a significant and positive effect on the household protein and caloric intakes. The ordinary least square (OLS) equation for the protein intake is:

$$\text{PPC} = 1783 + 170 \text{ HY} + 253 \text{ FSL}$$

$$\qquad\qquad (1.98) \quad (2.70)$$

t-ratios are in parentheses

where PPC is the per capita protein intake, HY represents the household income and FSL the benefit of the Free School Lunch Program.

In March 1988 I started the second part of the research "Impact of the Food Aid Programs in the Working of the Brazilian Food System." The main objective of this part was to establish the macroeconomic interactions between the food aid program and production, consumption, foreign market and market prices of the main agricultural products. The following steps were carried out:

- a) Literature review
- b) Collection of secondary data about the government expenditures on the social program, particularly on the Free School Lunch Program.
- c) Development of an econometrics model to analyze the macroeconomic interactions of the food aid programs. The theoretical model developed is presented below:

$$\begin{aligned} S' &= f(S, Q, X) & (1) \\ Q &= f(S, M, P) & (2) \\ X &= f(S, L) & (3) \\ D &= f(T, P) & (4) \\ S &= D & (5) \\ D &= f(Y, P, R, T) & (6) \end{aligned}$$

where

S'	=	product available for open market sale
S	=	domestic gross production
Q	=	internal procurement
X	=	(export-import)
M	=	real minimum price
L	=	consumption requirement used as basis for import planning

D	=	market demand (no rationing)
D'	=	market demand including rationing (food aid program)
R	=	rationing distribution
T	=	estimate of income transfer derived by the food aid program

Equation (1) represents the net availability of the product for market sale; equations (2) and (3) represent the main decision variables which also depend on uncertain factors; equation (4) represents the market demand function in which rationing has not been included; and, (5) is an identity.

Substituting equations (1) and (4) into (5), the system of five equations can be reduced to a system of three equations where:

P,Q,X are endogenous variables
S,M,L,Y are exogenous variables

Once the coefficients of the three equations have been estimated the model may be solved for the values of endogenous variables at given values of exogenous variables. Solutions will provide alternative scenarios for the Brazilian food system not including the food aid program. To evaluate the impact of the food aid program, equation (4) is substituted by equation (6) which represents a market demand function in which rationing has been included. Equation (6) was estimated with cross section data since annual data is not available. This data analysis has been performed since March 1989. The preliminary statistical results have not been good. The R^2 was low and other shortcomings were the low value of the Durbin-Watson statistics and the simulation results obtained were not very good. This indicates the necessity of further work on this part of the research. I expect to conclude this part in the next three months.

Publications Completed

"Impacto Macroeconomico del Programa de Ajuste sobre el Sector Agrícola en el Brasil:1979-84." In *Ajuste Macroeconomico y Sector Agropecuario en America Latina*. IICA: Buenos Aires, Argentina, 1988.

Publications Planned

"The Nutritional Impact of the Free School Lunch Program in Brazil." Completion estimated in August 1989.

"The Impact of Food Aid Programs on the Brazilian Food System." Completion estimated in December 1989.

Seminars/Workshops/Presentations

Attended the KIFP/FS Orientation seminar in East Lansing (1986) and annual seminars in Brazil (1987), Zimbabwe (1988) and Bangkok (1989).

"Impacto Macroeconomico del Programa de Ajuste sobre el Sector Agrícola en el Brasil: 1979-84." Paper presented at KIFP/FS and IICA funded seminar "Macroeconomic Adjustment and Agricultural Sector in Latin America", Buenos Aires, Argentina, August 1988.

"A Preliminary Evaluation of the Free School Lunch Program in Brazil." Paper presented at the seminar, "Assessing Food and Nutrition Policies in Brazil." This seminar was sponsored by a minigrant from KIFP/FS to University of Sao Paulo, Sao Paulo, Brazil, August 1989.

Travel Study and Hosting of Fellows' Activities

I have participated in study tours in Mexico (1987), Tanzania and Kenya (1988), and India (1989).

I have visited with faculty at: London School of Economics (Dr. Anthony Hall); Institut National de la Recherche Agronomique, Paris (Dr. Jean-Marc Boussard); and Food Agricultural Organization, Rome (Dr. Roberto Velluntini and Dr. Adolfo Figueiroa) during February 1988. I discussed their experience with efforts to analyze the macroeconomic interactions of the food aid programs.

I also hosted the KIFP/FS Fellows in Brasilia, Brazil during the KIFP/FS annual seminar in January 1987.

**Chaiwat Konjing
Department of Agricultural Economics
Kasetsart University
Bangkok, Thailand**

Title of Project: Food Consumption and Distribution Systems Among Rural Households in Thailand

Project Objectives

- 1) To identify the food consumption and distribution patterns of rural households, both farm and nonfarm.
- 2) To analyze the impact on the household's food consumption of income differential, food prices, the ethnic group of population and other related factors.
- 3) To estimate and analyze the household's marketable food supply and marketing decision making.
- 4) To address the food insecurity problems of rural households.
- 5) To design and recommend a policy and program aimed to improve the food distribution system and nutrition requirements of the rural population.
- 6) To provide a base for establishing academic cooperation and networking activities in food system improvement in Thailand.

Activities/Accomplishments

Research on food consumption. A two-year research activity on food consumption, food distribution and food security of rural households in the Northeast of Thailand, the poorest region of the country, was accomplished. One hundred and fifty sample households in two separate villages and provinces were drawn for field data collection. The data analysis of food consumption, marketable surplus and food insecurity index construction were accomplished. The drafting of a research report is now underway and publication is planned. Two other papers were prepared from the food consumption study.

Summary Observations

The preliminary results of the survey on food consumption and the distribution system in two different communities are: namely, a community with an abundant food supply and a community with less and unstable food supply in the Northeast, the poorest region of Thailand, revealed that food production and off-farm income earning opportunities have contributed to improving food security at a household level. In the community with less abundant food supply, the earned off-farm income enabled the households to acquire more food, hence minimize their food insecurity problems. Overall, the problems of food consumption and nutrition in Thailand are not as serious as assumed.

Other activities under the KIFP/FS grant, such as consultative meetings and seminar activities provided support for both research and networking activities with other professionals and institutions. They were considered very worthwhile in enhancing knowledge and as a means for food system improvement in Thailand. Overall, most of the objectives of the fellowship project have been accomplished. The exception is the book writing and the final publication of the project outputs which require further effort and time.

Publications Completed

Four papers relating food and agriculture were prepared. They are:

"A Comparative Study on Food Consumption Structure Between Japan and Thailand." Paper prepared jointly with Professor Tiara Yori of Kyoto University, Japan, November 1986.

"Status of Rural Development in Thailand," Department of Agricultural Economics, Kasetsart University, August 1988.

"Rice Policy of Thailand," Department of Agricultural Economics, Kasetsart University, August 1988.

"Agricultural Diversification in Thailand," Department of Agricultural Economics, Kasetsart University. Paper jointly prepared with Dr. Khaisri Konjing, December 1988.

Publications Planned

Four chapters of a textbook written in Thai entitled "Economics of Agricultural and Commercial Trade Policy" have been completed. The remaining four chapters will be completed by March 1990.

A chapter is being drafted for the Interest Group III book "Food for the Poor." My chapter will focus on food security at the household level in Thailand.

A comprehensive project report will be prepared utilizing as input the papers and seminar results listed above. The projected completion date is December 1989 with publication in early 1990.

Seminars/Workshops/Presentations

I participated in the following seminars:

Annual Conference of Thai Agricultural Economics Society, Chiang Mai, North of Thailand; December 12-15, 1986.

Workshop on "Research Methodology in Food Consumption and Nutrition," Cornell University; June 22-26, 1987.

Annual Conference of Thai Agricultural Economics Society, Surat Thani Province, South of Thailand; December 9-12, 1987.

Workshop on "Potato Postharvest Technology," Kunming, China; June 25-26, 1988.

KIFP/FS Asia Regional Seminar, Guangzhou, China; October 6-17, 1988.

Annual Conference of Thai Agricultural Economics Society, Khon Kaen Province, Northeast of Thailand; December 22-24, 1988

Conference on Food System and a Change in Food System in Rural Thailand," Mahidhol University, Bangkok; April 4-8, 1989.

I organized the following seminars:

Seminar on "Rice Marketing Improvement in Thailand," Kasetsart University, Bangkok; July 10, 1987.

"Food Industry Development Seminar," Kasetsart University, Bangkok; May 10, 1988.

KIFP/FS annual seminar, Bangkok; February 4-14, 1989

Travel Study and Hosting of Fellows' Activities

A travel study was made to Australia (February 15-19, 1989) to visit with professionals and farm operators in Tamworth and Pokolin counties. It was learned that the farming system in Australia is well advanced and operated through marketing board system. Australia was a major exporter of wheat, wool and dairy products. Australian farmers are efficient enough to produce surplus food to export.

July 1-4, 1987 I hosted Dr. Hidayat Syarief as a visitor. He met with food scientists and experts in food products development at Kasetsart University. During his visit a small group discussion to exchange experience was organized.

I hosted the KIFP/FS annual seminar in Bangkok. It was held February 4-14, 1989. The main activities included were the discussion of Thailand's food system and Asian Food System perspectives. Most fellows expressed high satisfaction with the seminar organization and hosting.

**Katundu M. Mtawali
Ministry of Agriculture
Lilongwe, Malawi**

**Title of Project: An Analysis of the Characteristics of Households Facing
Food Insecurity in Malawi**

Project Objective

The objective of the study was to examine and analyze factors that may limit household's access to adequate food. These factors are regarded as the root causal factors of food insecurity and hence the determinants of the nutritional status of the population. These are normally of a dual nature, i.e., economic factors and social factors. Economic factors include land availability to households (size and quality); cropping pattern, i.e., what is the balance between cash and food crop production; market structure and performance, employment opportunities in the wage economy both in rural and urban areas; the nature and availability of basic services such as safe water, hospital, schools, etc. The social factors are based on tribal structures and related beliefs and religion. The study had as its main objective to identify the food insecure households and to relate this to the factors listed above.

Activities and Achievements

The project initially involved the design of survey questionnaires. Five modules were designed to look at the following aspects:

- a) Household composition
- b) Income and expenditure
- c) Food availability
- d) Nutrition, and
- e) General questionnaire

The next stage was the recruitment of enumerators and survey staff. Eighteen enumerators were recruited. All of these enumerators had a minimum qualification of a Junior Certificate though most of them had a Malawi School Certificate. While the recruited staff had previous survey experience, it was decided to give them additional intensive training in order to ensure collection of good quality data. A one week training session was conducted in Salima. The trainers included a nutritionist from the Ministry of Agriculture, two survey experts from the Agro-Economic Survey Unit of the Planning Division and myself. As a means of training while at the same time pretesting the questionnaires, the enumerators were assigned households within the vicinity of the Training Centre to collect data applying the five modules.

After being trained, the enumerators were distributed in the six survey districts, including Rumphi, Mzuzu, Lilongwe, Salima, Zomba and Mangochi. Mangochi district had to be dropped after the survey had commenced because of reasons beyond my control. Hence, usable data was collected from only five districts. The main data collection was carried out in November 1987. Input of the data into the computer started in January. Two computer operators and a Systems Analyst were recruited for this task. This aspect of the work moved rather slowly since all three were working part-time in addition to their usual jobs.

The analyzed data confirmed the assumption that malnutrition is a significant problem on estates just as it is among smallholder households.

The study has shown that the prevalence of underweight children on estates is as high as 55% in the Salima district. Stunting is also a significant problem and the prevalence of stunting ranges from

17.8% in Zomba district to 41% in Salima district. The situation in urban areas is far better than on estates.

The study revealed that both income and food available to tenants were not only less than needed for adequate nutrition but food availability is erratic as well. This is probably the main reason why food insecurity exists and malnutrition is more severe on estates than among smallholders on customary land. Before actual sales of tobacco, family income is derived largely from casual labor but the labor requirements for tobacco production makes it rather difficult for the tenants to do casual labor.

Regarding the provision of public services, the study revealed that while the urban and smallholders are well-served, the situation on estates leaves much to be desired. Tenants have to travel an average distance of almost 10 kilometers to get to the nearest health center, and there is no public or private transport. This distance has to be covered on foot. In very few cases on large estates does one find a health facility provided by the estate owner. This is true for clean water supplies as well. Most tenants have to walk long distances to get water. Even more disturbing is that these women may actually wait in line for water for as long as twelve hours because of limited availability of boreholes. The waiting in line is normally at night so that by daybreak, the women can be back to help their husbands in the fields. Therefore, it is not an exaggeration to say that sometimes women work for 24 hours. The implications for child caring are obvious.

Another striking feature revealed by the studies is universal illiteracy among estate workers. Most of them can neither read nor write and those who have been to school have never completed primary school. The situation is even worse for mothers.

Sanitary conditions are pathetic. Toilets are a very rare commodity among estate workers and all the houses consist of grass from the walls to the roof. This situation can probably be explained by the mobility of these workers; very few stay for more than one season on an estate.

In a nutshell, the most important achievement of my project has been the revelation of facts that food insecurity is a more serious problem on estates than it is in the smallholder sub-sector where government has so far tended to focus most of its resources. These facts should generate a reconsideration of policy issues so as to increasingly include the estate sub-sector in the provision of socio-economic services to the community.

Publications Completed

Two papers have been written during the project. One is titled "Malnutrition in Malawi"; this is an overview which was intended for publication by Interest Group III. The second paper was presented at a workshop held at the Shire Highlands Hotel in Blantyre (see "Seminars/Workshops/Presentations" below).

Publications Planned

A more detailed analysis of the survey data will be submitted by August 15, 1989 and a doctoral thesis using the same survey data will be presented to the University of Malawi.

Seminars/Workshops/Presentations

Under my KIFP/FS project I have attended a number of workshops and seminars, both internally and externally. External conferences have included the annual conference organized by the University of Zimbabwe in conjunction with MSU/USAID food security project.

I organized a workshop, "Methodologies for Marketing and Nutritional Status Data Collection" in April 1988 at the Shire Highlands Hotel in Blantyre, Malawi. The workshop was supported by a KIFP/FS minigrant and the Ministry of Agriculture. This workshop attracted participants from various Ministries who were in one way or another connected with the collection and analyses of data relating to marketing and nutrition. The workshop was evaluated by participants has having been very useful.

Travel Study and Hosting of Fellows' Activities

During the course of the project a number of study tours were conducted. The initial visit was to Michigan State University for the Orientation Seminar. This was followed by a Latin American seminar held in Brazil in January 1987, an African seminar held in Zimbabwe in 1988 and the Asian seminar in 1989 held in Thailand. In addition to these meeting places, there were post-seminar study tours to selected countries within the continent/sub-continent. The most striking thing was the diversity of approaches in implementing policies relating to the food systems of each country. While there are commonalities in the three continents, i.e., Latin America, Africa and Asia, the diversity in means of achieving the same goal of food security were apparent. This provided a basis for comparison of efficiency of the food systems in these countries.

Eugenia Muchnik de Rubinstein
Department of Agricultural Economics
Universidad Catolica de Chile
Santiago, Chile

Title of Project: The Impact on Child Nutrition of Infant Feeding Systems and Nutrition Intervention Programs: Urban, Low-income Households in Chile

Project Objectives

There were two main research activities during the three year period in the KIFP/FS, both of them undertaken together with Isabel Vial. They were (a) a research project on the assessment of a milk-cereal product for preschoolers distributed by the Complementary Feeding Program, and (b) an assessment of the impact of women's market work on infant's well-being.

The specific research objectives of my three year fellowship project were:

- 1) to describe the different supplementary feeding programs in Chile, with emphasis on those aimed at preschool-aged children;
- 2) to assess and measure the impact of the main health/nutrition intervention programs for preschool children in the country;
- 3) to assess the impact of mother's market work on infant's nutritional status, among participants of the milk distribution program. Working mothers are expected to shorten breast-feeding duration while providing additional family income. The net effect of this on her infant's well-being is uncertain; and
- 4) to assess what working conditions for low-income mothers and type of supportive systems for infant care could help to provide better infant nutrition.

Activities/Accomplishments

In order to accomplish the first objective, a document ("Evolution of Chile's Main Nutrition Intervention Program: A Synthesis") was elaborated together with Isabel Vial and Juliana Kain. It describes the evolution of the three main supplementary feeding programs in Chile and also summarizes the methodology and results from past economic evaluations of some of these programs. Publication of this paper is pending, as some modifications are required as a result of comments by reviewers. The document has been made available to a World Bank mission which is reviewing ongoing health and nutrition programs in Chile. It is also being used as background by Dr. Amyrta Sen in a chapter about targeted food distribution programs.

The main research activity conducted as part of this fellowship program has been an investigation of participation and acceptability of a supplementary product: milk-cereal being delivered to preschoolers by the largest of these programs in the country, the Complementary Feeding Program. In 1975, milk-cereal was introduced to replace powdered milk for delivery to preschoolers while no assessment had been undertaken up to that point to evaluate the results of this change. There was concern as to the coverage of this program and uncertainty about the socio-economic and nutritional status of participants and non-participants. No information was available either in relation to the actual consumption of milk-cereal by the beneficiaries, its calorie contribution and possible leakages within the household or to other households.

In order to provide an answer to these questions which were being raised within the Ministry of Health and the Secretariat for Social Welfare Programs of the Presidency, a study was undertaken. It was based on the collection of primary data from a fairly large sample of close to 800 children attending the National Health Service clinics in urban Santiago. The data was obtained in August-November 1987 from personal interviews at home and from the health centers' records, including 24-hour recall individual food consumption surveys and anthropometric measurements.

The data was cleaned and processed with the use of computers, and the results of the analysis were presented in a final report in Spanish, in December 1988, to the Ministry of Health and to the Secretary of Social Welfare Programs. The study has apparently been instrumental for discussion of future funding of the program and of possible ways to improve its effectiveness. A closer relationship with the planners and economists of these government agencies has evolved as a result of the study. At the present time, we are holding conversations to continue our investigations in some specific aspects of the program.

A summary of the study has also been written in English as a first version of a chapter to be published by the KIFP/FS Interest Group III book, "Food for the Poor."

With respect to objectives three and four, I have written with Isabel Vial a paper, "Women's Market Work, Infant Feeding Practices and Infant Nutrition Among Low Income Women in Santiago, Chile" which corresponds to Chapter 6 in the book *Women's Work and Chile Welfare*, International Center for Research on Women, Washington, 1989.

The above publication is the result of further elaboration on data gathered in a previous study funded by Nestle Foundation, in which primary data was gathered for a sample of about 700 mother-infant pairs from low-income families participating in the primary health delivery and milk distribution program in Santiago.

Summary Observations

The research projects conducted in my home country blended extremely well with the international seminars held by the KIFP/FS in the different continents. In the first place, the seminar held by Interest Group III at Cornell University, led by Dr. Per Pinstrup-Andersen was very helpful for those of us who went into primary data collection on food consumption and nutrition. Secondly, in each of the three international seminars with all the Fellows, there were presentations by invited speakers and field visits which helped us appreciate the conditions and problems facing other countries under different political economies.

The participation in the International Conference of Agricultural Economists in Buenos Aires, Argentina (August 1988) was another good experience, I was able to attend thanks to the sponsorship from the KIFP/FS.

Finally, I would like to express at this time my gratitude for letting me be part of an extraordinary experience of interaction, not only with the other Fellows, but also with the MSU staff, with Directors from the Kellogg Foundation and other special participants and guests at the international seminars.

Publications Completed

A chapter in the book *Women's Work and Child Welfare* and a first version of a paper for a joint book by Interest Group III on food for the poor. A comprehensive report in Spanish has been handed to two Ministries. They are consulting it for future modification of the ongoing CFP program for preschoolers.

Publications Planned

The paper "Chile's Main Nutrition Intervention Program: A Synthesis" is being revised for publication. Estimated completion date is October 1989. Together with Isabel Vial, I am currently working on a publication in Spanish for *Cuadernos de Economia*, a journal of the Department of Economics of the Catholic University of Chile. Conversations are being held with the World Bank and the Secretary of Social Programs for further analysis of the information, particularly of the food consumption data.

Seminars/Workshops/Presentations

Attended a workshop held at Cornell University on "Methodologies on Food Consumption Surveys," June 1987.

Attended a seminar on Nutritional Surveillance, Santiago, May 1988. The seminar was organized by the Ministry of Health/Secretariat for Social Welfare Programs/World Health Organization/and UNICEF.

Presented the paper "Macroeconomic Adjustment and the Agricultural Sector in Chile" at the "Food and Nutrition Policies and Programs in Sustaining Food Security" seminar in Jakarta, Indonesia, February 17-18, 1989. The seminar was sponsored by Bogor Agricultural University, BULOG, KIFP/FS and MSU.

Attended a seminar on "Trade and Macroeconomic Policies' Impact on Agriculture in the Context of Structural Adjustment in Latin America," ECLA-UN/IFPRI, Santiago, May 23-25, 1989.

Attended a workshop to discuss the results of the study "Analysis of Complementary Feeding Program Participation: Milk-Cereal for Pre-Schoolers" with the Inter-institutional committee for Welfare Program in Chile, July, 1989.

Presented a paper "Analysis of Complementary Feeding Program Participation: Milk-Cereal for Pre-Schoolers" at the Latin American Econometric Congress in Santiago, August 1989.

Presented a paper on "A Supplementary Feeding Program in Chile" at the Conference on Household Behaviour and Economic Development at Yale University, September 4-8, 1989.

Other Significant Outputs

Two undergraduate students of Economics that I have been supervising with Isabel Vial are in the process of finishing their theses. A published thesis of a student of Statistics is now available. All of these students have used data that has been collected as a part of the KIFP/FS project.

A revised chapter on "North-South Grain Policies: Chile" to be part of a collaborative book with other Kellogg Fellows has been sent to David Blandford. It was written by me in collaboration with Carlos Budge, Professor of the Department of Agricultural Economics at Catholic University.

Travel Study and Hosting of Fellows' Activities

I helped arrange a visit to Chile for KIFP/FS Fellow Shanti Bapna in September 1988.

Sathyapala Pinnaduwege
Department of Agricultural Economics
University Peradeniya
Peradeniya, Sri Lanka

Title of Project: Availability of and Access to Food by the Different Social Groups in Sri Lanka: The Role of Food Intervention Programs

Project Objectives

- 1) To assess the availability of food in the country.
- 2) To assess the differential access to food by the different income groups and urban, rural and estate populations.
- 3) To assess the food consumption patterns of the different income groups and urban, rural and estate populations.
- 4) To review the nature of food intervention programs in Sri Lanka.
- 5) To assess the access to food and food consumption patterns of the recipients and non-recipients of food stamps.
- 6) To formulate extension and intervention programs to improve upon the current situation concerning the availability of and access to food.
- 7) To create knowledge and awareness among the relevant institutions and personnel concerned with food production and intervention programs.

Activities/Accomplishments

A major effort was made to collect national level data on food availability and consumption through secondary sources as well as by meeting with personnel in relevant institutions. This activity helped fulfill much of what was expected by objectives 1, 2 and 3 of the project. Most of the information collected appear in Chapter 2 of item number 1 under "Publications Planned."

In connection with objective 4, a chapter has been written and sent for publication (see "Publications Completed"). The relevant information was collected from secondary sources and by visiting various institutions concerned with food intervention programs.

A substantial proportion of project resources were utilized on a field survey of about 750 households distributed in three different districts in the country. The survey, among other things, sought information on food availability, food consumption and nutrition aspects relating to urban, rural and estate populations. Also, in each of the latter population sub-groups a further distinction was observed between the recipients and non-recipients of food stamps, a major form of intervention by the state affecting food availability and consumption. Some of the findings have been incorporated into a chapter for a book, *Food for the Poor*, expected to be published by Interest Group III (see "Publications Planned").

Three smaller field surveys were organized on home-gardening to assess the current levels of contribution to food availability and home consumption and also to visualize their potential in these respects. The initial two surveys have been completed. These led to the third and more comprehensive

survey on the subject undertaken with the assistance of the Department of Agriculture. A third of a total of 65 intended interviews with selected home-gardeners has been completed and the rest is to be completed by the end of August 1989. This activity was undertaken in relation to objective number 6.

In connection with objective number 7, I participated in the planning and implementation of two small-scale, village level programs sponsored by the Food and Nutrition division of the Ministry of Planning and Plan Implementation. These were composite programs aiming at improving incomes, nutrition and health of village inhabitants. Initially, socio-economic surveys were undertaken in the village to record some base-line information. The preschool children under five years of age were given a mid-day meal for about three months. The parents of the preschoolers assisted the program by preparing the meals. Food materials were purchased by using funds from the Ministry. Health officials assisted the program on a regular basis by visiting the village and conducting clinics and health educational programs. Steps were taken to distribute to the households the materials needed to put up lavatories. Financial support for these came from a donor agency. Through similar assistance, goats were distributed to families interested in goat rearing as an economic venture.

Publications Completed

"Synthesis of Food and Nutrition Intervention Programs in Sri Lanka" is the title of a chapter that will appear in the Asian Fellows Book.

Publications Planned

1. A volume on "Sri Lanka Food Systems." A first draft has been completed; a revised version will be published in Sri Lanka in early 1990.
2. "Food consumption, health and nutrition in Sri Lanka." A chapter for the volume "Food for the Poor," planned by Interest Group III.

Other Significant Outputs

The data collected under the project, particularly those from the field survey, are being utilized by a couple of Master's level students at the University of Peradeniya in the preparation of their theses.

Nearly 15 to 20 senior students at the University of Peradeniya who worked on the project received valuable training in field data collection using survey techniques.

Travel Study

Travel study on home-gardening and small-scale gardening in the Netherlands and United Kingdom. Dr. Maurice Rolls, Steering Committee member at the University of Reading, assisted in arranging the itinerary. The travel study was made during late May and early June 1989. The objective was to actually observe home gardens and to gain knowledge on several different aspects influencing home-gardening, including the institutional, legal and organizational features.

During the first phase of the travel study the following places in the Netherlands were visited:

The Agricultural University in Wageningen

De Kleine Aarde in Boxtel

The school for bio-dynamic farming at Warmonderbot in Tiel

The anthroposific garden at Hitberg, Haanew

De Kempphaah: The centre for home-gardening in Almere

The home-garden complex in Ede

During the second phase of the study spent in England, the following places were visited:

Kennedy's garden centre in Reading

Secretary, Gardener's Mutual Improvement Association in Tidmarsh, Reading

The Department of Agriculture and Horticulture in Reading University

The Berkshire College of Agriculture at Burchetts Green

The Royal Horticultural Society in Wisley

The allotment office at the Civic Centre in Reading

The visits to institutions and interviews with people in the Netherlands centered on technological and social dimensions of home-gardening. Observations were made of cultural practices which are in line with ecological horticulture and biodynamic farming featuring integrated livestock and crop production. The different types of compost making was also observed. The varying types of layouts for home-garden plots was yet another aspect on which information was obtained.

Among the social aspects that were evident were the techniques that were being tested out (e.g., raised beds) to create opportunities for the disabled people for home-gardening. Also observed were the cultivation practices followed by different ethnic and socio-economic groups in some communities.

The visits and interviews made in England while furthering the technological threw much light on the institutional and organizational aspects affecting home-gardening. The extension and educational activities carried out by the private sector concerns (Kennedy's Garden Centre), the Royal Horticultural Society and the Berkshire College were quite notable. Some of the legal aspects pertaining to home-garden plots (allotments) rented out by the city government in Reading were also noted. Also, much light was thrown on gardeners' associations and activities organized by them (field trips, lectures, workshops and training programs) for their members.

Yony Sampaio
Department of Economics
Universidade Federal de Pernambuco
Recife, Brazil

Title of Project: An Evaluation of the PROAB Program: The Supply of Basic Food in Low Income Areas

Project Objectives

- 1) Evaluate the effects and impacts of PROAB on a target population in the Recife area.
- 2) Make a critical analysis of food and nutrition programs in Brazil.

Activities/Accomplishments

A first paper on "Food and Nutrition Interventions in Brazil: A Summary Review of PSA, PROAB and PAP" together with a summary written by Antonio Campino covers the most important programs implemented in Brazil since 1975. The report *PROAB - Food Price Subsidy in Low Income Urban Areas: Its Impact on Food Consumption, Nutritional Status and Low Birth Weight* was completed in June, 1989. A partial first draft was discussed in the Bangkok seminar. A master's thesis, "Avaliacao do PROAB Sobre o Peso ao Nascer e o Estado Nutricional," by Marize dos Santos Mota, from the Graduate Program in Human Nutrition, UFPE, supervised by me and co-supervised by Heloisa A. L. Coelho was just completed and is scheduled to be defended in August. A portuguese version of the PROAB report, *PROAB - Projeto de Abastecimento de Alimentos Basicos em Areas de Baixa Renda: Seu Impacto Sobre o Consumo Alimentar, o Estado Nutricional e o Peso ao Nascer*, shall be published by Editora Universitaria by the end of the year. Two short papers taken from the PROAB report are being drafted: the English version to be presented at the Michigan seminar and possibly included in a tentative book, *Food for the Poor*, planned by Interest Group III; the portuguese version to be presented in a seminar on "Food and Nutrition Policies in Brazil, 1985-89, and Its Prospects for Next Years," to be held in Sao Paulo, August 8-9, and possibly included in the Annals planned to be published by FIPE-USP. Finally, another report "The Cruzado Plan Price Freeze: Its Impact on Food Habits and Consumption" is due by early 1990.

Summary Observations

PROAB - The Supply of Basic Food in Low Income Areas was started in 1979 and had as its objective, "to contribute to improving health conditions of low income families by increasing consumption of basic food through subsidies." The Brazilian Food Company (COBAL) is in charge of buying and distributing food to selected retailers. COBAL also is in charge of selecting retailers located in low income districts, under the supervision of the National Institute for Food and Nutrition, INAN. Consumers' price is determined by addition of a margin of 7%, for COBAL, to the price paid by COBAL to producers less a subsidy of 20% and finally plus a margin of 11% for retailers (cost + 7% - 20% + 11% = retail price). Eleven basic products were selected: rice, sugar, dry beans, manioc flour, corn meal, dry milk, eggs, dry meat, macaroni, fish and edible oil.

A basic hypothesis of the program is that the distribution of food only in poor districts, a geographical targeting, will be most beneficial to undernourished families. Thus, it is supposed to be a target group project with a very low administrative cost. Although it is recognized that some income group leakage exists, no idea of the magnitude is known.

Started in the Recife area, PROAB was expanded to other state capitals in the Northeast.

PROAB met little success in improving food consumption, calorie consumption, nutritional status of preschoolers and weight at birth of newborns. What seemed to be a low cost program with a possible high cost-effectiveness turned out to be a transfer of income with negligible nutritional results. No results other than the ones from the increase in purchasing power were found. And these were meager results as consumption of the subsidized commodities did not change significantly and the increase in purchasing power was mainly directed to consumption of non-food commodities.

Several causes are responsible for the negligible results. First, and most important, the "low income" areas selected for PROAB interventions had a minor percent of households with malnourished children. Thus, even if PROAB had been effective it would not have been a cost-effective program if leakages were considered. Second, the adopted scheme of subsidy to basic food gave great emphasis to some commodities with low income elasticities minimizing the possible direct nutritional effects. Third, because eleven commodities were chosen probably PROAB was not identified as a nutritional program but rather as an income transfer program. And finally, some administrative problems, not analyzed in this report, such as vagaries in fixing subsidies, fluctuations in the regular supply of commodities and the poor quality of commodities in particular weeks must have further undermined the effectiveness of the program.

It must be mentioned that for some time the national food and nutrition (PRONAN) philosophy emphasized the income transfer character of food and nutrition programs in comparison to more "nutritional" programs. However, if the main goal was to achieve an improvement in the nutritional status of preschoolers and low birth weight a two-step targeting procedure based on growth monitoring and a follow-up with pregnant mothers, as is adopted in Chile and Tamil-Nadu in India, would be a better choice. Given the recent data pointing to a decrease in the number of malnourished children and in the percent of low birth weight in Brazil, even in low income areas, a more targeted program must be much more cost-effective.

Two results were highlighted in the analysis. The importance of sanitary conditions as probably the major conditional factor of nutritional status and the importance of pre-natal services, singly responsible for a significant increase of almost one Kg in the weight at birth. These results point towards the redirection of nutritional programs to infrastructural services, such as the provision of potable water and sanitary waste disposals, to health services related to a systematic follow-up with pregnant and lactating mothers and to a systematic growth monitoring of preschoolers.

Publications

"Food and Nutrition Interventions in Brazil: A Summary Review of PSA, PROAB and PAP"

"PROAB - Food Price subsidy in Low Income Urban Areas: Its Impact on Food Consumption, Nutritional Status and Low Birth Weight," completed in June 1989. A portuguese version of this paper will be published in late 1989 by the Federal University of Pernambuco.

A summary paper on the PROAB is being submitted as a contribution to the Interest Group III book, "Food for the Poor." A portuguese version of this paper was presented in August 1989 at a national seminar supported by a minigrant from the KIFP/FS. This paper and papers from Kellogg Fellows Campino, Dall-Acqua and Sampaio, will be included in a seminar publication at the University of Sao Paulo.

A report, "The Cruzado Price Freeze: Its Impact on Food Habits and Consumption" is due by early 1990.

Travel Study and Hosting of Fellows' Activities

Hosted the KIFP/FS annual seminar in Recife, Brazil, January 1987.

Participant in Mexican-CONASUPO travel study, February 1987.

Attended KIFP/FS annual seminar in Zimbabwe and a travel study in Kenya, January-February 1988.

Participated in a China travel study, October 1988

Attended KIFP/FS annual seminar in Thailand and travel studies in India and Australia, January-February 1989.

**Hidayat Syarief
Institut Pertanian Bogor
Bogor Agricultural University
Bogor, Indonesia**

**Title of Project: Improve Indonesia's Food and Nutrition Systems Through
Evaluation and Development of National Training and
Research Programs**

Project Objectives

- 1) To design a multidisciplinary socio-technological training and research program which will support the national program in food and nutrition improvement.
- 2) To demonstrate the importance of agro-nutrition manpower in food and nutrition improvement.
- 3) To bridge a gap among institutions dealing with food and nutrition improvement programs.
- 4) To provide policy makers, planners, and/or field worker data and information to enhance the quality of the family nutrition improvement program.

Activities/Accomplishments

During the three-year period of the KIFP/FS the following activities have been implemented: 1) Development of case study method in teaching/instruction; 2) Home country seminars and workshops; 3) Consultancy meetings; 4) Travel study; and 5) Other related activities.

The case study method has been used in teaching a graduate course of "Family Resources Development." This course is offered in Fall semester (September-January) as a core course for students majoring in Community Nutrition and Family Resources.

Through a case study, students are exposed to a real situation and the problems encountered by low income families, particularly in rural areas. Using theories and concepts discussed in class, the students are encouraged to formulate alternative solutions to the problems.

Study of food availability, food consumption, and nutritional status of rural community families has been implemented in selected villages (Cakung and Ujung Menteng in Jakarta, and Karadenan in Bogor).

The execution of this case study had been also linked to the implementation of a migrant project on Participatory Action Research on Improvement in the Food and Nutrition Systems in Rural Communities (PAR-FN).

In line with the objectives of the KIFP/FS project, I have implemented and participated in many seminars and workshops (see "Seminars/Workshops/Presentations" for detailed list).

I have also taken part in several consultancy meetings. These were designed to gather information on policy and programs related to food and nutrition improvement which can be used to develop "multidisciplinary socio-technological" training and research programs in the field of food and nutrition at IPB, as well as to promote institutional linkages dealing with food and nutrition improvement programs in Indonesia.

Besides group travel study arranged during the KIFP/FS annual seminars, I have carried out individual travel study activities in related institutions (see "Travel Study and Hosting of Fellows' Activities" for details). These activities have been performed to broaden my horizon, knowledge and experience on food and nutrition systems particularly on training and research developed in other countries. The results will be useful for developing training, research, and extension programs at IPB. The travel studies also helped to increase my leadership capabilities.

Other activities related to my KIFP/FS projects have been conducted. For example:

"Study on Designing a Model for Nutrition Education in Elementary Schools." A research project funded by the Interuniversity Center for Food and Nutrition, IPB. (June 1987-March 1988)

"Study on a Timely Warning Information System for Food and Nutrition Surveillance." A research project funded by the Ministry of Health. (1987-1989)

Participation in Interest Group III and Asia Regional KIFP/FS minigrants.

Summary Observations

The implementation of various activities during the three-year period of the KIFP/FS project resulted in a multiplying effect which supported institutional building in the improvement of food and nutrition systems in Indonesia.

Importance of a multidisciplinary socio-technological approach to improvement of food and nutrition systems through training and research has been disseminated. This approach resulted in stronger institutional linkages among institutions dealing with food and nutrition policy and program formulation.

Expansion of agro-nutrition manpower for food and nutrition improvement was clearly emphasized in the Food and Nutrition chapter of Indonesia's Fifth Five-year Development Plan.

Involvement of students and junior faculty in the implementation of the KIFP/FS project was very beneficial. The students from various institutions and regional origins should be an important human resource for the improvement of Indonesia's food and nutrition systems in the future.

Publications and Teaching Materials

A book *Principles in Family Resources Development* has been drafted from experiences and data collected as part of the case studies.

One Master's thesis was written using data collected.

One sound-slide presentation on PAR-FN and sets of overhead transparencies have been produced.

Seminars/Workshops/Presentations

Seminar on "Integrating Nutrition in Agriculture and Rural Darmaga Bogor Development." Dept. GMSK, Faculty of Agriculture, IPB. Sponsored by the KIFP/FS. (July 8, 1989; Darmaga, Bogor)

Second seminar on Nutrition. SEAMEO-TROPED. "Better Nutrition in Nation Building." (March 20-21, 1989; Jakarta)

Workshop on Food Diversification Program in Replita V. Ministry Coordinator for Social Welfare, Republic of Indonesia. Member of Steering Committee. (March 7-8, 1989; Jakarta)

Seminar on Food and Nutrition Policies and Programs in Sustaining Food Security. Sponsors: IPB, BULOG, KIFP/FS, Ministry of Agriculture and Republic of Indonesia. (February 17-18, 1989; Jakarta)

Workshop on "Networking for Information on Food and Nutrition." Organized by MOH. Member of Steering Committee. (January 20-21, 1989; Cicurug, Bogor)

Presented a paper "Design of Nutrition Education for Elementary Schools" at the seminar on "Food, Health, and Environment," Inter University Centers, WB XVII. (December 14-17, 1988; Yogyakarta)

Scientific Meeting on "Food Diversification." National Institute of Science, Republic of Indonesia. (September 20, 1988; Jakarta)

National Seminar on "Linkages of Agriculture, Nutrition and Health." Sponsors: IPB, BULOG and KIFP/FS. Member of Steering Committee. This seminar was funded by a KIFP/FS minigrant and a follow-up of the November 1, 1987 seminar (August 11-12, 1988; Bogor).

Panel discussion on "Food Diversification." Organized by Institute for Community Development, Institute Pertanian Bogor. (July 19, 1988; Bogor)

Presented a paper "Participatory Action Research on Improvement in the Food and Nutrition Systems in Rural Community" at the seminar on "Integrated Rural Development." Organized by "MENWA Alumni," West Java. (June 10, 1988; Cisarua, Bogor)

National Workshop VI on "Food and Nutrition." Organized by: National Institute of Science, PERGIZI-PANGAN, and PERSAGI. Member of Steering Committee. (June 1-3, 1988; Jakarta)

Participant in Nineteenth Nestle Nutrition Workshop on "Protein Calorie Malnutrition." (March 24, 1988; Jakarta)

Seminar on "Food Products and Quality Improvement to Promote Export of Agricultural Commodities." IUC Food and Nutrition, IPB. Chairman of Steering Committee. (January 18-19, 1988; Tajur, Bogor)

Presented a paper "Implementation of Training Research and Extension Program at the GMSK Department" at a workshop on "Evaluation of Agro-nutrition, Training and Research Programs." Held by the GMSK Dept. Faculty of Agriculture, IPB. Chairman of Steering Committee. (January 6-7, 1988; Bogor)

Participant in a seminar on "Urban Food Demand, Supply, and Population: Metropolitan Jakarta." Center for Agro Economic Research and FAO. (December 14, 1987; Bogor)

Presented a paper "The Roles of GMSK in Food and Nutrition Improvement" at a panel discussion entitled "Agriculture in Nutrition Improvement Policy and Program." Dept. Community Nutrition and Family Resources, GMSK, Institute Pertanian Bogor. (November 2, 1987)

Presented a paper "Promoting Institutional Linkages for Food and Nutrition Improvement in Rural Community" at a seminar on "Improving Roles of University in Rural Community Development." Held by IPB. (September 29, 1987; Bogor)

Presented a paper "Poverty and Malnutrition" at a seminar on "Rural Community Development." Organized by the Juanda University and Agrosainstiani Foundation. Member of Steering Committee. (September 21-22, 1987)

Presented a paper "Graduate Training in Agro-Nutrition at Institut Pertanian Bogor" at a seminar on "Evaluation on Inservice Training Abroad for Nutrition Manpower Development." Organized by NUFFIC--the Netherlands and Indonesian Nutrition Association (PERSAGI). (July 14-16, 1987)

Seminar on "Standardization of Terminology for Measurements in Food and Nutrition." Dept. GMSK, IPB. Member of Steering Committee. (June 15, 1987; Bogor)

Presented a paper "Strategy for Research in Food and Nutrition" at a workshop on "Institutional Research on Food and Nutrition." IUC Food and Nutrition, IPB. Member of Steering Committee. (March 12-13, 1987; Bogor)

Participant in workshop on "Nutrition Policy and Program Studies." Organized by Ministry of Health. (October 6-9, 1986; Cipanas, Bogor)

Poster presentation at national symposium on "Food and Nutrition." Held by Indonesian Food and Nutrition Association (PERGIZI, PANGAN). (August 28-31, 1986)

Travel Study and Hosting of Fellows' Activities

Seminar and travel study on Thailand Food and Nutrition Systems: Policies and Programs. (February 6-14, 1989; Bangkok)

Seminar and travel study on India Food Systems: Policies and Programs. (January 29-February 4, 1989; Delhi, India)

Travel study to the Philippines, UPLB and SEARCA. Purpose: Exploration for joint project on Database Management for Rural Development. (October 16-19, 1988; Philippine)

Travel study to China. (October 8-15, 1988; China)

Asia Regional Meeting on Food Systems. (October 4-7, 1988; Guangzhou, China)

Seminar and travel study on "Food Systems in Kenya." (February 3-6, 1988; Nairobi, Kenya)

Seminar and travel study on "Food and Nutrition System in Zimbabwe," Second KIFP/FS annual seminar. (February 8-17, 1988; Harare, Zimbabwe)

Seminar and travel study on "Food and Nutrition Systems in Sudan." (February 19-22, 1988; Khartoum, Sudan)

Travel study to Kasetsart University, Bangkok. Visit to Department of Agricultural Economics and Food Technology, Institute of Food Research and Development, and Nutrition Division at Ministry of Agriculture. (July 2-4, 1987; Thailand)

Travel study to Purdue University. Seminar on "Nutrition Training and Research Programs in Indonesia: A Multidisciplinary Socio-Technological Approach." (June 27-30, 1987)

Workshop on "Methodologies for Food Consumption Studies," Cornell University. Sponsor: KIFP/FS. (June 21-26, 1987; Ithaca, NY)

Seminar on Food and Nutrition Systems in Mexico. Host Institution: CONASUPO, Mexico; Co-sponsor: KIFP/FS. (January 25-30, 1987)

Seminar and travel study on Food and Nutrition Systems in Latin America. First annual seminar of the KIFP/FS. (January 11-24, 1987; Recife and Sao Paulo, Brazil)

Travel study to London. Discussion was held with Dr. Campbell Platt, Department Head of Food Science and Technology, University of Reading; and Dr. Boorman, Prof. of Nutrition, University of Nottingham. (January 8-9, 1987; London)

Travel Study to Kuala Lumpur, Malaysian Agricultural Research and Development (MARDI) was Acting as my host during the visit to UPM (Malaysian Agricultural University) and MARDI. (January 6-7, 1987)

**Tomas Uribe-Mosquera
FEDASARROLLO
Foundation for Higher Education and Development
Bogota, Colombia**

Title of Project: A Reassessment of Food Insecurity Among Colombia Households

Project Objectives

- 1) To reassess food insecurity in 1981 based upon the National Department of Statistics' (DANE) National Food and Nutrition Survey.
- 2) To analyze household behavior first as a function of income and subsequently of income and prices taken jointly.

A KIFP/FS minigrant expanded the project objectives to include a reassessment of food insecurity based upon DANE's 1984-85 national household income and expenditure survey in urban areas.

Activities/Accomplishments

The rather extensive analyses of the 1981 household survey data was completed and summary reports were published (see "Publications Completed"). After a long delay in accessing the 1984-85 data set, the nutritional conversion of household food purchase data were completed, the analyses were made and the results compared with 1981 food security assessments. These results are being written up by FEDESARROLLO staff for publication in their periodical, *Coyuntura Economica*.

During 1987-88 I utilized my research results in providing advisory inputs to the Office of the President on the development of a food security strategy.

A summary of some relevant background information and the KIFP/FS project results follow:

The study of food insecurity in an econometric sense is a case of risk analysis. The risk involved usually refers to the non-negligible probability of a significant downward variation from trend, during any given year, in aggregate food production or supply and to its dietary impact on the more vulnerable groups of society. The magnitude of the downfall, whether measured in metric tons (MT) of cereal-equivalent, in kilocalories (Kcal), in U.S. dollars (at the current international market prices) or in any other reasonable fashion, is thus a rough indicator of food insecurity. So is the number of people--or the percentage of society--affected by such a risk, both currently and incrementally, where the former total only includes the population already at risk prior to the downfall. In turn, a dietary threshold, e.g., a minimum kilocalorie intake level of 90% energy adequacy, is wont to be taken as a cut-off criterion for the determination of the at risk population. The population figures are all the more useful as they indicate the human dimension of food insecurity, especially to the extent they can be broken down per region and habitat. The respective dietary gap at the per capita household level, before and after the downfall, is yet another yardstick of food insecurity in society.

Thus understood, food insecurity in Colombia had only been assessed once, for year 1972, by Garcia (1981). Current food insecurity was found, at the time, to apply to 72% of the rural dwellers and 19% of their urban counterparts, for a total of 40% nationwide. In any given year, there was a not an insignificant probability that a 3 to 5% shortfall in food supply from trend might occur, bringing about a 12% increase in the people at risk. This was associated with an aggregate food gap of 165,000 to 400,000 (MT) of cereals--US \$38 to 92 million, or 4 to 9% of the 1972 import or export value--and

a daily per capita energy gap of 710 to 1,600 Kcal, depending on the relevant dietary standards and microeconomic estimates and assumptions.

In the course of the Project, Uribe (1987) and Cordoba and Uribe (1989), respectively, reassessed food insecurity in 1981 and, for the larger urban centers only, in 1984-85. For the sake of comparability, the same probabilistic risk distribution was retained and so were most of Garcia's standards, estimates and assumptions. On the other hand, a much more precise income distribution, by per capita household income or expenditure percentiles, was used. The food security risk concept was also broadened to extend to rises in relative food prices as a primary determinant, next to food supply downfalls from trend, rather than as an intermediate step in the causal process. Finally, alternative dietary thresholds were used, involving both updated intake standards and other dietary agents, namely protein and another seven nutrients.

A much improved income distribution was found to apply in 1981, in both habitats (urban and rural) and nationwide. This made for a 10 to 20% population **actually** at risk, i.e., less than half the 1972 total. The urban-rural mix was also very different, with 10% of the rural dwellers and 20% of the urban population at risk. As a result, the urban sector contributed more than 60% of the Colombian people at risk nationwide, against over 70% for the countryside alone in 1972. This turnaround was observed with other dietary agents besides energy, either to a comparable extent or in greater or lesser proportion: thiamin and ascorbic acid; protein, iron and vitamin A. Incremental food insecurity could add another 10% nationwide in any given year, for a potential one-fifth to one-third of the Colombian population at risk. Finally, the improvement noted was largely distributional in nature. Both the national food gap--310,000 to 386,00 MT, worth US \$48 to 54 million--and its household-level dietary analogue (1,070 to 1,285 Kcal) thus remained high, even though the aggregate figure was still relatively more manageable: 1% of the 1981 import bill.

The 1984-85 data afford limited comparability with 1981. Not only are they exclusively urban but, further, there is reason to believe that the larger towns and cities making up the new sample suffered more from the then prevailing economic crisis than smaller cities and towns. This biases the comparison against 1984-85 and may account for the extent to which income distribution appears to have deteriorated. The paradoxical result that, even with such a bias, "human" food insecurity in the urban sector did not rise either from its 1981 "current" level (30% of the population) or from that year's incremental component (10%) further complicates the analysis. The proportionate aggregate and household food/dietary gaps, however, do worsen, as does the import requirement. Such a negative evolution is not enough to offset the improvement observed over 1972-81 on all fronts (food, dietary and income distribution) but does empirically illustrate the role of income and its close correlation with energy and nutrient consumption.

Publications Completed

"Income and Energy and Nutrient Demand in Colombia." In *Coyuntura Economica*, Vol. XVIII, No. 1, March 1988.

"Agrifood Policy: Its Probable Effects on Supply and Demand (1987-92)." In *Coyuntura Economica*, Vol. XVII, No. 4, December 1987 (Co-author with Rosario Cordoba).

"Towards a Food Security Strategy." In *Planning and Development Review*, Vol. XIX, Nos. 1 and 2, March-June 1987.

"Basic Aspects of Food Security." In *Javeriana Review*, No. 534, May 1987.

"A Reassessment of Food Insecurity in Colombia." In *Coyuntura Economica*, Vol. XVII, No. 1, April 1987.

"The Food and Nutrition Priority." In *Absolute Poverty/Five Flag Programs/Expectations and Critique of the Development Model*. Published by Editorial Oveja Negra, Bogota, Colombia under the Sponsorship of the Institute for Liberal Studies and the Friedrich Neumann Foundation, April 1987.

"A Commentary on the Policies of the Fight Against Poverty." In *The Plan to fight Poverty/Coyuntura Economica Debates*, March 1987.

Publications Planned

"Reassessing Food Insecurity in 1984-85." To be published in *Coyuntura Economica* or *Coyuntura Social* in late 1989).

"The Political Economy of Colombia's Food and Nutrition Plan (PAN)." To be published any time in *The Political Economy of Nutrition*, the Johns Hopkins Press, under the sponsorship of the International Food Policy Research Institute (IPFRI). Editor: Per Pinstrup-Andersen.

"Income, Prices and Energy and Nutrient Demand in Colombia." To be published in *Coyuntura Economica* or *Coyuntura Social* in early 1990.

Seminars/Workshops/Presentations

Participant and discussant in the third annual KIFP/FS seminar in Delhi, India and Bangkok, Thailand, February 1989.

Member of the Colombian Delegation to the Mid-Term Review of GATT's Uruguay Round, Montreal, Canada, December 1988.

Member of the Colombian Delegation to the Bilateral Trade Consultations between the United States and Colombia, Washington, DC, September 1988.

Participant and discussant in the second annual KIFP/FS seminar in Nairobi, Kenya; Harare, Zimbabwe; and Accra, Ghana; February 1988.

Participant and discussant in the Seventh Latin American Meeting of the Econometric Society, Sao Paulo, Brazil, August 1987. (Presentation: "Energy and Nutrient Demand as a Function of Income")

Participant and discussant in the II Latin American Congress of Agricultural Economics, Mexico City, July 1987. (Presentation: "Short and Medium-term Food Programs")

Participant and discussant in KIFP/FS methodological workshop on food demand studies, Cornell University, Ithaca, NY, June 1987. (Presentation: "Who? Where? How?")

Participant and discussant in the first annual KIFP/FS seminar in Recife and Sao Paulo, Brazil, January 1987. (Presentation on the Colombian Food System)

Participant and discussant in the KIFP/FS orientation, Michigan State University, East Lansing, MI, June 1986.

Other Significant Output

Advisory assessment and recommendations for the Office of the Presidency on food policy alternatives ("Critical Notes on a Food Security Strategy"), under the sponsorship of UNDP, Bogota, D.E., April-November 1987.

Travel Studies

I participated in the KIFP/FS annual seminars in Brazil, Zimbabwe and Thailand. Additional travel study trips were made to Kenya and Ghana.

I attended and assisted in the preparations for the Interest Group III workshop on "Methodologies for Food Consumption Surveys" held at Cornell University in June 1987.

**Isabel Vial de Valdes
Institute of Nutrition and Food Technology (INTA)
University of Chile
Santiago, Chile**

**Title of Project: The Impact on Child Nutrition of Infant Feeding Systems
and Nutrition Intervention Programs: Urban Low Income
Households in Chile**

Project Objectives

There were two main research activities during the three year period of the KIFP/FS, both of them undertaken together with Eugenia Muchnik: (1) A research project on the assessment of the new milk-cereal product for preschoolers distributed by the CFP, and (2) an assessment of the impact of women's market work on infant's well-being.

The specific objectives of my fellowship project were:

- 1) to assess the impact of mother's market work on infant's nutritional status, among participants of the milk distribution program. Working mothers are expected to shorten breast feeding duration, while providing additional family income, so that the net effect on her infant's well-being is uncertain;
- 2) to assess what working conditions for low income mothers and type of supportive systems for infant care could help provide better infant nutrition;
- 3) to describe the different health-nutrition intervention programs, with emphasis in those aimed at preschool age children; and
- 4) to assess and measure the impact of one of the health/nutrition intervention programs for preschool children; including determinants for participation, impact on food consumption and income transfer of the program.

Activities/Accomplishments

The first two objectives were accomplished by elaborating and writing the paper "Women's Market Work Infant Feeding Practices and Infant Nutrition Among Low Income Women in Santiago, Chile," published in the book *Women's Work and Child Welfare*, International Center for Research on Women, 1989. The publication further analyzed data gathered in a previous study, using retrospective and prospective measurements obtained for a sample of 700 mother-infant pairs of low income households participating in the primary health delivery and milk distribution programs.

With respect to the third objective a document was written jointly with Eugenia Muchnik and Juliana Kain. Publication will follow the introduction of modifications suggested by reviewers. The paper, "Evolution of Chile's Main Nutrition Intervention Programs: A Synthesis," presents a synthesis of the major food intervention programs currently operating in Chile and their evolution over time. The main objective was to review ongoing health and nutrition related programs, summarize previous analyses undertaken and lessons drawn for the design of future programs and policies in Chile.

Finally, the main research activity accomplished was to assess program participation and acceptability of the milk-cereal product distributed by the CFP, particularly among low income households. In 1975, powdered milk was substituted with milk-cereal and no assessment had been carried out so far on the effectiveness of this new product. There was some concern about the acceptance of this new product,

reflecting the fact that coverage had decreased during 1986-87, the reasons for such behavior were unknown. No information was available in relation to the actual consumption of the milk-cereal by the beneficiaries (preschoolers), its calorie contribution to the children's diet and possible leakages to other household members.

In order to provide adequate answers to the above concerns, the study focused on the following objectives:

- 1) To measure the coverage of the CFP for the preschool age group, especially of children from low income households.
- 2) To assess the degree of acceptability of the milk-cereal product delivered by the CFP to preschoolers attending the NHS in Santiago.
- 3) To identify non-participants, particularly in terms of socio-economic household characteristics, nutritional status and biomedical risk of the children.
- 4) To assess the net increment in calorie consumption of children participating in the CFP and intra-household leakages of the milk-cereal.
- 5) To estimate the average monthly income transfer represented by the milk-cereal.

The population sample comprised 744 preschoolers and household members living in Santiago and attending the Health Centers of the National Health Service. Two types of surveys were implemented for the accomplishment of the study: each household was interviewed to gather information on socio-economic individual and household characteristics, and for a sub-sample of 420 households, two 24-hour recall individual food consumption surveys of all household members were carried out. Additionally, children's anthropometric measures were obtained at the time of the interview.

A report in spanish was handed out to the Ministry of Health and to the Secretary of Social Welfare Programs. Based on such report, decisions are being discussed to implement modifications of the program as well as the need to further study other important components of the CFP, such as the revision of the criteria used at the health centers to determine children "at biomedical risk" and substitution of the infant soup "sopa pure" distributed to the infants.

Finally, the first version of the chapter for the Interest Group III book, "Food for the Poor," is finished. This is to be published by the KIFP/FS.

Publications Completed

Two papers to be included as chapters of two different books, as mentioned above.

A comprehensive report in spanish has been handed to two Ministries. This document is being currently consulted for future modification of the ongoing CPF for preschoolers.

"Effect of a Milk-Based Food Supplement on Maternal Nutritional Status and Fetal Growth in Underweight Chilean Women." *American Journal of Clinical Nutrition*, March 1988. Mardones. S. Francisco et al.

A report to the Ministry of health on "Evaluacion del Sistema de Informacion en Salud y Nutricion: SISVAN, June 1989.

"Algunos Determinantes de la Lactancia Materna en Chile." *Revista Chilena de Pediatría*, 1989.

Publications Planned

The paper on "Chile's Main Nutrition Intervention Program: A Synthesis" is being presently revised so as to introduce the suggested modifications. Estimated completion date is October 1989.

Together with Eugenia Muchnik, we are currently working on a publication in Spanish for *Cuadernos de Economia*, a journal of the Department of Economics of Catholic University.

Conversations are being held with The World Bank and the Secretary of Social Programs for further analysis of the information, particularly of the food consumption data.

Seminars/Workshops/Presentations

Workshop held at Cornell University on "Methodologies on Food Consumption Surveys," June 1987.

Seminar on Nutritional Surveillance, Santiago May 1988; organized by Ministerio de Salud, Secretaria de Desarrollo Social, World Health Organization and UNICEF.

Latin American Congress of Nutrition, paper presented on Nutritional Surveillance, Vina del Mar, November 1988, Chile.

Seminar on "The Determinants and Consequences of Female Headed Households." Paper presented on policy issues related to women's participation in the labor force, Washington, DC, March 1989. Organized by the International Center for Research on Women and the Population Council.

National Congress of Nutrition, presenting the main findings of the study on "Participation on the CFP for Preschoolers: Effects and Consequences," Santiago, May 1989.

Workshop to discuss the results of the study "Analysis of Complementary Feeding Program Participation: Milk-cereal for Preschoolers" with the Interinstitutional Committee for Welfare Programs in Chile, July 1989.

Latin American Econometric Congress. Paper to be presented on "Analysis of Complementary Feeding Program Participation: Milk-Cereal for Preschoolers." Santiago, August 1989.

Other Significant Outputs

I have been invited to participate in a project to evaluate the current modalities of health services delivery in Chile, so as to present alternatives for the coming government. This is a three year research program.

Two undergraduate students of economics are in the process of finishing their theses which have been supervised by Eugenia Muchnik and myself.

Travel Study and Hosting of Fellows' Activities

During August 1988 I participated in the KIFP/FS seminar on "Macroeconomic Adjustment in Latin American Countries and Implications for Food and Agricultural Policy," held at Buenos Aires.

During September 1988, Shanti Bapna traveled in Santiago with the purpose of visiting some food distribution programs. Some visits to the programs' sites were arranged, as well as meetings with professionals working in the field.

Interest Group IV

Technology for Food Production and Processing

**Sitt El Nafar M. Badi
Food Research Centre
Khartoum North, Sudan**

Title of Project: Supplemented Cereal Based Traditional Food

Project Objectives

The prevailing conditions in Sudan, including the drought, refugees and displaced people from the wars and the nomads, lead to the objectives of this project. The aim was to develop a high nutritive value, traditional (cereal-based) food that can be used by the vulnerable population of both children and adults. The food should be commercially available, ready to use, easy to handle, transport, store and consume. It should also sell at a reasonably cheap price.

Activities/Accomplishments

The traditional processing of sorghum and millet into the staple foods of Sudan is tedious and involves a great effort. Simpler mechanical processes were developed through this research which involved milling, baking and cooking technologies. These products are kisra, baby food and high bran brown bread.

Kisra, a thin pancake-type product, was prepared from fermented sorghum batter and enriched by the addition of 25% peanut/chickpea (roasted) plus sweeteners and milk powder. The kisra was baked in a mechanical kisra line and dehydrated before packaging in polyethylene bags.

Baby food contained 70% sorghum or millet flour (80% extraction rate) and 17% milk powder. The batter was dried into flakes by a Buflovac Laboratory drum drier. The finished product was then ground using a Laboratory Wiley mill.

The brown bread is made with the addition of 10 and 20% sorghum/wheat bran. A simple pan bread formula is used. The samples were either consumed fresh or sliced and dried in a baking oven.

A description of the material and cooking methods are detailed in a manuscript now ready for publication.

The three products (kisra, baby food and brown bread) were subjected to feeding trials using groups of five Wistar male rats. These trials and some of the analyses were carried out at Carlsberg Research Centre, Copenhagen, Denmark. The results of these trials were evaluated for use of the product by infants.

Consumer acceptability tests were carried out for dehydrated kisra and brown bread at camps for refugee and displaced people. The results obtained showed high acceptability for fermented kisra and sorghum bran bread.

Summary Observations

The addition of chickpea and peanuts improved the quality of kisra, a staple food of Sudan. This type of kisra can be used as a well-balanced food for infants above the age of one year.

The addition of a higher percentage of peanuts was restricted due to the high oil content of peanuts that can cause rapid rancidity of the finished product. It was also difficult to process a batter containing more than 25 percent of peanuts. Also, the price and color of the finished product are limiting factors.

The baby food developed from sorghum/millet malt, milk powder and processed by drum drier provides a safe level of protein for children above the age of 12 months. This formulation and mode of processing are well-suited for commercial production of sorghum/millet based baby food.

Based upon the investigation above it is recommended that the use of brown bread for infants should not exceed 10% wheat or sorghum bran as it affects digestion.

Publications Completed

A scientific paper titled "The Nutritive Value of New and Traditional Sorghum and Millet Foods From Sudan" has been accepted for publication in the journal, *Plant Foods for Human Nutrition*.

Publications Planned

A pamphlet (in Arabic) is under preparation for the dehydrated packed kisra.

Seminars/Workshops/Presentations

A one-day seminar "Sudan Food Systems and Nutritional Food Problems" was held at the Food Research Centre on February 20, 1988. It was addressed and attended by national and international organizational representatives in Sudan. Among the speakers were an FAO Representative, the Director of the USAID mission, a UNICEF representative, a WHO representative, etc. The discussion and resolutions were very sound and useful.

A one-day workshop was organized on "Composite Flour Products in Sudan: A New Concept." This was attended by the Prime Minister, his cabinet, national scientists and industrialists. It was held on January 4, 1989 and was followed by a discussion on television and in national newspapers.

Attended and presented a paper at the sorghum and millet symposium organized by ICC (International Cereal Chemists) May 27-28, 1988 at Lausanne, Switzerland. The title of the paper was "Commercial Production: A Breakthrough in Kisra Technology."

Other Significant Outputs

Development of a new kisra line for commercial production of Sudan staple food

The development of high bran bread and sorghum sweet products (improved traditional and home scale recipes)

Extruded sorghum/millet baby food

100% sorghum bread

Composite flour products (milling and baking technologies)

Travel Study and Hosting of Fellows' Activities

During the fellowship program, I made a travel study to Copenhagen Denmark; Cuhlam, United Kingdom and a group study tour to The People's Republic of China.

The travel study to Denmark (June-July 1987) was to the Carlsberg Research Centre in Copenhagen. As the Centre has a collaborative program with the Food Research Centre in Khartoum, I could use their facilities. These included laboratories and equipment where I could do some of the sample analyses that I was unable to do in the Sudan due to lack of equipment and shortage of chemicals. Also, I could spend some time at their library doing a computer literature search.

The travel study to the Tropical Development Research Institute (TDRI) at Cuhlam, United Kingdom included a visit to laboratories and a demonstration for a new method in the processing (milling) of sorghum. Also, I used their facilities in London which had a very large library and a documentation centre.

The China travel study was under a minigrant for Interest Group IV. The trip was organized during June 20-30, 1988. It included a seminar, field trips and discussions. This was very useful preparation for the Asia Seminar in February 1989. It was also a useful learning experience since the main theme of the travel study was on transfer of technologies.

February 18-22, 1988 I hosted a post-African seminar visit to Sudan by three Fellows and a Steering Committee member. The program included a seminar on nutritional problems in Sudan, field trips to food production and food industry. A special trip was organized to travel to the headquarters of Agricultural Research in Sudan and the famous Gezira Scheme in Wad Medani (180 kilometers south of Khartoum). The Fellows were quite pleased with the program.

**Mahmud Duwayri
University of Jordan
Amman, Jordan**

**Title of Project: Constraints to the Adoption of Modern Technologies in the
Rainfed Agriculture of Jordan**

Project Objectives

The main purpose of this study was to investigate the factors that may hinder or/and speed the extent and rate of the adoption of new practices by the cereal producers in Jordan.

The objectives were:

- 1) To determine the degree of adoption of the new practices by cereal producers.
- 2) To determine the differences in demographic characteristics between cereal producers who have adopted the new practices and those who have not.
- 3) To determine whether there are significant differences in the adoption of new practices by cereal farmers when grouped by selected factors.
- 4) To determine the differences in the adoption of new practices by cereal farmers when grouped by demonstrators and non-demonstrators.
- 5) To determine the perception of the cereal producers about the impact of selected factors with regard to the adoption of new practices.

Activities/Accomplishments

This study was initiated to update knowledge of cereal production practices in Jordan and to determine the factors which influence adoption of cereal technology. A package of "Best Bet" Practices has been determined from previous research findings. This study was designed to determine the level of adoption of the Best Bet Practices and to determine the influence of the level of participation in field days which demonstrated the practices. It also determines the socioeconomic characteristics and the reasons adopters gave for non-adoption or for discontinuing of recommended practices.

A questionnaire survey of a sample of 196 highland farmers provided the data. Interviews were conducted between May and August 1987. The most frequently used practices included herbicides, chemical fertilizer, improved seed and mechanical harvesting. In contrast less than one third of the sample used seed drills, duckfoot or chisel plows or planted before the rains. Exposure to the Best Bet Practices made a big difference. Demonstrators used all of the practices more frequently than did field day attenders who in turn applied all the practices more frequently than did the non-attenders. When asked why they discontinued use of the Best Bet Practices, former adopters cited unavailability of equipment, high cost, lack of credit and lack of knowledge. When non-adopters were asked why they had not adopted the whole package unavailability of equipment, high cost of equipment and lack of credit were cited by more than half of the sample. About one third cited rainfall as a reason. Much smaller proportions cited several other reasons. Exposure to demonstrations was related to age, education, income, vehicle ownership, travel outside Jordan and organizational participation. It was not related to full- or part-time farm operation, agrimedia use and grain yields. Results were published in *Diraset* (see "Publications Completed").

As a follow-up to the published study, another survey was conducted to find out the adoption of modern technology by cereal producers in Jordan as seen by the agricultural leaders. They are:

- 1) Jordan Cooperative Organization administrators and its workers in different parts of the country where cereals are grown under rainfed conditions.
- 2) Agricultural station managers and workers in the different parts of the country where cereals are grown under rainfall.
- 3) Extension workers who are responsible for making field demonstrations for cereal production.

The survey consisted of a questionnaire designed to fulfill this purpose. About 125 of the above mentioned agricultural leaders were interviewed in the different parts of the country during May 1989. Statistical analysis and writing of the report is underway.

Another study has been initiated to assess the impact of agricultural research on development in Jordan. Research has been conducted by three different institutions in Jordan including the Ministry of Agriculture (since 1952), Faculty of Agriculture of the University of Jordan (since 1973) and the Faculty of Agriculture and Veterinary Medicine of the Jordan University of Science and Technology (since 1986). Results of all major research projects conducted by these institutions are being collected and analyzed using KIFP/FS funds.

Research projects and publications at the University of Jordan have been analyzed and collection of data is continuing at the national level. Additional publications have been obtained from the International Service for National Agricultural Research (ISNAR). All of this information will be used in making further assessments of the impact of agriculture research on development in Jordan.

Publications

Duwayri, M., C. Eastman, N. Fanek & Akram Baqaeen. 1988. "Adoption of Agricultural Technical Practices by Jordanian Cereal Farmers." Published in *Dirasat*, Vol. XV, Number 11.

"Views of Agricultural Leaders and Scientists on Technology Adoption in Jordan." Planned for publication in 1989.

Travel Study and Hosting of Fellows' Activities

Attended the Orientation Seminar at Michigan State University (1986), the KIFP/FS annual seminars in Brazil (1987), Zimbabwe (1988) and Asia (1989). Also participated in a travel study in Kenya in 1988.

Visited the International Service for National Agricultural Research (ISNAR) in the Netherlands, July 24-31, 1987.

Visited China, June 20-30, 1989.

Interest Group IV visited Jordan and Syria September 6-12, 1987. They visited the University of Jordan and different agricultural institutions in Jordan.

Dr. Sathyapala Pinnaduwege visited Jordan for two days (June 9-11, 1989). He took field trips and had meetings with Economic and Extension Department Head staff.

Dr. Norberto Quezada visited the University of Jordan on a consulting mission in June 1989. He met with the Faculty of Agriculture staff members.

Boniface F. Makau
National Council for Science and Technology
Nairobi, Kenya (June 1986-June 1989)
and
Ministry of Planning and National Development
Nairobi, Kenya (August 1988-Present)

Title of Project: Agricultural Research and Technology Diffusion by the Private Sector

Project Objectives

- 1) To determine private sector research and development (R & D) resources and activities in Kenya.
- 2) To undertake a comparative cross-country study with a view to determining what factors affect firms' decisions to invest in R & D, including government regulations and the legal framework.
- 3) To investigate differences in management of R & D units in the private and public sectors.
- 4) To investigate different R & D financing arrangements between the public and private sectors.
- 5) To establish coordinating and collaboration mechanisms for R & D between the private and public sectors, the universities and other centers of research in Kenya.

Insofar as agriculture and industry are closely interdependent in Kenya the project investigated the two sectors together.

Activities/Accomplishments

For the first time in Kenya basic data on private sector R & D activities and resources in the country was generated on a systematic and scientific basis. The data is now being used for planning and development purposes.

A unique bibliography has been prepared on private sector research with special reference to agriculture. This information is available for further exploration of the subject.

The studies on private sector research in other countries enabled the National Council for Science and Technology, and other institutions, to move forward with confidence in discussing issues of private sector R & D and collaboration with public institutions. In the early 1980s when the subject was first broached, it was decided that there was need to look at what was happening in countries with the relevant experience in order to have a feeling for the possible strategies necessary for the formulation of successful policies in this new area of endeavor. It was then difficult to convince the parties concerned to move forward without that information. The studies in my project have filled that need.

The climax of the project was the "National Conference on Cooperation Between the Private Sector, Public Sector, Research Institutes and the Universities in Research, Innovation and Diffusion of Technologies" held July 17-19, 1989. This was supported by a grant from the KIFP/FS.

The conference was a successful event. It went far in setting the policy direction for modelling a new national research system involving the government, public research institutes, the private sector and the universities at the national, sectoral, institutional and individual levels. Participation was at the highest levels of the business and public sectors and the universities.

The Minister for Research, Science and Technology described it as the first conference of its kind in Kenya.

The Chairman of the National Council for Science and Technology hailed it as a landmark conference.

There was a general consensus that the conference came at the right time when the government is undertaking a structural program aimed at creating an enabling environment for the private sector and that the results of the conference would lead to a far-reaching "soul-searching" reevaluation of the institutional set-up for R & D in the country.

The conference generated considerable interest in the local media judging by the extensive coverage and repeated editorial comments accorded the conference by all the media (newspapers, radio and television).

Thus, what started on a modest scale with a national survey on private sector R & D resources and activities slowly rose to a major national awareness on the possibilities of cooperation between the various sectors in R & D. Myths were exploded, positive attitudes created, and the policy stage set for future cooperation and linkages. It was necessary to start on a low key initially and generate awareness incrementally because the exercise involved changing long-held institutional and individual attitudes. In this regard, my fellowship can be said to have been a resounding success. KIFP/FS was represented at the conference by Dr. Darrell Fienup.

My fellowship resulted in an unprecedented exposure to different cultures, food systems and professional contacts within the three years of the program. This was good for professional, personal and social development.

My fellowship generated the need to pay attention to the computer as a vital tool in modern management. Relevant skills in the use of the computer in management were acquired in the process.

Summary Observations

It can be said that the fellowship was immensely successful in that:

- it provided the leadership forum in which policy directions for new institutional R & D roles and relationships were set up;
- reliable information and data on private sector R & D in Kenya was generated for the first time for planning purposes: this was backed by relevant studies in other countries; and,
- the fellowship boosted my professional and career development as well as the institutional capacity of the host institution and the country in general in dealing with the subject of private sector research and its cooperation with public institutions.

It can, however, be said that the greatest effects of the fellowship will be lagged (i.e., the effects will be greater in the years to come). The institutions involved have committed themselves to implementing the results of the conference. Various individuals, including myself, have committed themselves to making sure that awareness of the subject remains high and that the proceedings of the conference do not become yet another report for the shelves.

Publications Completed

Ikapel, W. I. and L. Gatugata. 1986. *Review of the Legal and Regulatory Framework as it Affects Private Sector Participation in Research and Development (R & D) in Kenya: A Report to the National Council for Science and Technology (NCST)*. NCST, Nairobi, Kenya.

Makau, B. F. 1988. *Survey on Private Sector Research and Development (R & D) Resources and Activities in Kenya*. NCST, Nairobi, Kenya.

Makau, B. F. 1988. *Agricultural Research and Technology Diffusion by the Private Sector: A Bibliography*. NCST, Nairobi, Kenya.

Publications Planned

In the coming year I plan to put together all the information I have collected into one publication on private sector research.

There will also be a publication of the proceedings of the conference mentioned. The publication will be ready by early September.

Seminars/Workshops/Presentations

A minigrant was provided by KIFP/FS towards support of the "National Conference on Cooperation Between the Private Sector, Public Sector, Research Institutes and the Universities in Research, Innovation and Diffusion of Technologies" held in Nairobi, Kenya July 17-19, 1989. The conference, as mentioned earlier, was highly successful.

Travel Study and Hosting of Fellows' Activities

Orientation Seminar, Michigan State University and individual study visits in the U.S.A.: June 1986.

KIFP/FS annual seminar and individual study visits in Brazil: January 1987.

Africa seminar planning meeting, Harare, Zimbabwe: June 1987.

Interest Group IV visit to Jordan and the International Centre for Agricultural Research in Dry Areas (ICARDA) in Syria and individual study travel in Britain: September 1987.

KIFP/FS annual seminar and study visits in Zimbabwe: February 1988

Hosted KIFP/FS Fellows visit to Kenya: February 1988.

Interest Group IV visit to China: June 1988.

Individual study visit in Norway, West Germany and the Netherlands: September-October 1988.

KIFP/FS annual seminar in Thailand and study visits in India and Australia: January-February 1989.

Samuel Sefa-Dedeh
Department of Nutrition and Food Science
University of Ghana, Legon, Ghana

Title of Project: Traditional Food Processing Systems-Innovations from the Grass-Roots. A Case Study of Cereal and Legume Processing in Ghana

Project Objectives

- 1) To survey and collate information on traditional food processing in Ghana.
- 2) Provide need-based information on traditional methods of processing through publications and films (slides and video).
- 3) Review critically the traditional processing of cereals and legumes with the aim of identifying innovative and simple techniques which can be subject to technological improvement.
- 4) To do physical and chemical analysis of selected traditional foods to establish nutritional and storage potential.

Activities/Accomplishments

A field survey on traditional methods of food processing covering five of the ten regions of Ghana was completed. The regions covered include:

Greater Accra
Volta
Central
Western
Upper East.

Some areas of Eastern region were also surveyed. To obtain a complete national picture, the survey is to be extended to other regions not covered.

A complete database on traditional methods of food processing in Ghana has been developed using the dBase III plus software. The database which covers all the agricultural commodities grown in Ghana is serving as a valuable source of information to other researchers.

The chemical, physical and processing characteristics of some traditional foods were investigated. The laboratory investigation involved basic chemical analysis, product quality evaluation and product characteristics. The quality indices of "pito" and "nmeda," two traditional food drinks, were investigated.

A method was developed to process an indigenous food drink, nmeda, using pasteurization and bottling. The processors of this malted cereal drink are women; some of the unit operations during processing are time-consuming and a lot of fuel is used for the process. The method developed sought to reduce the time for processing, the amount of fuel used (by reducing the wort extraction time) and preserve the product and reduce the risk of contamination and loss of income. Storage stability tests on the products indicated that the process is able to maintain the desired flavour, aroma and colour of the products.

Another aspect of the project was to assess the possible modification of processing technologies to increase the income of the processors. This has involved the use of the spent grain resulting from the "Nmeda" processing to make another product using enzymic hydrolysis.

The process depends on the enzymes present in the corn malt for hydrolyzing starch from the spent grain to sugars prior to extraction. A product has been developed from the spent grain which does not require the addition of sugar or caramel. If the process is found viable it will lead to a reduction in the use of sugar in the drink and, therefore, will save foreign exchange. In addition, the process will increase the income of women involved in the processing of "Nmeda" as they will be able to make two products from the same starting raw material.

Documentation of traditional processing methods using slides and photographs was undertaken. This information will be organized for use in teaching and food technology extension.

Cowpeas (*Vigna unguiculata*) is an important legume in Ghana and its processing follows different treatments. Some of these are laborious and there is the need to develop simple processes for increased utilization of this important source of protein. Part of the work under the Kellogg project involved the production of cowpea flour. The work concentrated on the dehulling characteristics of different varieties of cowpea. Three of the ten varieties of cowpea investigated were found to dehull well and can be potential raw materials for the preparation of cowpea flour.

Data analysis and report preparation. This has been a major activity in the last year. Information collected have been organized into a database using the computer software dBase III plus. Reports have been prepared from the data collected in the Greater Accra region.

Summary Observations

The informal sector of agro-processing in Ghana is very important. This sector uses mainly traditional simple technologies and the industry is controlled by women.

Data collected from the project indicate that most of the women using these technologies have little or no education and have little capital, therefore operate at a small scale.

Traditional food processing technologies are very important in the Ghanaian food system. They are used to provide value added to all the major commodities grown in Ghana.

The food processing industry provides direct employment for many women. The indigenous food processing sector depends on locally fabricated equipment which provides non-agricultural employment to some men, especially in the towns and cities.

The informal sector of agro-processing handles all the major commodities grown in Ghana. Cereals, legumes, fish, oilseed and root crop processing are the most important. The small-scale/household processing of cereals was found to be prevalent.

There are many cereal and legume products in Ghana. Some of these are localized in their production and utilization and have high demand. There are some that are widely produced in the country.

Milling is an important operation in cereal and legume processing. The production of cereal and legume flour or meal is done by individual processors. There is the need to produce flours from locally grown cereals for use in indigenous foods. This will provide:

- a) new employment opportunities
- b) reduce the time spent for processing

- c) ease marketing problems of farmers
- d) help curtail post-harvest losses
- e) provide a means of effectively controlling the quality of the raw material used for processing.

Several products have been identified as having a potential for improvement. This is partly because of the product and process characteristics, product demand and use.

- a) nmeda - a non-alcoholic malted cereal drink
- b) pito - an alcoholic malted cereal drink
- c) komi and fante kenkey - fermented corn dumpling
- d) cowpea flour
- e) agbelima - a fermented cassava dough
- f) various types of cereal-based dumplings

The KIFP/FS research project has had an effect on other areas of research. The resources made available under the Kellogg program and the field experiences contributed to the initiation of new projects and the strengthening of others. The following research/activities have been made possible as a result of the Kellogg program.

- a) The use of solar drying as a tool to reduce post-harvest losses in food processing.
- b) Investigations on freshwater fish processing in Southern Ghana.
- c) Measurement of indices for bread quality as perceived by the Ghanaian consumer and baker.
- d) "Agbelima," an important product in the Ghanaian diet. Inoculum preparation and other process characteristics.
- e) A report on "Agro-Industries in Ghana" for the Ministry of Agriculture under the Medium Term Agricultural Development Programme.

Publications Completed

Traditional alcoholic beverages from cereals in Ghana. Processing of pito and burukutu in the Greater Accra Region. Report 01-88. Sefa-Dedeh, S. and S. A. Asante., 1988.

Freshwater fish processing in Ghana. The fishing industry at Machingani. Report 02-88, Sefa-Dedeh, S., M. Mensah, and D. Fianu.

Processing of *Ga kenkey (komi)* in Greater Accra Region. A techno-economic survey. Report 03-88. Sefa-Dedeh, S. and H. Plange.

Cereal processing methods in Greater Accra Region. Report 04-88. Sefa-Dedeh, S. and M. Mensah.

Publications Planned

Women in brewing-a techno-economic evaluation of traditional brewing in Ghana (Estimated completion date: September 1989).

Cereal technology in Ghana. A techno-economic study of some cereal products. (Estimated completion date: September 1989).

Improvement of process product characteristics of a traditional cereal drink. Example from nmeda. (Estimated completion date: September 1989).

Cassava processing in Ghana. A techno-economic evaluation of selected cassava products. (Estimated completion date: September 1989).

Fish processing in Ghana. Process and product characteristics. (Estimated completion date: September 1989).

Women, technology and the utilization of oilseeds in Ghana. A techno-economic evaluation of palm, palm kernel and coconut oil processing. (Estimated completion date: December 1989).

The utilization of starchy-fruits in Ghana. Process and product characteristics of selected foods. (Estimated completion date: December 1989).

Grain legume processing in Ghana. A techno-economic evaluation. (Estimated completion date: February 1990).

Traditional meat processing methods in Ghana. Process and product characteristics. (Estimated completion date: March 1990).

Indigenous food drinks made from spices in Ghana. (Estimated completion date: March 1990).

A techno-economic review of traditional methods of alcohol production from sugar cane and related products. (Estimated completion date: May 1990).

The informal food processing sector and Ghanaian agro-economy. (Estimated completion date: September 1990).

Seminars/Workshops/Presentations

Data from the in-country research project was presented at lectures, seminars and workshops organized in Ghana.

1. University of Ghana, Inter-faculty lecture May 28, 1987.

Topic: National Food System Improvement Strategies: The Role of Technology.

2. National Energy Board, Seminar on Solar Drying and Pumping. May 26-June 1, 1988.

Topic: Solar drying and food quality within the agricultural post-harvest system.

3. Workshop on effective post-harvest management of cereals and legumes. University of Ghana. Legon. (An institutional minigrant activity)

Topic: Cereal and legume processing and post-harvest management.

Topic: Grain quality in cereal and legume marketing and processing in Ghana.

Topic: The human factor in the promotion of cereals and legumes processing.

4. Seminar on Food Technology for Development. University of Ghana. (An institutional minigrant activity)

Topic: Harnessing traditional food technology for development.

Topic: Case studies on cereal and legume processing technology.

Travel Study and Hosting of Fellows Activities

A travel study was undertaken in September-October 1986. The Tropical Products Institute (now Overseas Development Natural Resources Institute) in London and the Agricultural University of Wageningen, Netherlands were visited. The study tour provided an opportunity to learn about current trends in food technology research. At the Tropical Products Institute the post-harvest units at Slough and Culham were visited. Discussions held with some of the researchers were very fruitful and contracts were made for continued cooperation.

After the second annual seminar in Zimbabwe in February 1989, four Fellows and the Director of the program paid a four-day visit to Ghana.

The Director and the Fellows visited:

1. The Cocoa Research Institute at Tafo
2. The University of Ghana, Agricultural Research Station at Kade
3. The Ministry of Agriculture, and
4. The Elmina fishing village.

A seminar was organized at the University of Ghana on Ghana's Food System to discuss various issues related to Ghana's agriculture. The seminar was addressed by invited speakers and a fruitful discussion was undertaken.

**James M. Teri
Sokoine University of Agriculture
Morogoro, Tanzania**

Title of Project: Agricultural Technology Development and Transfer in Tanzania

Project Objectives

To evaluate the development of agricultural technology in Tanzania, including transfer and utilization systems in order to suggest ways to make research more responsive to the needs of the farming community.

Activities/Accomplishments

A workshop on agricultural technology development, transfer and utilization in Tanzania was organized in May 1987. The proceedings of the workshop have been published. The list of recommendations will be useful to the current task force which is working on a national agricultural and livestock research masterplan.

Visits were made as planned to study agricultural research and extension systems in other countries and institutions and research methodologies as follows:

ISNAR, The Hague, Netherlands - January 1987
Norway - February 1987
Jordan and Syria - June 1987
China - June 1988
Malaysia - July 1988
Netherlands - May/June 1989

Surveys of the research and extension systems and the farming community to determine constraints in technology development, transfer and adoption were completed and the data analyzed. All activities have been conducted with colleagues from several different departments in the agricultural faculty. This has included planning and conduct of the workshop, survey work and analysis of data.

Summary Observations

The development of appropriate technology, its dissemination and adoption are crucial to the development of the agricultural sector. Tanzania has both research and extension systems, but a majority of the farmers who are small holders have no access to improved technology for a variety of reasons.

Some of these reasons are historical. At independence in 1961, Tanzania inherited a technology development and transfer system manned by colonial staff which emphasized specific export crops and was directed at large scale commercial expatriate farmers. The colonial government did not train Tanzanians for research or for the management of agriculture. There were only a handful of Tanzanians with university training at independence and none with a Ph.D. in an agricultural field. Very few smallholder farmers were brought into commercial production.

After independence the colonial staff and expatriate farmers left, leaving a system which was severely lacking in human resources. The government put a lot of emphasis on training, but this has not matched the demand or openings.

Other problems are policy related. Despite the government's acknowledged realization that agriculture is the backbone of the economy the policies followed have discriminated against agriculture. Very few resources have gone into the sector and the farmers have lacked incentives in addition to being unsupported and taxed. Subsistence production still dominates.

There are several reports on the problems of technology development, transfer and adoption in Tanzania. The technological constraints limiting food production are known including research needs and strategies to overcome them.

Some of the identified constraints in agricultural R&D are:

1. Too few resources are going into research and extension. Hence, there are inadequate facilities and equipment.
2. Weak R & D institutions and poor linkages among them. All institutions to support R & D seem to suffer from the same constraints of resources, management and instability among others.
3. Weak infrastructure to support R & D especially the input and output markets and the distribution systems.
4. Institutional instability due to too frequent changes in the structure and organization of institutions and transfers of staff.
5. Lack of well-defined R & D priorities and objectives leading to insufficient concentration of resources in the most important commodities and production areas.
6. Rapid erosion of incentives for researchers, extension workers and farmers.

Despite this list of constraints which have been described as formidable there is a reserve of untapped potential. The research system has made notable accomplishments in:

1. Development or introduction of improved crop cultivars or livestock breeds.
2. Development of improved crop and livestock production and protection packages.
3. Development of technologies for the conservation of the environment.

These improved technologies have not been widely disseminated or adopted by farmers, though the majority of farmers are receptive to adopt improved technologies. The reasons for this anomaly are in economic, social and political areas like inputs, credit, prices, marketing, international trade, policies which have discriminated against agriculture, and weak research-extension-farmer linkage.

It is concluded that efforts in technology development and transfer should be accompanied by policy measures which will facilitate the adoption of the technologies and stimulate the sector in order to foster a sustained growth.

Major efforts will need to be directed at the following priority areas:

1. Research to develop the information base for planning and policy making in agriculture.
2. Getting the available knowledge or technologies to farmers.
3. Strengthening R & D institutions including the agricultural support services and their linkages.

4. Training of researchers and managers of agricultural enterprises.
5. Setting clear priorities and objectives in agricultural R & D.
6. Increasing investments in agriculture and for agriculture.
7. Strengthening international linkages and transfer of technology.
8. Arresting environmental degradation.
9. Putting more emphasis on low external input technologies like recycling of nutrients, biological nitrogen fixation (BNF), tolerance to environmental stresses and improved utilization of crop residues by livestock.
10. Commercialization of the smallholder sector.

Principal Outputs

"Science and Farmers in Tanzania" - proceedings of the May 1987 workshop in Arusha.

"Agricultural research in Tanzania: Issues and suggestions for improvement" - final project report to be completed by December 1989.

Workshop papers:

The role of Sokoine University of Agriculture in agricultural research in Tanzania. Paper presented at the 2nd MALD/SACCAR/ISNAR workshop on Agricultural Research Management, Arusha, July 1988.

The management of agricultural technology development and transfer systems in Tanzania. Paper presented at the 2nd MALD/SACCAR/ISNAR workshop on Agricultural Research Management, Arusha, July 1988.

Multidisciplinary research: Experiences at Sokoine University of Agriculture. Paper for the 20th anniversary of the Faculty of Agriculture, SUA, August 1989.

Travel Study and Hosting of Fellows' Activities

Participated in the KIFP/FS orientation and annual seminars

Michigan State University - 1986

Recife, Brazil - January 1987

Harare, Zimbabwe - February 1988

Bangkok, Thailand - February 1989

Australia - February 1989

Participated in Interest Group IV's organized travel studies

Jordan and Syria - June 1987

China - June 1988

Additional travel studies to:

ISNAR, The Hague, Netherlands - January 1987
Norway - February 1987
Malaysia - July 1988
The Netherlands - May/June 1989

Hosted the following:

Steering Committee member Dr. W. K. Gamble's visit - April 1987
Fellows' post Harare seminar visit to Northern Tanzania - February 1988
Associate Director Dr. Darrell Fienup's visit - July 1989

Ephrem Whingwiri
Department of Research and Specialist Services
Ministry of Lands, Agriculture and Rural Resettlement
Zimbabwe

**Title of Project: Increased Soyabean Production and Household Utilization
in Hurungwe Smallholder (communal area) Farming Area**

Project Objective

The overall objective was to stimulate interest in the growing and utilization of soyabeans in the diet by smallholder farmers.

More specific objectives were:

- a) to increase soyabean production by smallholder farmers in Hurungwe District.
- b) to promote the utilization of soyabeans in the home.
- c) to conduct research into specific topics important in achieving the overall objective.

Activities and Accomplishments

In order to achieve the project objectives the following activities were undertaken:

- coordinate participation of relevant individuals working in extension, community development, health and the farming community.
- train trainers to ensure that the message given to the farmers is correct and consistent with project objectives.
- provide extension and community development staff with the necessary cooking materials to facilitate project activities.
- conduct workshops and meetings.
- involve farmers in planning and monitoring of the project activities.
- demonstrations to explain the growing and cooking of soyabeans.
- institute competitions and provide attractive prizes for best performers.
- conduct three production and two utilization field days in 1987/88/89.
- conduct some research into problems associated with the growing of the crop.
- conduct surveys to establish the impact of the project.
- extend the experience gained to other areas in the community at large.

The following was accomplished:

The estimated area under soyabeans in 1988/89 season increased by about 400% compared to 1986/87 (from 306 to 1300 hectares in Hurungwe District).

Most farmers never used certified seed. Agritrade, a company which sells crop seeds in the area did not sell any soyabean seed before 1988. More than 200 bags of certified seed of the recommended variety Roan were sold in 1988/89. Some smallholder farmers can only afford to buy small quantities of seed, therefore, it was necessary to package seed in 10 kg bags in addition to the traditional 50 kg bags. It was the 10 kg bags which were sold out. Henceforth, soyabean seed will be marketed in 10 kg bags in addition to the usual 50 kg bags.

By 1988, most farmers interested in growing soyabeans had accepted that the variety Roan was better than Hurungwe Special, a locally grown unimproved type.

Most extension workers in the area are now better trained in soyabean production.

For the first time some farmers in the project area purchased Rhizobium inoculant to treat their seed before planting, while others used soil from fields which had grown inoculated soyabeans the previous season. Inoculant is produced locally but smallholder farmers find it difficult to store it before planting as cool conditions are required to keep the bacteria alive. Research conducted in this project has shown that inoculant could be stored for up to two months in clay pots placed in a granary.

At the time the project started some families used soyabeans in food preparation but did not process the beans correctly. The initial preparation to neutralize anti-nutritional factors was not known. Community development workers were taught the basics of soyabean use in the diet at village level including how to neutralize the trypsin inhibitors. Each community development worker was provided with pots, cups, plates and ingredients to use when teaching people in their ward. Cooking competitions were conducted on field days and prizes were awarded to the top four women who prepared the best soyabean-based dishes.

Soyabean utilization in household food preparations increased during the life of the project. When the project started, a survey of 120 families in Mzilawempi ward and 49 in Kanyati during 1986/87 revealed that only 7% and 20%, respectively, of those interviewed made use of soyabeans in their diet. When 37 families in Mzilawempi and 140 in Kanyati were interviewed two years later in 1988/89, the proportion of families using soyabeans had increased to 54% and 79%, respectively. A maize/soya bread preparation was the most popular recipe for more than 90% of the families, while a "soya coffee" made from ground, roasted beans and soya milk was the next most popular recipe.

In the 1988/89 season, the project changed emphasis towards demonstrations on how to grow and cook soyabeans for people in other areas of the country (see "Seminars/Workshops/Presentations").

My project won the first prize of a floating trophy and Z\$100.00 for the most appropriate exhibition at the International Fair on Technology for Sustainable Development in Mutare, Zimbabwe in 1989.

Summary Observations

In community-based projects it is important for the community to choose leaders among themselves who have demonstrated interest in the crop or project to represent the community in the management and monitoring of project activities. As soon as a Running Committee chaired by the farmers was formed, project activities received overwhelming support from the community. Researchers and extensionists provided the technical and financial backing.

Members of the Running Committee were reimbursed for their transport expenses, given food and a small allowance for incidentals for each day of the meeting. Attendance was very good at most of

the monthly meetings because committee members did not lose money by taking up the responsibilities given to them. Since most of the members were poor farmers, none would like to be involved in any activity which required using their own meager resources.

The leader of the project should command respect, authority and power to control resources and be able to take decisions. This is very important in projects involving other institutions. The leader must be able to use project resources in whatever manner considered consistent with attaining objectives. The prizes, allowances given, etc. could not have been possible if the leader did not have complete control over the way funds could be used.

Farmers, particularly those in the Running Committee, should be encouraged to participate freely. The project leader must be open-minded and eager to involve all interested people.

In such community-based projects, where a number of institutions are involved, the top leadership in some organizations may not provide the project with the support expected. Soliciting support from both the top and the bottom of the hierarchy in each organization should be encouraged. Support is generally assured at the grassroots level where the problem exists. People are generally anxious to improve their own situation. Confrontation with anybody who may have influence over project outputs should be avoided by all means.

Competition and prizes are effective means of getting people to perform better.

Publications Completed

Whingwiri, E. E. and D. M. Naik. 1989. *Soyabeans in Our Diet*. (A recipe book)

Proceedings of the production and utilization workshops of August 28-29 and November 13-14, 1986. Guidelines on how to grow the crop are given.

Kupfuma, B. and E. E. Whingwiri. 1989. "A feasibility study of a soyabean-based food industry." (Unpublished)

"Production and Marketing of Field Crops in the Small-scale Farming Areas of Zimbabwe." (To be published)

Publications Planned

Food and nutrition textbook for third and fourth year high school pupils entitled "Grain Legumes in our diet." Mrs. Malaba (Ministry of Education and Nutritionist), Mrs. Sileya (Lecturer, Nutritionist, Belvedere Teachers College), D. Naik and E. E. Whingwiri. (To be completed by October 31, 1989).

Talent Consortium (Pvt) Ltd. (Zimbabwe) successfully secured funds from Oxfam America for producing a documentary on soyabean production and use at village level. The experiences from the soyabean project provide the major component of the documentary. Filming will be done in September 1989. It is hoped that the documentary will be available for use before the end of 1989.

"Soyabean as a Cash and Food Crop." A book to be written in 1990.

Seminars/Workshops/Presentations

Venue: Seventh Day Adventist Church, Mbare; May 23, 1989.

Participants: 45 church leaders and members.

Comments: Great success with unexpected turnout.

Venue: Agronomy CPU, DR & SS, Harare; May 8, 1989

Participants: 150 soyabean based lunch to staff of Ministry of Lands, Agriculture and Rural Resettlement.

Comments: Demand for food far exceeded supply. Soya stew was the most preferred preparation.

Venue: Health Centre Scheme, Shaeva; May 4-5, 1989

Participants: 30 Home Economic Demonstrators and Community Development workers.

Comments: This was a training of trainers' workshop in how to prepare soyabean dishes.

Venue: Community Hall, Glendale; April 28, 1989

Participants: 69 farm laborers mostly women led by Mrs. Mutandiro of Save the Children Fund.

Comments: There is about 40% malnutrition among children of farm laborers on most large-scale farms and yet a lot of soyabeans are produced on these farms. The people were taught how to cook soyabeans.

Venue: Civic Centre, Kwekwe; April 26, 1989

Participants: The Mayor, Mr. Mutandwa and Councilors, about 15 in all.

Comments: Councilors appreciated the unlimited potential of soyabeans as a cash crop and food crop. I presented a seminar on my experiences in Asia.

Venue: Mbizo Township, Kwekwe; April 26, 1989

Participants: Community Development workers; Nursing staff, local women, representatives from Department of Health and Youth and Kwekwe municipality; about 60 people in all.

Comments: Participants were amazed by what could be prepared with soyabeans.

Venue: Jameson High School, Kadoma; April 25, 1989

Participants: Lecturers in home economics from all over the country, 120.

Comments: In addition to watching a video the participants were given demonstrations on how to prepare a number of soyabean-based dishes.

Venue: Bhora Dairy Centre, Chikwaka (Murewa); December 12, 1989

Participants: Extension workers, community development workers, teachers and local people; about 65 people.

Comments: Demonstrations on how to grow and cook soyabeans were conducted.

Venue: Mavhudzi School, Chikwaka; December 11, 1988

Participants: Extension workers, community development workers, teachers, adult literacy workers, local farmers; about 60 people.

Comments: Demonstrations on how to grow the crop using ox-drawn implements and how to cook the beans were done.

Venue: Magunje, Mudzimu, Birimahwe, Mzilawempi (Hurungwe); November 12, 1988

Participants: 102 farmers.

Comments: Practice and discussions on how to grow soyabeans. Refreshments were all soya-based.

- Venue: Chirau Centre (Zvimba); September 21, 1988
Participants: Extension workers, village health workers, and local farmers led by Miss Bhiri of Chinhoyi AGRITEX; about 53 people.
Comments: Two farmers were selected to host field production demonstrations in the area. Farmers pointed out that Roan was not available at the local farmers' Co-op. Arrangements have now been made for seed to be available.
- Venue: Chitomborwizi Tiugare Homestead, Small-scale farming area (Zvimba); September 20, 1988
Participants: Extension, health community development workers and local farmers; about 26 people.
Comments: The session focused on production and utilization of soyabeans.
- Venue: Zowa small-scale farming area, Zvimba; September 20, 1988
Participants: Farmers, health workers and extension workers; about 55 people.
Comments: Production and utilization workshop.
- Venue: Kariba Hospital, Kariba; September 16, 1988
Participants: Nutrition staff from Kariba and Omay hospitals; about 50 people.
Comments: Great interest was expressed in soya milk and soya maputi.
- Venue: Agronomy Institute, September 15, 1988
Participants: Departmental staff and parliamentarians; about 70 people.
Comments: Members of parliament were amazed with the range of uses that soyabeans can be put to.
- Venue: College Hall, Gwebi; August 1988
Participants: Extension officers from throughout the country.
Comments: Practical demonstrations given in addition to my lecture on nutrition.
- Venue: Rowa Training Centre; September 28-October 3, 1988
Participants: The International Fair on Technology of Sustainable Development in Zimbabwe; about 1,500 visited our show room.
Comments: A very successful workshop because the soya project won the first prize for the most appropriate exhibition. A floating trophy, plus Z\$100 were won.
- Venue: Ursula Urban Centre, Harare; July 23, 1988
Participants: 75 members of the Food and Nutritional Association of Zimbabwe (FANAZ).
Comments: The lady from Hurungwe communal area demonstrated the various preparations commonly done in her peasant area.
- Venue: Hurungwe; June 23-25, 1987
Participants: Utilization workshops for farmers.
Comments: Women were taught the correct method of preparing soyabean recipes.
- Venue: Magunje, Hurungwe; November 14-29, 1986
Participants: Home economic demonstrators and community development workers.
Comments: Practical course on the use of soyabeans in diet.
- Venue: Karoi Hotel, August 28-29, 1986
Participants: Extension workers.
Comments: Extension workers trained on how to grow soyabeans using ox-drawn implements.

Other Significant Outputs

A soyabean-based food company (Zimsoy Products Pvt Ltd) will soon be launched in Zimbabwe, with the primary objective of producing and marketing products largely promoted in the soyabean project.

Travel Study and Hosting of Fellows' Activities

Orientation for KIFP/FS Fellows; Michigan State University; August 1986.

KIFP/FS seminar and study tour of Soyabean Research; Brazil, Parana State (Londrina); January-February 1987.

Visiting Agricultural Research Centres and Universities; Jordan, Syria and the United Kingdom; September-October 1987.

Understanding the food systems in Tanzania; Tanzania; February 1988.

Understanding the food systems in China; China; June 1988.

Visiting Malaysian Agriculture Research Institute; Malaysia; July 1988.

KIFP/FS seminar and understanding the food systems in Asian countries; India, Thailand and Indonesia; January-February 1989.

In January/February 1987 the KIFP/FS annual seminar was held in Harare, Zimbabwe. My institution was host to the Fellows.

What I learned during my travel studies:

The orientation week at Michigan State University was no doubt a success. This was my first trip to the U.S.A. In a short period of the orientation it became clear that a family had just been formed. The Fellows got to know one another very well.

The highlight of my trip to Brazil was when I visited the EMBRAPA Soyabean Research Centre in Parana State, Londrina. The "cow-machine" which produces soya milk at a clinic in Parana State was no doubt a successful example of how soyabeans were being exploited in Brazil.

The trip to Jordan, particularly to Jordan Valley, clearly demonstrated how plastic greenhouses can be used for commercial production of horticultural crops.

The most rewarding of all of my study travels were my visits to China, India, Thailand and Indonesia. I learned a great deal in China about the responsibility system, the shortcomings of cooperatives in agriculture, soil conservation, and community-based projects. As a result of my visit to China I wrote a letter to the National Research Council of Zimbabwe suggesting that an interministerial committee be formed to monitor the conservation of our soil, water and forestry. This committee has been formed and I am presently Vice-Chairman.

Increased food production and self-sufficiency in Africa will only be realized through expanded irrigation of crops and judicious use of fertilizer. This has been the case in Asia.

Transportation is a serious problem in most of Southern Africa. Vehicles are extensively used but animal power is seriously underutilized. Some Asian countries exploit both vehicle and animal drawn carts for transporting people and other material things. The Asian experience could be of interest to problems in the Southern part of Africa.

Yan Rui-zhen
People's University of China
Beijing, China

Title of Project: Food Problems in Poor Mountain Areas and Scientific and Technological Progress in China

Project Objectives

The poverty line for China's rural population has been set at a per capita income of RMBY200 and per capita food consumption of 200 kilogrammes. Population below this level account for 8-10% of the national total and are found mainly in mountainous areas. Food problems for people below the poverty line are principally problems of poor mountain areas. Case studies of selected areas of this type were made with the purpose to learn the income and nutrition levels in these areas; to determine the causes of poverty and food deficiency; and the inter-relation between solution of food problems and the introduction of new technologies. The major objective was to develop a strategy and policy for economic development and the solution of the food problems in China's poor mountain areas for the use of policy makers.

Activities/Accomplishments

The study tours of the rural economies in the United States, Brazil, Argentina, Mexico, Africa, Japan, India, Thailand, Australia, Jordan and Syria organized through the KIFP/FS project have been helpful in many ways. They have enabled the author to gain a clearer picture of the world food situation and the food policies of the various countries, thereby broadening the author's vision; to have a better understanding of the role of technology in solving food problems and the breakthroughs made in various countries; to learn the policies and successful experiences of the various countries in bridging the gap of incomes between different areas and trades; to allay the apprehensions concerning rural economic development in developing countries such as incurring debts, brain drains and international trade on unequal footing, etc. They are also conducive to the improvement of the general academic level of the world's food system.

In the case studies of the poor mountain areas in the central and western parts of China, the author has discovered the crux of the food problems, formulated the basic ideas of a strategy for their solution, and conceived some new concepts of value, both in theory and practice.

Dissemination of the initial results of the research project through academic seminars, articles, and reports presented to the policy making department, has aroused extensive interest and concern. Some of the national news papers have carried exclusive reports on the areas under study. A report on the research work will be presented to China's central government's department for policy making when finalized.

Summary Observations

For a decade, there has been a widening gap of incomes and food consumption levels between poor mountain areas and rural areas in general, although both have been improved.

The main food problems in poor mountain areas are: inadequate food output, low purchasing power, and improper strategy and measures for economic development. The solution to these problems should, therefore, be associated with the general task of the mountain areas' economic development and freeing them from poverty, instead of just considering the problems as they stand.

Rapid progress has been made in the rural economy in the developing areas. People's living standards in the poor mountain areas have improved but there has been a one-way flow of educated working people and funds from these areas to other parts of the country. Mountain areas are still not integrated into the planned market economy.

The fundamental way to change the situation in poor mountain areas lies in deepening the reform and putting their economy on the right track of a planned market economy. To achieve this, it is crucial to make full use of the resources in these areas, and to transfer their resource advantages into products and commodities.

Natural and labor resources are poorly utilized in the mountain areas, which are their advantages. The reasons for this are: the swelling population and the strains on food supply have led to the overuse of the small plots of land and lower marginal benefit, while vast hilly land resources are undeveloped and there is the serious problem of surplus labor. This negative pattern of utilizing resources should be changed into the positive pattern thereby to develop the hilly land and mineral resources, and send labor to other parts of the country.

Shortage of food is a knotty problem in bringing about the above stated strategic change to the mountain areas. Food supplies should remain entirely or semi-dependent on their own for some time to come. This means reliance on minimizing instead of expanding the crop acreage, restoring hilly lands now under crops back to forests and grasslands, improving the ecology and capital investment on farm land, and changing extensive into intensive farming in order to raise per hectare crop yields for solving the food shortage problem.

The development of hilly land and mineral resources, the shifting of surplus labor to other places, and intensive farming are closely associated with the introduction of new technologies. Technology is decisive in the development of mountain areas.

Capital input is indispensable for the development of mountain areas. Peasant households in mountain areas fall into approximately three categories according to their incomes: households with low income in general are incapable of producing enough to eat; households with average income can barely maintain subsistence production; and, households with high income have the ability to expand production. State inputs had formerly been supplied mainly for helping households with low income, which as a result, went to relief and failed to promote the development of the resources in the mountain areas. This practice should be changed for the funds to become loans for households with big incomes for the economic development in mountain areas, in order to provide economic opportunities and improve the living of households with low income--a way to kill two birds with one stone.

The emphasis of investments in mountain areas was formerly on irrigation, which calls for large expenses but produced small results. It is necessary to make investments in communication and in the control of soil erosion in the mountain gullies, including the capital construction (terracing) of farm land, and other infrastructural development.

Because of their special geographical environment, mountain areas incur far greater losses than rural areas in general, in the price differentials between industrial and farm products and the incomes between different regions. Therefore, it is necessary to give mountain areas preferential treatment in order to help free peasants in these areas from poverty.

Principal Outputs

A comprehensive project report is to be mailed shortly.

Ten reports on the studies of special subjects related to the project.

A 200,000-word book on "Food Problems in Poor Mountain Areas of China" expected to come off the press in 1990.

Contributed a Chapter to the Asian Fellows' book, "Increasing Economic and Physical Access to Food: Experience of Selected Asian Countries."

Travel Study and Hosting of Fellows Activities

Participated in Interest Group IV travel study in Jordan and Syria, 1987.

Travel study in Japan, one month in 1988.

Organized Group IV Travel Study in China, June 1988.

Assisted Simei Wen in organizing a travel study for Asian and other Fellows, October 1988.

Participated in supplemental travel study trips associated with KIFP/FS annual seminars. The countries visited included Kenya, Mexico, Sudan, India and Australia.

