

Report of the  
**FAO-SEARCA REGIONAL WORKSHOP**

25-26 March 2004  
Cha-am, Thailand

**POLICY ISSUES  
AND  
INVESTMENT OPTIONS  
TO  
AVERT HUNGER  
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FOOD INSECURITY IN ASIA**



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# Executive summary

## Background

The Rome Declaration on World Food Security and the Plan of Action adopted at the World Food Summits in 1996 and 2002 brought to fore the global commitment to eliminate hunger and malnutrition and achieve sustainable food security for all. This commitment was further reaffirmed in the Millennium Development Goals (MDGs) following the Millennium Summit in 2000. MDGs are now widely accepted as the framework for development action as well as the measurement of development progress. Eradication of extreme poverty and hunger – the main goal articulated in MDG-1 – leads the development agenda.

The challenge of sustainable agriculture and rural development to alleviate hunger and poverty against the backdrop of an increasingly globalized and liberalized agricultural trade (as embodied in WTO agreements) transcends national boundaries. Strategies require exchanges of useful experiences as well as consolidation of efforts for a comprehensive advocacy of fundamental policy and institutional support to achieve the development goals.

On the occasion of the World Food Day 2003, the FAO Regional Office for Asia and the Pacific (FAO-RAP) launched the Round Table for a Regional Alliance Against Hunger (RAAH). Noting the initiative as timely and strategic, participants of this meeting emphasized that hunger eradication requires policy reforms to empower the poor and to commit resources for agriculture and rural development.

The RAAH round table recognized that governments have a major responsibility for improving the policy framework for agricultural and rural development and for making required investments in rural infrastructure and agricultural research. Emphasizing the role of the private sector and agribusiness, *inter alia*, in developing and disseminating improved technology and ensuring remunerative farm prices, round table members recommended that FAO-RAP prepare suitable guidelines, taking into account the initiatives that have been successfully implemented by countries in the region and that provide a dynamic and mutually reinforcing framework of policies and actions.

Considering the above, there is a need to expand and strengthen the regional alliance in order to discuss and identify modalities that can address the fundamental policy and institutional issues relating to the MDGs on poverty and hunger.

*On this account, the Policy Assistance Branch of the FAO Regional Office for Asia and the Pacific (RAPP) with the Project GCP/RAS/188/JPN and in collaboration with the SEAMEO Regional Center for Graduate Study and Research in Agriculture (SEARCA) organized a regional workshop on "Policy Issues and Investment Options to Avert Hunger and Food Insecurity in Asia".*

## Workshop objectives

The aims of the workshop were to discuss collaborative strategies, policy instruments and country experiences that relate to reducing food insecurity and poverty in the context of increasing globalization and agricultural trade liberalization, and to determine how the agriculture and rural sector ought to respond to emerging challenges. It provided RAPP with an up-to-date perspective of the priority areas and research agenda of leading policy institutes in the region, particularly SEARCA and those comprising the Asia-Pacific Agricultural Policy Forum, with respect to enabling

policies and programmes for sustained agricultural and rural development. It also provided a forum to discuss the following:

- RAPP's collaboration with the regional and national policy institutes;
- Collaboration and exchange of information at the policy level between and among institutes from high-, middle- and low-income countries.

Through this joint work, it is hoped that the FAO Policy Assistance Branch for Asia and the Pacific could enhance the provision of effective policy assistance to developing member countries.

### **Participants**

The participants were members of the leading policy centres and institutions from countries in the region – e.g. from high-income countries (Japan, Republic of Korea and the United States of America), middle-income countries (Indonesia, Philippines and Thailand) and low-income countries (India and Nepal). These organizations normally function as policy “think tanks” and have an influential role in shaping policies and programmes in their countries. Most notably, in attendance was H.E. Shin Sakurai, M.P., Japan and current chair of the Food Security Committee, Asian Forum of Parliamentarians on Population Development (AFPPD), who delivered remarks on Japan's cooperative activities.

### **Papers presented**

The workshop featured the keynote paper entitled “Averting hunger and food insecurity in Asia” presented by SEARCA Director, Prof. Arsenio M. Balisacan. Thematic papers on key development concerns in agriculture and rural development were then presented. Prof. Huang Jikun, Director of the Center for Chinese Agricultural Policy (CCAP), presented the first thematic paper, which focused on China's agricultural research and development, particularly the reforms, challenges and implications for developing countries. Prof. Wilfredo P. David, Chancellor of the University of the Philippines in Los Baños (UPLB), followed with his presentation on water resources and irrigation policy issues in Asia. Rural institutions, agricultural development and pro-poor economic growth were the focus of the thematic paper delivered by Prof. James Roumasset from the University of Hawaii. The main aim of each paper was to synthesize the key policy and research issues critical to advancing agricultural development and food security in developing countries of Asia.

Speakers on the second day came from the participating institutions that prioritized poverty and food security in their current research agendas. They included Mr Kyoung-soo Hong from the National Agricultural Cooperative Federation (NACF) of Korea and Mr Akio Yamamoto from JA-ZENCHU of Japan. They presented issues concerning Korean and Japanese agricultural cooperative development, respectively. Dr Donato Antiporta, Senior Policy Adviser at RAPP and Prof. Tirso Paris from UPLB discussed an overview of the regional policy assistance work carried out within the framework of GCP/RAS/188/JPN – *Support to the Policy Assistance Branch on agricultural policy simulation work in China, Indonesia and the Philippines*. Meanwhile, other leading policy centres in Asia were also given a chance to present their current research work.

# Highlights of the regional workshop

1. Dr He Changchui, Assistant Director-General (ADG) of the FAO Regional Office for Asia and the Pacific (FAO-RAP), delivered the welcoming remarks while Dr Mafa Chipeta, Director of the FAO Policy Assistance Division (FAO-TCA), gave the opening speech, which highlighted the features of Asia and the role of FAO in development work, thus setting the tone for policy discussions. Dr Arsenio M. Balisacan, Director of the SEAMEO Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA), likewise helped set the atmosphere by providing the appropriate political and development backdrop. The general message sent to workshop participants was that countries in Asia shared the primary development goal of reducing hunger and extreme poverty through policy work and regional collaboration. Mr Chipeta noted that good policy work is essential, but examples of these must be made known to a larger audience to be of value. On the part of SEAMEO SEARCA, Dr Balisacan reported that the workshop was one of the avenues through which the regional centre hoped to enter the mainstream work of poverty alleviation, a major objective boldly and clearly indicated in the centre's Eighth Five-Year Plan along with the attainment of food security.
2. H.E. Shin Sakurai, Japanese lawmaker and current Chairperson of the Food Security Committee of the Asian Forum of Parliamentarians on Population and Development (AFPPD), emphasized in his message that while the world population has been continually rising, the earth's resource base remains limited. Moreover, at present, a phenomenal increase in food production is not expected. Because of this, solving the population issue is deemed essential to achieving sustainable development. He added that World Trade Organization (WTO) rules must be consistent with the concept of food security and that workshop participants must work to create more advanced rules that allow for cooperation and follow the principles of competitiveness and harmonization in their respective countries. These are believed to be important undertakings as there are still many big issues in the area of food security.
3. Dr Balisacan subsequently presented the keynote paper entitled "Averting hunger and food insecurity in Asia". The paper comprehensively reviewed the current status of poverty and hunger in the region vis-à-vis the Millennium Development Goals (MDGs) while assessing agricultural growth and rural performance in relation to poverty and food insecurity. It also examined the implications of emerging (and recurring) policy and institutional issues on agricultural organization, rural growth and poverty and hunger reduction while incorporating emerging paradigms in development economics.
4. The following were the issues raised by participants during the open forum that followed the presentation:
  - a. Dr James Roumasset of the University of Hawaii pointed out that the 12 percent share of government expenditure allotted to price stabilization was too high, adding that if one considered the full cost (i.e. including the access burden), the percentage would be much higher. He said that previous studies have shown that geography does not matter much in determining income levels, but institutions do (e.g. Rodrik *et al.* 2002). He cited as an example the economy of Catanduanes, a small island in the Philippines that remains isolated because of natural and policy-induced trade barriers. In this economy, there is zero export and people depend more on remittances and other income generated outside the province. With no export-led growth, the economy is hence allegedly stagnant.

Dr Roumasset then identified common issues related to geography such as high shipping and general transportation costs, which have an impact on food security. He also

highlighted the hypothesis that globalization is neutral while raising the idea that efficiency-enhancing growth benefits the poor. In this sense, if globalization indeed increases efficiency, then factoring the negatives (e.g. environmental degradation) into the resulting improvements in trade still allows the net effect of the globalization process to be pro-poor. He further stated that completing the process could help eliminate the bias between poor and developed countries.

- b. Dr Sang Mu Lee, Chairperson of the Global Agricultural Policy Institute (GAPI), broached three points related to “conditioning factors” that influence the response of the rural non-farm sector to the stimulus of agricultural growth. The first touched on the need for greater focus on factor markets, particularly in regard to market potential, in order to shed light on what may be another driving factor behind demand creation. The second related to the importance of examining the management factor (and not only the technical factor), especially in terms of the skills needed in the area of information and risk management and finance. The third referred to the need to study the relationship between agricultural and rural development both in the agriculture and non-agriculture sector given the importance of linkages in income growth theory.
- c. Dr GS Bhalla of the Center for the Study of Regional Development (CSRD), meanwhile, respectfully requested that poverty figures for India be reviewed as the latest survey results (NSS 2000) show poverty incidence to be less than 36 percent while the paper reported it to be about 48 percent. He also said that assessment of a direct relationship between agricultural growth and rural poverty would have made the results of the study more robust considering that rural poverty accounts for a greater share of total poverty in Asia. He commended the author’s approach to globalization and said it was presented in proper perspective. He added that greater details on the declared limits of globalization should have been presented to support the general points stated in the paper.
- d. Dr Dilli Raj Khanal of the Institute of Policy Research and Development (IPRD) raised questions on the impact of globalization, the link between trade and agricultural growth and the transmission mechanism required to bring about a positive effect on the rural economy. He also drew attention to issues related to the status of factor markets and their link to the product market, especially under a liberalized environment. He added that issues concerning relative prices and the creation of an environment that provides incentives for farmers should also be analysed.
- e. Mr Materne Maetz of the FAO Agricultural Policy Support Service (FAO-TCAS) brought up two important points. The first related to the need for further analysis of the type of growth that facilitates poverty alleviation given existing evidence of a strong correlation between growth and poverty reduction. This implied the conduct of studies on the composition of growth and how it influences poverty as well as on the impact of agriculture and off-farm enterprise development on poverty reduction. The second point, which he said required further study as well, pertained to the failure of food security and nutrition indicators to improve substantially despite a very good response of poverty reduction to the growth stimulus. He then inquired about analytical work that related agricultural or rural growth to food security indicators to improve understanding of these relationships. He added that greater information was needed to be able to comprehend the dynamics involved and to isolate the lessons from experiences of countries performing less favourably in Asia as well as in other regions.
- f. Dr Balisacan responded by stating that the workshop was designed precisely to elicit such questions and identify policy issues that may be addressed in terms of modeling, empirical econometric work and simulation modeling. He said most agriculture models indeed lacked feedback mechanisms but reported that ways to bring the rural non-farm



component into the picture were already being explored. He added that the issue of public spending was of concern and agreed that factor and product markets should be understood more fully, especially in terms of the interaction between the urban and rural areas via the labour market. Moreover, future growth in the food and agriculture sector depended mainly on productivity increases and that change in agriculture required improvement in agriculture technology. The question left for the participants to ponder upon was this: "Can research systems of developing countries maintain strong agricultural research and development (R&D) programmes and ensure productivity growth?"

5. Dr Jikun Huang, Director of the Center for Chinese Agricultural Policy (CCAP), presented the first thematic paper, which he originally wrote together with Dr Ruifa Hu of CCAP and Dr Scott Rozelle of the University of California in Davis. The study focused on China's agricultural R&D, namely the reforms needed, challenges faced and the implications of policy changes for other developing countries. In his presentation, Dr Huang reviewed the existing structure of the Chinese agricultural research system, examined the trends and structure of agricultural research financing and revenues in the country and discussed the current reforms and policies. He concluded by presenting policy recommendations tailored for the Chinese Government while citing their relevance to developing countries in general.
6. The open forum that followed the presentation drew the following responses:
  - a. Dr Roumasset raised the issue of maintaining performance standards and accountability when expenditures are decentralized. He noted that decentralization would often lead to rent seeking activities of politicians as experienced by countries that have undergone the process (e.g. Philippines). He also suggested that the priorities on public subsidies be appropriately expanded. In particular, cash crop and hybrid seeds can be handled by the commercial sector while the crossbred variety and staple foods can be publicly supported since the beneficiary is the poor household.
  - b. Dr Dyaa Abdou, Chief of the Policy Assistance Branch of the FAO Regional Office for the Near East (FAO-RNEP), gave the following observations. First, he expressed hope that the strategy for agriculture research in China would coincide with the overall strategy of sustainable agriculture and food security in the region, the reason being that sometimes strategies are crafted in isolation of actual priorities of the country and without regard to the strategic framework for development in the region. Second, he believed that whenever agriculture research is discussed, policy-oriented issues must always be included. While many studies refer to the technical aspect of agriculture, very little attention is given to the actual economic environment. Third, he said issues related to the applications of research, technology transfer and extension work should be further elaborated.
  - c. Mr Maetz then voiced the general concern over inadequate investment in research. This reportedly occurred even though various studies have already made an excellent case for investing in research. He further inquired into the availability of convincing qualitative evidence of the effectiveness of advocated reforms to support the author's recommendations for change in the Chinese research system. He was particularly interested in how the management of research, especially in terms of the process of selecting research areas, affected the efficiency of resources utilized. Emphasis was also placed on strategies to ensure that research being conducted met the needs of farmers. He added that consideration should be given to qualitative indicators such as those associated with the availability of resources for the staff because these help in assessing research efficiency and in steering policy towards a more favourable direction.
  - d. Dr Bhalla similarly raised several key points. First, he called attention to the problem associated with using total research allocation as a measure of total research productivity

given that a larger part of research expenditure often goes to the salaries of scientists with very little going to actual research (e.g. Nepal and Bangladesh). He reminded everyone to be careful about using such criteria. Second, he mentioned the role of public and private sector in R&D, stating that agriculture research at present has become very costly and is virtually monopolized by multinational research institutes. He ended by posing the question: "How do developing countries confront this issue of dependence on multinationals for research?"

- e. Dr Nipon Poapongsakorn, Senior Consultant at the Thailand Development Research Institute (TDRI), reported that the situation in China was similar to that in Thailand where there was also underinvestment in research and understaffing of agricultural research institutions. Although public research in agriculture is vital, the limited number of good researchers hinders performance in that area. Thus, he said one problem that ought to be addressed was designing a system capable of attracting highly skilled researchers.
  - f. Dr Lee highlighted the relationship of agriculture research to extension work, stressing how the latter is just as or even more important in terms of practical results. He then asked the author's perspective on China's opening up of its R&D market to multinationals, especially the privately owned ones.
  - g. Ms Neela Gangadharan, Chief of FAO-TCAS, emphasized that public research served as the hero during the green revolution because results could easily be seen on the ground. She asked whether public research remained demand driven and inquired into the results of public research that justify its need for financial support. She also pointed out that agricultural research that prioritizes environmental stability must also consider cost effects on farmers with regard to production, prices and output.
  - h. Dr Saifullah Syed, Chief of the Policy Assistance Branch of the FAO Regional Office for Asia and the Pacific (FAO-RAPP), raised questions regarding the design or system for distribution of research in China. He then noted the possible effects of privatization on research, specifically in terms of the impact on poor farmers' access to research output.
  - i. Dr Balisacan commented that governments usually do not look at agriculture research activities in view of the long term but rather treat these as short-term undertakings.
7. Dr Roumasset then delivered his thematic paper, which focused on the topic of rural institutions, agricultural development and pro-poor economic growth. To gain understanding of relevant issues, he applied a conceptual framework that contrasted sharply with conventional wisdom, citing several examples principally from the Southeast Asian region to illustrate his points.
8. The open forum that followed elicited the following responses:
- a. Dr Bhalla emphasized issues related to equity and then asked why interventions that were meant to alleviate poverty ultimately ended up achieving very little for target beneficiaries.
  - b. Dr Poapongsakorn asked if pushing for agricultural development could actually benefit the rural poor given the existence of rural non-farm households that earn their income from the non-agricultural sector. In relation to this, he inquired about mechanisms to ensure that the poor gain from agricultural rural development. Lastly, he wanted to know if the author had an alternative model that explained share tenancy given that the paper criticized the mainstream (Stiglitz) model.
  - c. Dr Khanal noted that the whole argument presented in the paper was based on new institutional theory and that the various empirical studies mentioned were somehow

based on the social delivery principle. He claimed that the initial conditions in traditional societies were different from what the theories assumed. As an example, most people in the agrarian system had less than 0.5 hectares of land, with the share of the landless population increasing over time. He suggested that an alternative policy to address hunger and food insecurity be forwarded bearing in mind that societies are not homogenous. Differences occurred not only in terms of culture, he emphasized, but along social, political and economic dimensions as well.

- d. Dr Abdou said he expected a broader discussion of agricultural institutions, particularly in terms of formal and informal arrangements and the possible role of such structures in enforcing policies concerning water scarcity, pollution, management, food security and poverty alleviation. A larger picture of rural institutions that includes organization, decision-making processes, property rights, regulations and laws was observed to be missing. He said he hoped to hear more about the regional aspect of building institutional capacity and fostering cooperation among countries although he clarified that this omission was true not only for this presentation but for earlier presentations as well.

He also suggested the addition of empirical results, which he believed could enrich the paper more than the theoretical framework in marketing and credit. He added his own notes on the issue of subsidy, reiterating that financial support given to the farmers should have associated criteria, as it would be difficult to discuss the topic without also discussing target groups. The last point he raised touched on the special programme for food security, which aimed to increase farmers' incomes through diversification and intensification of production. He said this provided a good occasion for testing the theories on land tenure and decision-making mentioned in the paper.

- e. Dr Lee stated that rural institutions were widely acknowledged to be politically important in developing countries. He then aired the problem of how to handle institutional reforms considering the political behaviour and environment of these countries.
- f. Dr Chipeta highlighted the change in the state of poverty in Asia. He cited that the number of poor people has actually gone down quite swiftly, implying a rapid transformation of the economy. In light of this development, he emphasized that although more people have become landless, they were not necessarily worse off. He hypothesized that the situation in Asia might eventually become similar to that in Europe where the landless number among the most food secure and where people work outside of the agriculture economy (e.g. only 5 percent of the people own the land). This, he averred, could be the scenario in 50 to 70 years, at which time landlessness might no longer feature as an issue surrounding food security. He added that under conditions of rapid change, dynamism played an important role. In this context, the vital question is whether or not institutions are adaptable to transformations in the economy.
- g. Dr Syed pointed out that as long as the institutional aspect was not addressed, development efforts would not be very successful. He further stated that institutions embodied the efficient response within any socio-economic milieu at any time and hence represented the most fundamental element in the organization for economic development.
- h. Dr Antiporta meanwhile requested the author to further elaborate in his paper what he believed could be a suitable pro-poor credit policy or programme.
- i. Dr Roumasset responded to the comments by stating that the conceptual framework rationalizing existing institutions was flawed. He explained that there were two forces that shaped institutions – efficiency and government failure. In addition, he said there were two types of government failure: the presence of subsidies that pervert incentives and cause moral hazard and the failure to provide the infrastructure for cooperation. Infrastructure, he said, included not only physical infrastructure but also the legal framework or rule of law (e.g. based on the principle of equality or absence of

discrimination). He emphasized that it would be difficult to determine whether or not an institution was “efficient” because these two forces were entirely different.

This does not preclude though that an institution may already be efficient by itself, thus undermining the logic of many government intervention programmes, Dr Roumasset added. He cited Dr Yujiro Hayami’s favourite example of land reform in the Philippines. In this case, share tenancy was substituted by permanent labour, which turned out to be less efficient. He also cited Dr Balisacan’s paper where elasticity of economic growth on poverty reduction was shown to be as high as 3 but where the mixture of efficiency and inefficiency pulled it down to 1. The problem with all the attempted interventions (e.g. directed credit, government sponsored cooperatives and land reform), he said, was that these only contributed to retarding economic growth and have proven to be unsustainable.

Another kind of government failure cited by the author was the pervasiveness of rent seeking in governments. The National Food Authority of the Philippines, for example, was reportedly anti-poor and anti-growth because it directly contributed to shrinking the size of the country’s economic pie and worsening income distribution. While government price stabilization sounded good, it has been found to be massively wasteful and destabilizing.

On comments about the definition of institutions, he replied that this generally included organization, contracts, relationships and the nature of firms, while the apparatus of new institutional economics also included regional cooperation. Principles related to game theory, he emphasized, can be very useful in enhancing cooperative engagement.

He shed light on another aspect of new institutional economics, which recognizes three different levels of analysis of the agricultural setting: the old (first best) level, which has proven to be helpful in explaining the terms of contractual relationships in the rural environment; the second best level, which emphasized the presence of transaction costs; and the third best way, as pioneered by Dr Balisacan, which recognized the political economy of the existing environment, explicitly taking the rules of the games as endogenous (instead of exogenous). Formation of different coalitions in society and government influence must be fully understood if cooperation towards development is the goal, and this new type of economics helps provide the tools.

Dr Roumasset further clarified that institutions are not presumed efficient, but theory says that abstracting from political economy makes it efficient (i.e. rent-seeking activities take place if political economy is considered). He also clarified that agency theory could already suitably explain the 50 percent sharing rate in existing tenancy arrangements and that a consistent model could thus be built.

On the subject of pro-poor credit, he reported that although microfinance has emerged as a model, it was not expected to be completely financially self-sustaining. He said the World Bank should be able to provide management assistance and even subsidize administrative operations in order to maintain the incentives for selecting good clients.

As regards the issue of subsidy vs. privatization, he said there was already a widening consensus that directed subsidies did not work. He added that privatization was clearly the ideal way forward although more study would be needed to be able to design a hybrid model.

9. Presentations made by members of invited institutions marked the second day of the workshop. Mr Kyoung-soo Hong of the National Agricultural Cooperative Federation (NACF) discussed the topic of Korean agricultural cooperatives followed by Dr Akio Yamamoto, executive director of the JA-ZENCHU Central Union of Agricultural Cooperatives, who similarly tackled issues relating to Japanese agricultural cooperative development. Dr Khanal

of IPRD from Nepal and Ms Rosemarie G. Edillon, Executive Director of the Asia-Pacific Policy Center (APPC) in the Philippines, likewise presented their current research work in the area of food security and poverty reduction. Dr Linxiu Zhang, Deputy Director of CCAP, presented his view on social viability, gender and food security with a focus on China.

10. Dr Antiporta of FAO-RAPP and Dr Tirso Paris of UPLB then discussed an overview of the regional policy assistance work carried out within the framework of GCP/RAS/188/JPN on agricultural policy simulation as applied to Indonesia, the Philippines and China.

*Support to the Policy Assistance Branch (Project GCP/RAS/188/JPN)*

11. The following were the issues and concerns addressed to the presenters:
  - a. Dr Roumasset noted that supply stabilization was generally quite difficult to undertake. He added that among the issues that also needed to be considered were trade, international prices and wages. He also commented that the unemployed in the population were apparently not waiting to acquire skills before seeking jobs but were creating activities for self-employment as seen in the studies.
  - b. Mr Roberto Samanez, Chief of the FAO Field Programme Development Service (FAO-TCAP), inquired why the research covered only Indonesia, China and the Philippines and not other countries such as Viet Nam, Cambodia or Lao People's Democratic Republic.
  - c. Dr Khanal asked questions related to stability in the micro and macro sense as well as to the policy implications of the zero hunger programme.
  - d. Dr Bhalla emphasized results that illustrated how with urban wages higher than farm wages and non-farm incomes higher than rural wages, the incidence of poverty was markedly higher in rural areas.
  - e. TCAS representatives meanwhile commented that analytical results and specific policy recommendations from the studies were much desired.
  - f. Dr Antiporta explained in response that the zero hunger programme was only a partial study. On the issues surrounding stabilization, he stressed that what was visualized was not a buffer stock or a form of government support. He also averred that while the goal of "zero hunger" tended to be criticized and labeled as unattainable, there was nothing wrong with making it a vision for future development. In the case of Philippines, he said, zero hunger might even be achievable within five years and that small farmers expected income to improve. He further clarified that the programme would eventually cover other countries in order to guide future policy reforms.
12. The programme was then opened up to all participants, including FAO officials in attendance. Below is a summary of the discussion that marked the last portion of the workshop:
  - a. Dr Abdou of FAO-RNEP expressed appreciation of the meeting as it turned out to be both informative and useful. He highlighted some of the main topics tackled, namely institutional capacity building, the role of governments in policy development and the directions taken at the regional and country levels. He noted that the concerns discussed at the workshop were similar to countries in the Middle East, although agriculture contributes very little to national income in this region. He believed that the inappropriate involvement of government in development distorted the market mechanism. Too much subsidies in agriculture, for instance, could lead to misuse of inputs (e.g. chemicals and fertilizers, which also represent environmental hazards), he said. He then highlighted the problems endemic in subsidy and subsidy redistribution systems. Other issues underscored by Dr Abdou dealt with diverse topics such as water resources management,

livestock development, organic farming, regional collaboration and the importance of working with governments in developing strategies on agricultural issues.

- b. Mr Madhy Bamba, Chief of the Policy Assistance Branch of the Regional Office for Africa (FAO-RAFP), informed workshop participants that the Africa Ministers of Agriculture in 2001 developed a Comprehensive Agriculture Development Programme (CADP), which formed part of the vision called the New Partnership for African Development (NEPAD). The agriculture component (which included access to land and agricultural infrastructure, control of water, production and productivity) was subsequently agreed upon in June 2002. He added that commitments have been made until 2015 to work in this direction and suggestions have been raised to introduce fishing, forestry and livestock in the list of priority areas for development. He further reported that the activity of the FAO Regional Office for Africa at present involves assisting countries in updating their policies and strategies to make these consistent with key areas identified in the CADP. Moreover, assistance is now given at the country level in order to craft a national programme that is coherent with the global practices defined in the programme. He added that a major component of the CADP has been to promote regional integration and encourage development activities that have regional impact and focus.
- c. Mr Kidane of SAFP put emphasis on the recurrent drought in their subregion (Southern and Eastern Africa) and said that countries traditionally considered as food secure were now becoming increasingly food insecure. After structural adjustment, the region reportedly still grapples with the impact and hence strategies to reverse the situation are currently given utmost priority.

He then raised the issue on the outcomes of liberalization whereby many countries have withdrawn from their involvement in production, marketing and service provision. He reported that their policy office was working along these lines, citing a study on the impact of such reforms on food security issues. He also cited the existence of another study done with colleagues in the FAO system that discussed the mitigating impact of structural adjustment on the input/output market in remote areas. The FAO-SAFP is also currently promoting the "Never Again" slogan, which the countries have begun to adopt and emphasize. This slogan, he said, embodied the commitment to avoidance of repeated hunger and thus emphasized that addressing the food scarcity problem was top priority.

Mr Kidane meanwhile raised issues related to the HIV disease, citing a particular country in Africa as the area most severely affected and where the proportion of infected people ranges from 20 to 38 percent. Policy instruments are clearly needed to mitigate such problems, he said.

He then highlighted land related issues resulting from a colonial past and said their organization needed to respond to these challenges. The last area of concern he mentioned related to economic integration, particularly with respect to the Common Market for Eastern and Southern Africa, which declared the region a free trade area with zero tariffs. He reported that the policy office helps in terms of addressing both institutional dimensions and imminent issues (e.g. pertaining to rules of origin and common external tariffs).

- d. Mr David Sedik, Chief of the Policy Assistance Branch of the FAO Regional Office for Eastern Europe (REUP), noted how the importance of agriculture varied in each country, with less weight assigned to the sector in countries that had very little agriculture involvement. He added that participation in capacity building and training in policy areas ought to be strengthened. Issues surrounding rural development and policy assistance given directly to people instead of to governments were also raised.

- e. Mr Luis Gomez-Oliver, Chief of the Policy Assistance Branch of the FAO Regional Office for Latin America and the Caribbean (FAO-RLCP), emphasized that increasing food security and promoting rural development were also important in light of the present economic conditions in their region, where the increase in per capita income in many countries averaged at only about 1 percent. To date, agriculture in Latin America and the Caribbean contributes 7 percent to GDP and 20 to 40 percent to employment. He pointed out that the relationship between agriculture growth and food security might not always be positive but that increased food security could certainly aid in mitigating poverty. Agricultural development basically characterized rural development in many countries, he said, adding that there was a need for improvement in agriculture productivity and improvement of market and processing facilities.
  - f. Ms Gangadharan of TCAS then presented a paper related to distance learning of agriculture, food and rural development policies in Asia.
  - g. Dr Khanal likewise presented a brief report on food security, macropolicies and politics that provided economic and social perspectives. He also highlighted various issues relating to multilateral involvement, the countervailing role played by institutions such as the FAO, market and non-farm employment and land policy that followed market principles.
  - h. Dr Lee expressed his appreciation of the meeting and extended his congratulations to workshop organizers. In his position as Chairperson of the FAO Korea Association, he announced that he was willing to similarly collaborate with both FAO and SEARCA. He added he was willing to do the same as Chairperson of the Asia-Pacific Agriculture Policy Forum, currently composed of five country institutions including CCAP in China, the Pertarnian Institute in Indonesia, GAPI in the Republic of Korea, APPC in the Philippines, with other members from Malaysia, Nepal and Thailand. He said it is hoped that other countries in the Asia and Pacific region would also be included in future and that contact with the United States of America, Australia, New Zealand and Latin American countries would be established. In agreement with FAO-RAP ADG Mr Changchui, he suggested that a regional policy and research network be formed together with the relevant FAO regional office and SEARCA. He appealed to Japan, Republic of Korea and other potential donors to support this endeavor. Meanwhile, he also highlighted the gender issues raised by Dr Linxiu Zhang.
13. Dr Chipeta likewise extended his gratitude to the workshop organizers and assured the group of their readiness to cooperate and build upon the issues presented. He appealed to the group to find a way to spread the message regarding the various policy concerns and thus generate greater policy opportunities. He said there should be a drive to share the knowledge with and solicit support from people who govern the bigger economy, especially the decision-makers who set national policy priorities.
14. In closing, Dr Balisacan thanked the group for their active participation and productive discussion of policy concerns. He emphasized the accessibility of the papers presented in the website of SEARCA and FAO and urged everyone to view the exercise as a work in progress. He said that regional collaboration would certainly enrich policy advice given to national governments. Furthermore, he hoped that the discussions would spread beyond the walls of the workshop hall and lead to more solid policy advice. The appropriate venue for further discussion of the issues, he said, included the halls of congress and the executive branches of governments, the occupants of which had the greatest means to advance food security via better policy. He concluded the meeting by expressing his sincere appreciation for the opportunity given to collaborate with FAO and promised workshop participants that SEARCA would continue to pursue similar forms of cooperation with other organizations in the region.

# Averting hunger and food insecurity in Asia

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Recent years have seen a resurgence of economic growth in Asia. The region's growth of roughly 5 percent achieved in 2003 came close to the level achieved prior to the East Asian financial crisis in the late 1990s. Remarkably, despite this crisis that led most countries in East Asia to either a sharp economic slowdown or a contraction, the past decade witnessed significant poverty reduction. Between 1990 and 2000, the number of people living on less than a dollar a day fell by about 243 million. Poverty incidence in East Asia declined from 29.46 to 15.6 percent while that in South Asia fell from 41.3 to 31.1 percent. At these rates, the Millennium Development Goal (MDG) of halving the proportion of people whose income falls below one dollar a day (in purchasing power parity [PPP]) by 2015 looks attainable for Asia. Indeed, China, Viet Nam, Thailand and Indonesia have already reached that goal while the rest, except Sri Lanka, are on target (Table 1). The prevalence of undernourishment between the late 1980s and late 1990s also declined from 29 to 13 percent in East and Southeast Asia and from 38 to 23 percent in South Asia (Table 2).

Even so, the region still accounts for about 60 percent of the world's 1.1 billion poor. The proportion of underweight children in the region fell by only four percentage points (from 35 to 31 percent) between the early and late 1990s (ESCAP 2003). In Cambodia, Bangladesh, India and Nepal, almost half of the children under five years are still moderately and severely malnourished. The proportion of undernourished people in the region remains high at 16 percent, with very little progress in the 1990s for Bangladesh, India, Nepal and the Philippines. Without a renewed push and fresh initiatives, the region will likely miss the MDG of halving the incidence of hunger by 2015.

**Table 1. Proportion of population with income below \$1 (PPP\*) per day**

	Early 1990s	2001	MDG Target 2015	Trend 2015
<b>East Asia</b>	29.6	15.6		7.0
Cambodia	48.3	35.5	24.2	21.6
China	31.3	18.5	15.7	9.5
Indonesia	20.6	7.2	10.3	2.0
Lao PDR	53.0	26.3	26.5	11.0
Malaysia	0.5	<2.0	0.3	0.0
Philippines	19.1	14.6	9.6	10.5
Thailand	12.5	<2.0	6.3	0.0
Viet Nam	50.8	17.7	25.4	4.7
<b>South Asia</b>	41.3	31.1		21.5
Bangladesh	35.9	36.0	19.9	36.1
India	52.5	44.2	27.0	25.9
Nepal		37.7		
Pakistan	47.8	13.4	23.9	2.5
Sri Lanka	4.0	6.6	2.0	6.6

Sources: ESCAP (2003), Figure I.2; Chen and Ravallion (2004).

\* Purchasing power parity



**Table 2. Proportion of people who suffer from hunger**

Country	Percentage of children under 5 years of age who are moderately and severely underweight			Proportion of the population below minimum level of dietary energy consumption		
	Early 1990	Late 1990s	MDG Target 2015	Early 1990s	Late 1990s	MDG Target 2015
Cambodia	40	45	20	43	36	22
China	16	10	8	16	9	8
Indonesia	35	26	18	9	6	4
Lao PDR	44	40	22	29	24	14
Malaysia	23	18	12	3	–	2
Philippines	30	28	15	26	23	13
Thailand	26	19	13	28	18	14
Viet Nam	45	33	22	27	18	14
Bangladesh	67	48	34	35	35	18
India	53	47	26	25	24	12
Nepal	49	48	24	19	19	10
Pakistan	38	38	19	25	19	12
Sri Lanka	38	29	19	29	23	14

Source: ESCAP (2003), Figure I.3.

The global community's efforts in attacking poverty must focus on agricultural and rural development. Of the world's poor, 75 percent work and live in rural areas and 60 percent will continue to do so in 2025. In Asia, nearly two-thirds of the poor live in rural area, the large majority of them dependent on agriculture and agriculture-related industries for employment and income. In Viet Nam, for instance, about 80 percent of the poor live in households where the head works in agriculture (Glewwe *et al.* 2000). In rural Bangladesh, poverty incidence among marginal farmers is about 43 percent while that among landless and nearly landless households – whose members make up 45 percent of the population and are mostly agricultural wage labourers – is about 60 percent (IFAD 2002). Moreover, reductions in rural poverty in the Philippines, Malaysia, Indonesia, Thailand and India account for 40 to 70 percent of the observed reduction in national poverty incidence (Warr 2001)<sup>1</sup>.

It is one thing, however, to say that agricultural growth and rural development are keys to the reduction of poverty and food insecurity. It is another matter to identify the key drivers that bring about growth and development in the rural economy given fiscal constraints, political-economy considerations and global trends in trade, finance and technology. This paper distills lessons from recent Asian experiences and identifies critical development issues and options for securing rural growth and household welfare. In the next section, the paper revisits recent findings on the growth-inequality-poverty nexus. It then briefly reviews agricultural performance vis-à-vis overall growth and poverty reduction. From there, it examines the implications of overarching development issues pertaining to public investment in agriculture, institutions (governance) and globalization and trade reforms on food security and poverty reduction. It ends with some remarks.

### **Growth is good – but not enough**

Asia's GDP growth has consistently outpaced those of other regions of the world in the past 30 years. This growth though has not been uniform across subregions and countries. In East Asia,

<sup>1</sup> The rest are accounted for by urban poverty and migration.

GDP per capita expanded by 6 percent annually, driven by sustained growth in China, Republic of Korea, Thailand and Malaysia. In South Asia, where growth rates of output were relatively low and those of population high, the rate was about 3 percent per year. For India, growth gained momentum in the 1990s and early 2000s, enabling the country to join the ranks of fast growing nations in Asia.

Poverty reduction accompanied this growth in income. Based on the World Bank's poverty line of one dollar (PPP) a day, poverty in East Asia dropped from 29 percent in 1990 to 14 percent in 2000. Performance was less stellar in South Asia; over the same period, the reduction was about 10 percentage points.

Data based on national poverty lines tell the same story – i.e. where the income growth rate was relatively low, so was the rate of poverty reduction. For instance, per capita real GDP grew at an average of 1 percent per year for the Philippines in the past 30 years compared with 4.7 percent for Thailand and 4.3 percent for Malaysia (Table 3); average annual rates of poverty reduction were 0.9, 1.9 and 1.6 percent, respectively, in these countries. Where high output growth has not been sustained for a considerably long period, economic booms have nonetheless been associated with significant abatement of poverty as in the case of the Philippines in 1985-87 and 1994-97 (Balisacan 2003). Recessions, on the other hand, have been accompanied by deceleration or reversals in poverty reduction (Deininger and Squire 1996). The harder hit economies of Thailand and Indonesia, for example, saw higher poverty rates in the aftermath of the 1997 financial crisis (Suryahadi *et al.* 2000; Balisacan *et al.* 2003; ESCAP 2003).

**Table 3. Annual growth of per capita GDP (%)**

	1970-1979	1980-1989	1990-1999	2000-2002
Cambodia		4.4	1.7	4.4
China	4.1	7.9	8.5	7.0
Indonesia	5.3	4.4	3.1	2.7
Lao PDR		1.3	3.8	3.2
Malaysia	5.2	3.0	4.6	2.2
Philippines	2.9	-0.4	0.6	2.0
Republic of Korea	6.6	6.3	5.2	5.6
Thailand	4.6	5.4	4.2	3.2
Viet Nam		2.1	5.5	5.7
Bangladesh	-0.3	1.7	3.0	3.5
India	0.4	3.7	3.8	3.1
Nepal	0.6	1.9	2.4	1.2
Pakistan	1.6	4.0	1.4	1.4
Sri Lanka	2.5	2.6	4.0	1.2

**Source:** World Bank, *World Development Indicators 2003*.

Estimates of the responsiveness of poverty to growth corroborate the above story. In developing economies, the elasticity of the poverty headcount index with respect to mean income ranges from -2.1 to -3.1 (Ravallion and Chen 1997; Bruno *et al.* 1998; Adams 2002). This varies widely across and within countries due to differences in conditions prior to growth. Where access to land, credit, social services and infrastructure is highly unequal, the response is weak especially in the rural areas. Such is the experience of provinces/districts/regions/states in the Philippines (Balisacan and Pernia 2003), Indonesia (Balisacan, Pernia and Asra 2003), Viet Nam (Balisacan, Pernia and Estrada 2003) and India (Datt and Ravallion 2002). In some cases, weak local institutions (including social capital), poor investment climate and inward-looking policies favouring capital over labour-intensive sectors such as agriculture exacerbate the feeble response. In East Asian countries like China and

Republic of Korea, the effect of growth on poverty is stronger than in other economies in the region owing to their generally more favourable initial conditions – a salient one for China being the equitable distribution of land use rights (Fan *et al.* 2002). Income distribution also affects growth elasticities. Economies with lower levels of initial income inequality have greater potential to lift people out of poverty (Ravallion 1997; World Bank 2000). Countries with Gini coefficients below 40 have estimated elasticities of -5.7 to -6.1; for those with Gini values above 40, the range is -2.4 to -3.3 (Adams 2002).

Country studies that use disaggregated data provide ample evidence that income inequality blunts the impact of growth on poverty. If inequality had not changed or worsened, every 1 percent growth would have reduced poverty incidence in Lao PDR by 3.2 percent between 1992 and 1998; the same holds for Thailand between 1988 and 1992. The actual decline for both countries was about 1 percent (Kakwani and Pernia 2000). If growth had been distributionally neutral in the Philippines in 1994-97, poverty incidence would have fallen from 32 to 22 percent instead of to 25 percent (Balisacan 2003). Conversely, a 1 percent reduction in per capita income would have raised the percentage of the poor by 4.7 percent in Thailand, but the actual increase in the recent financial crisis was 6.5 percent (Kakwani and Pernia 2000).

During growth periods in Viet Nam, households in communities with paved roads record larger increases in expenditures than households with poorer roads while those with higher levels of education experience larger declines in poverty. Households that remain poor have about twice as much debt relative to assets compared with those that have escaped poverty (Glewwe *et al.* 2000). In the Philippines, irrigation and favourable terms of trade for agriculture positively influence living standards of the poor (apart from their indirect impact via overall income growth) as does schooling, if complemented with roads. The welfare of the poor tends to be lower in provinces governed by political dynasties than in those characterized by competitive politics (Balisacan and Pernia 2003). In Indonesia, improvement in access to technology such as electricity and information channels raises incomes of the poor (Balisacan *et al.* 2003). In India, states with lower literacy rates, higher landlessness and higher infant mortality rates benefit less from non-farm growth (Ravallion and Datt 2002). Strong correlations among poverty, technology adoption, irrigation, agricultural productivity, education, road density, electricity and non-farm employment growth were also observed (Fan *et al.* 1999). Overall, these observations suggest that policies, quality of institutions and access of the rural population to infrastructure, credit, land and human capital are robust predictors of income and poverty.

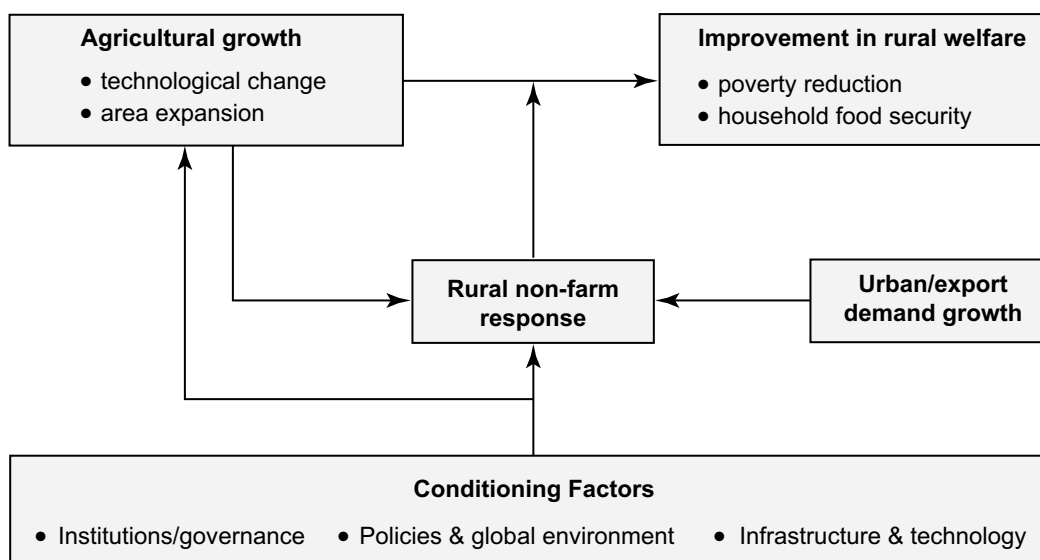
Evidently, the nature of growth and not just its speed matters to poverty reduction. In this regard, the quality of growth has to be made more broadly based than it has been for a number of Asian countries. Agricultural and rural development is key to achieving broadly based growth.

### **Why agricultural growth matters**

As pointed out earlier, the majority of Asia's poor live in rural areas and depend on agriculture. Thus, growth in agriculture reduces poverty and food insecurity directly by augmenting farm incomes. If broadly based, this growth stimulates rural non-farm activities through demand and supply linkages, thereby increasing employment opportunities and providing enduring sources of poverty reduction.

The response of the rural non-farm sector to the stimulus of agricultural growth hinges on certain "conditioning factors", which for present purposes can be broadly grouped into: (1) infrastructure, broadly defined; (2) policies and the global environment for trade and finance; and (3) institutions. This is illustrated in Figure 1. In what follows, the paper examines the linkages shown in the figure as gleaned from the Asian experience and from results of recent empirical work.

The pace of agricultural growth in the developing countries of Asia is quite varied (Table 4). During the past two decades, agricultural growth was remarkably rapid in China, where overall growth



**Figure 1. Agricultural growth and rural welfare outcomes**

and poverty reduction were also very impressive by international standards. This was not quite so in the Philippines and South Asian countries (except India), especially if one takes into account their much higher population growth. The Mekong countries (save for Cambodia) experienced equally robust agricultural growth, which accounted for nearly half of GDP growth.

#### *Sources of productivity growth*

Productivity growth brought about primarily by investment in research and development (R&D) and good governance is key to sustained production growth. Total factor productivity (TFP) growth accounted for two-thirds of China's agricultural output growth in 1972-95. This was driven by investments in infrastructure, irrigation and research, especially during the latter half of the period when the effects of institutional reforms were already exhausted (Rosegrant and Hazell 2000). TFP growth was likewise determined by changes in these spending items in India. Its contribution to agricultural growth declined though from 42 percent in 1975-80 to 30 percent in 1986-90 (Desai 1994; Desai and Namboodiri 1997) as resources were allocated more to input subsidies. By itself, public spending on research and extension accounted for 70 percent of India's TFP growth (Evenson *et al.* 1999).

In the Philippines, Thailand and Indonesia, factor accumulation played a major role in output growth, with fertilizers accounting for 14 to 20 percent; irrigated land, 10 to 16 percent; and labour, 9 to 15 percent (Mundlak *et al.* 2002). Physical infrastructure (represented by roads) and human capital (represented by schooling and infant mortality) were equally important, each accounting for 10 to 15 percent of growth in agricultural output. Notably, the slowdown in agricultural growth in the Philippines (from 3.8 percent in 1961-80 to 1.4 percent in 1980-98) was largely driven by a drastic fall in TFP growth from 0.98 to 0.13 percent (Mundlak *et al.* 2002).

**Table 4. Contribution of agriculture to GDP growth, 1990-2001**

Region/Country	Average GDP growth rate (%)	Average agriculture growth rate (%)	Contribution of agriculture to GDP growth (%)
<b>East Asia and the Pacific</b>			
Cambodia	5.02	2.00	19.03
China	9.37	4.08	8.73
Indonesia	4.71	1.94	7.11
Lao PDR	6.28	4.97	44.13
Malaysia	6.76	0.44	0.81
Myanmar	7.05	5.65	47.88
Philippines	2.94	1.84	12.26
Republic of Korea	6.22	1.58	1.55
Thailand	4.93	1.00	2.27
Viet Nam	7.32	3.87	15.44
<b>South Asia</b>			
Bangladesh	4.99	3.78	19.53
India	5.48	3.07	16.05
Nepal	4.99	2.89	24.96
Pakistan	3.89	3.81	25.54
Sri Lanka	4.76	2.09	10.08

**Source:** World Bank, *World Development Indicators 2003*.

#### *Food security performance*

Its falling shares in national income and employment notwithstanding, agriculture continues to be important to developing Asian economies, not only as it fuels industrialization, but more importantly, as it ultimately improves food security and household welfare.

Alongside growth in agricultural output, food supply per capita in Asia rose from 2 200 calories/person/day in 1970 to 2 260 in 1980 and to 2 700 in 2001. This figure increased from 2 030 to almost 3 000 in China in those 30 years. For the rest of East and South Asia, increments were lower but nonetheless significant at around 630 and 340 kcal/person/day, respectively.

If food adequacy is measured at 2 300 kcal per person per day (FAO 1999), then Cambodia and Bangladesh have yet to attain the norm. Republic of Korea and Malaysia had done so before 1970 and China and Indonesia in the early 1980s. Thailand, Viet Nam and Pakistan, although experiencing fluctuations about the standard in the 1980s, have stayed consistently above it since 1992. The Philippines and India breached this adequacy norm only in 1989 but have maintained above-base levels since 1994. Lao People's Democratic Republic achieved 2 300 kcal/person/day only in 1999.

Agricultural growth in Asia was accompanied not only by higher food supplies but also by changes in diet composition, particularly shifts from vegetable to higher-quality animal products. In China, the share of calories from animal sources increased from 6 percent in 1970 to 20 percent in 2001; that of vegetable sources declined from 94 to 80 percent. The corresponding changes for the rest of East and Southeast Asia were from 6 to 9 percent and from 94 to 91 percent of total calorie intake. Within the vegetable group, there was also a shift towards non-cereal products and away from cereal products; the latter's share in calorie intake in South Asia declined from 67 to 61 percent over the period. Notably, these improvements in the quality of diet did not occur or were marginal in the Philippines, Bangladesh and Sri Lanka.

South Asia now relies less on food aid. The quantity of cereals received by Bangladesh, India and Pakistan from donor countries dropped from 3.1 million metric tonnes in 1975 to only about 950 000 metric tonnes in 2001. It appears that at the macro level, availability of food in developing Asian economies has improved. The aggregates, however, gloss over the variations in food entitlements across areas or groups within countries. Stability of household food demand does not automatically follow from availability of total food supply. When economic expansion benefits only certain areas, the consequent demand-pull increase in overall prices may further restrict access to food (and other commodities) of poor households in isolated and backward communities.

The performance of Asian economies in terms of attaining food security also shows up in the nutrition indicators. In China and Indonesia, less than 10 percent of the population is undernourished. The same indicator fell by 10 percentage points in Viet Nam and Thailand during the past decade. By contrast, there has been virtually no progress in Bangladesh, India and Nepal, which suffer from very high proportions of underweight and stunted children (about 50 percent). Much work also has to be done in Cambodia, Lao People's Democratic Republic and the Philippines where a sizeable portion of the population (28 percent on average) is undernourished. In these countries then, performance has been relatively weak not only in abolishing income poverty but also in controlling malnutrition.

Further improving food security and winning the war against poverty require nothing less than broad-based, rapid and sustained economic growth. For developing Asian economies, agricultural and rural development is the key. However, this does not take place in a vacuum. With respect to each agricultural input, the issues of availability, quality, accessibility and affordability, especially by small farmers, need to be addressed. The urgency of addressing them is critical in view of the degradation of the environment, the infeasibility of further land expansion and the deterioration of input "quality" (smaller farm sizes, aging farmers, extreme weather conditions and incidence of new types of pests and diseases). The solution may require prioritization of public expenditure programmes, policy changes and the establishment or strengthening of national and local institutions.

### **Public spending, growth and poverty**

One rationale for public spending is to promote economic efficiency. Left unaddressed, market failures result in suboptimal outcomes. Public goods (e.g. roads) may not be provided or may be insufficiently produced by the market. Individuals have no incentive to pay for such a good voluntarily since each would benefit from its provision regardless of his or her contribution. Additionally, some goods and services require large-scale, long-term, risky investments (e.g. agricultural R&D) that private entities may be unwilling to make.

Public spending is also carried out to stabilize the economy and stimulate output with its multiplier effects on employment and national income. Even in the absence of market failures, public spending may be warranted for equity reasons. Some commodities that possess the characteristics of private goods (i.e. consumption is rival and exclusion is relatively easy) are provided or subsidized by the government to ensure access of the poor to these welfare-improving assets. Education, for example, allows the acquisition of knowledge and skills that increase the productivity of labour – the most basic and often only asset of the poor – and enhances employment opportunities in both farm and non-farm sectors. In agriculture, it enables the adoption of more advanced technologies that bring about higher yields. Furthermore, investment in education has reinforcing effects on poverty through health, nutrition and fertility.

Governments spend on health not only to correct insurance market failures but also to provide affordable medical services. This comes from recognizing that better health (as well as nutrition and sanitation) contributes to productivity and incomes of the poor – for instance, by reducing work hours lost due to illness or by improving one's capacity for learning.

Hazell and Haddad (2001) point to the following benefits that can be derived by the poor from agricultural research: (1) increased own-farm production, providing more output for consumption and sale; (2) greater agricultural employment opportunities and higher wages within the adopting regions; (3) more opportunities for migration; (4) development of the non-farm economy in both rural and urban areas; (5) lower food prices; (6) greater physical and economic access to more nutritious crops crucial to the well-being of the poor, particularly women; and (7) empowerment of the poor by increasing their access to decision-making processes, enhancing their capacity for collective action and reducing their vulnerability to economic shocks via asset accumulation.

The living standards of the poor are also enhanced by infrastructure such as roads, electricity and information and communications technology. Farm-to-market roads, for example, enable the producers to bring their raw agricultural produce to markets in urban areas where their products can command higher prices. Moreover, low transport and communication costs strengthen the employment-creating linkages between agriculture and the rest of the economy. Hence, low transaction costs amplify the response of poverty to agricultural and urban demand growth.

In turn, the employment and income generated by public investments in these various assets enable the poor to invest more in technology, human capital and other resources (e.g. land). Empirical studies have estimated the rates of return on and the poverty effects of these assets although very few have used a comprehensive set of public investment data primarily to assess the impact of various types of government spending on poverty.

Returns to education are typically estimated at 12 percent or more and are highest for primary education in China, Nepal, Thailand, Viet Nam and the Philippines, where social rates of return are also greater than private returns (Psacharopoulos and Patrinos 2002). In Viet Nam, an additional year of formal schooling of the household head raises the relative probability of escaping poverty by about 11 percent (Glewwe *et al.* 2000) while an extra year of primary education increases crop income by about 8 percent of the mean (van de Walle 2000). Household attributes are likewise important in the Philippines where the head's education accounts for 30 percent of the observed variation in household welfare (Balisacan 2003) and in Bangladesh where the spouse's level of education is also important to poverty reduction (Wodon 1999). In Indonesia, each primary school constructed per 1 000 children increases the education of those aged 2 to 6 by 0.12 to 0.19 years and wages by 1.5 to 2.7 percent (Duflo 2001). In this country, improvement in human capital proxied by adult literacy reduces poverty principally via growth (Balisacan *et al.* 2003), with the effects of changes in public spending on primary education most strongly felt by the bottom two quintiles (Lanjouw *et al.* 2001). Among public investment variables in rural China, education has the second highest return to agricultural GDP (next to R&D) and the third highest with respect to total rural GDP. It has the largest impact in terms of poverty reduction, with nine persons brought out of poverty per 10 000 yuan of additional investment (Fan *et al.* 2002). A similar analysis for India yields 41 persons out of poverty for an incremental education spending of one million rupees (Fan *et al.* 2000). Non-farm growth in this country is more pro-poor in states with higher female literacy and lower infant mortality rates (Ravallion and Datt 2002).

Infrastructure affects growth positively (Jacoby 2000; Balisacan *et al.* 2003; Fan *et al.* 2002) and improves the welfare of the poor. Assessments of rural road projects show the poorest households deriving substantial benefits although equity impacts are less clear (Jacoby 1998; Jacoby 2000 as cited by Fan *et al.* 2002; Van de Walle and Cratty 2002). In rural China, an additional 10 000 yuan of public spending on roads lifts three persons out of poverty. A 100 billion rupee increase in road investment reduces rural poverty incidence in India by 0.65 percent, with 124 persons raised above the poverty line for every one million rupee of incremental spending (Fan *et al.* 2000). In Indonesia, poverty incidence is also more responsive to growth in provinces that have good roads (Kwon 2000). In Viet Nam, households located in communes with paved roads experience larger increases in expenditure during growth years and have a higher probability of escaping poverty than those in areas without paved roads (Glewwe *et al.* 2000).

Access to electricity has a similar impact on growth and welfare. In the Philippines, this accounts for 22 percent of the variance in household welfare (Balisacan 2003). Where public investment in electricity has already been substantial as in India and China, however, marginal returns are already low (Fan *et al.* 1999; Fan *et al.* 2002).

Spending on agricultural R&D not only accounts for a significant share of TFP growth in Asian agriculture (Evenson *et al.* 1999; Evenson and Gollin 2003; Rosegrant and Hazell 2000) but also yields high rates of return (ROR). For China, RORs range from 36 to 90 percent (Fan 2000). Out of 65 studies on the marginal internal rate of return to agricultural research for Asia, 41 showed that it exceeds 50 percent while 20 estimated it between 20 percent and 50 percent (Rosegrant and Hazell 2000). In China, a yuan of public spending on R&D increases agricultural and total rural GDP by about 10 yuan each; additional investment of 10 000 yuan lifts seven persons out of poverty (Fan *et al.* 2002). In India, a million rupees of additional public investment on R&D raises 85 persons above the poverty line through improved agricultural production (Fan *et al.* 2000).

Higher agricultural productivity from irrigation also tends to improve the living standards of the poor (Glewwe *et al.* 2000; Balisacan and Pernia 2003) and so too availability of technology. In Indonesia, a 10 percent improvement in access to technology raises incomes of the poor by around 2 percent (Balisacan *et al.* 2003).

Indicators of investment intensity in agriculture generally reveal decreases over the past 20 years (Table 5). For the entire region, public spending on agriculture as a percentage of agricultural GDP declined from 10 percent in 1980 to 8 percent in 1998. This is about the same figure posted by both China and India; interestingly, India used to invest twice as intensively as China in 1990. The share of public spending on agriculture to total government spending shows a clearer downward trend: Between 1980 and 1990, it fell for all countries except the Philippines, Republic of Korea and Thailand; between 1990 and 1998, it declined for all countries except China and Myanmar, hence the five percentage point reduction for the entire region.

Estimates of public expenditures on rural areas further highlight the important role of government spending on growth and poverty reduction. In rural China, public spending on irrigation expanded at an annual rate of 12 percent between 1953 and 1997 (Table 6). This together with agricultural R&D accounted for 25 percent of total government spending on rural areas. China also made huge

**Table 5. Intensity of public spending on agriculture**

	Total agri. expenditures, in 1995 PPP dollars (billions)			Agri. expenditures in total government expenditures (%)			Agri. GVA in GDP (%)		
	1980	1990	1998	1980	1990	1998	1980	1990	1998
Bangladesh	0.73	1.60	2.87	13.0	12.0	11.9	49.6	29.4	24.5
China	24.00	28.91	57.53	12.2	10.0	10.7	30.1	27.0	18.6
India	26.01	44.51	43.52	27.8	20.7	14.5	38.6	31.3	27.7
Indonesia	4.91	5.82	6.98	10.8	8.3	7.2	24.0	20.4	18.1
Malaysia	1.55	2.25	1.33	8.7	6.7	3.4	22.6	15.2	12.6
Myanmar	1.41	0.64	0.77	23.6	9.3	14.4	46.5	57.3	59.0
Nepal	0.27	0.27	0.29	16.1	8.4	6.1	61.8	51.6	39.9
Philippines	1.52	2.95	3.22	6.1	6.8	5.8	25.1	21.9	16.9
Rep. of Korea	1.72	6.51	10.57	5.6	9.5	8.1	14.8	8.5	4.9
Sri Lanka	3.00	0.62	0.69	28.6	5.7	4.8	27.6	26.3	21.1
Thailand	2.09	3.60	4.83	9.7	10.4	7.5	23.2	12.5	12.7

Sources: Fan and Rao (2003), Tables 1 and 3; World Bank, *World Development Indicators 2002*.



**Table 6. Public spending in rural China, 1953-97**  
(millions of 1990 yuan)

Year	R&D	Irrigation	Education	Roads	Power	Communication
1953	17	177	2 584	194	3	18
1955	55	530	2 490	224	13	26
1960	770	5 291	6 314	510	78	193
1965	584	2 520	4 405	424	136	110
1970	657	3 416	3 060	537	287	156
1975	883	5 859	6 944	572	623	278
1980	1 295	7 457	10 660	693	988	237
1985	1 764	5 183	19 025	1 253	2 565	457
1990	1 625	7 164	25 006	2 559	4 968	1 078
1995	2 267	15 417	34 139	5 673	9 597	7 795
1997	2 170	23 415	41 024	10 700	14 147	9 350
Annual growth rate (%)						
1953-78	19.14	17.55	4.55	5.37	26.85	12.44
1979-89	2.89	(5.26)	9.56	11.01	14.81	13.21
1990-96	4.21	18.43	7.33	22.68	16.13	36.15
1953-96	11.63	11.74	6.48	9.54	20.79	15.28

Source: Fan, Zhang and Zhang (2002), Table 3.1.

education investments, which grew by 6 percent annually. Education's share in total spending thus remained high at 41 percent. Infrastructure – roads, power and communication – accounted for 34 percent of total rural spending, up from only 7 percent in 1953. Electricity investments, in particular, have been substantial. As a result, nearly 100 percent of villages and households had been energized by 1996 (Fan *et al.* 2002). Telecommunications spending grew from 1 billion yuan in 1990 to 9 billion yuan in 1997 and together with private expenditures generated a 600 percent increase in the number of rural telephone sets. Econometric estimates by Fan *et al.* (2002) confirm that such government expenditures contributed to the improvement of irrigation, development of roads, advancement of rural education and communication and increased use of electricity. These in turn enhanced productivity, wages and employment in both the farm and non-farm sectors as well as reduced rural poverty incidence, which is now at less than 5 percent of the population based on official estimates.

Parallel results were obtained from state spending data for India where the bulk of the resources was allocated to development items – i.e. social and economic services (Fan *et al.* 1999). Social services, which include education, health and welfare, composed 47 percent of development spending (and 35 percent of total state spending). The rest went to economic services, comprising agriculture, irrigation, transportation, power and rural development. Welfare and rural development spending posted the highest annual growth rates in 1970-93 although other items also posted respectable growth rates. Agriculture and irrigation spending, in particular, expanded by 6.5 percent and 5 percent per year, respectively. Fan *et al.* (2000) noted that the downward trend in rural poverty from the late 1960s to the late 1980s coincided with the rapid adoption of high-yielding varieties (HYVs) and improved irrigation. These in turn were a direct result of public investment in R&D and extension, infrastructure, irrigation and education.

In the Philippines, public spending on agriculture has not only been inadequate but also misallocated. Government expenditure on R&D, for example, averages only 0.3 percent of GDP; the comparable figures for Malaysia and Thailand are 1.1 percent and 1.6 percent, respectively (David 2003). Long-term, productivity-enhancing types of investments account for less than half of total agriculture

spending. Shares of R&D and infrastructure in 1998 were 8 percent and 5.5 percent, respectively; in comparison, a hefty 19 percent went to land acquisition and distribution. Production support, post-harvest facilities and price stabilization cornered 12 percent of agricultural spending. Irrigation, infrastructure and other developmental projects have also been plagued by corruption, poor quality and design and (the resultant) high maintenance costs. Such weaknesses may have muted the poverty impacts of public investments.

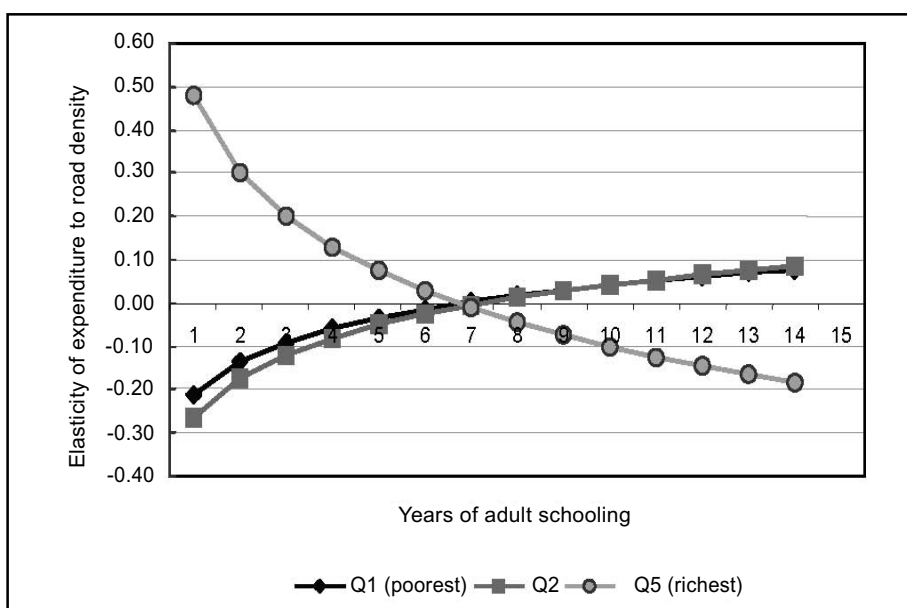
Evidently, countries whose governments spend more on agricultural and rural development obtain larger and more rapid reductions in poverty. It is not only the amount of resources that matters though, but also its allocation. Making effective and efficient investments is even more vital for developing countries where government resources are limited and where comprehensive income taxes are generally not a viable option for redistribution. Bigger gains from public spending in terms of poverty alleviation are derived from long-term, productivity-enhancing investments. Also, whether the benefits of public spending materialize and accrue to the poor ultimately hinges on the efficiency of implementation.

While the existing literature has adequately shown that certain types of assets – and thus public investment in them – are income-augmenting and poverty-reducing, it falls short in addressing the complementarities among these assets. That synergies exist is quite apparent. There may be enough health centres and schools in rural areas, for instance, but the poor may not benefit from these establishments unless there are good roads to make the services offered accessible. In the same manner, distributing land to poor farmers enables them to have command over a major resource, but lack of credit may hinder them from making productive use of it.

Empirical studies validate the importance of asset complementarities. The level of education of the mother, for example, has been found to positively affect the health and nutritional status of children (Skoufias 1999; World Bank 2000; Lanjouw *et al.* 2001). In the Philippines, a year of education increases annual income by about 13 000 pesos on average, but this is augmented by an additional 2 000 pesos if the household has electricity (Barnes 1997 as cited by World Bank 2000). In Indonesia, electricity positively influences the income of the poor through growth, with direct effects clearer for the upper quintiles, implying that some minimum level of income as well as complementary facilities are required to benefit from electricity (Balisacan *et al.* 2003). Rural electrification meanwhile raises the usage of irrigation in Bangladesh and India where poverty incidence has been significantly reduced (Songco 2002).

Balisacan and Pernia (2003), using provincial panel data, found that by itself, the roads variable has a negative coefficient with respect to the income of the poor, suggesting that roads do not typically reach the areas where most of the poor live and where they do, they may exert an adverse impact through factor market, political economy and other processes. But when schooling is interacted with roads – which serve as a proxy for access to markets and social services – the coefficient is positive and significant. In Figure 2, the impact of raising average province-level schooling on returns to roads (in terms of changes in quintile mean expenditures) is shown for the bottom two and top quintiles. The contrast suggests that higher schooling allows the poor to benefit directly from overall road development. Put differently, road access can improve the income of poorer groups provided they have sufficient human capital to take advantage of it.

In Viet Nam, benefits from investments in irrigation are larger for those with higher levels of schooling: An increase in the education level of all adults raises the net marginal effect of irrigation on crop income by 19 percent while an increase in the primary schooling of all adults raises it by 36 percent. Because of this interdependence, the presence of inequalities in education, correlated with levels of living, results in smaller returns to irrigation for the poor. Thus, irrigation investment without a corresponding investment in education may actually increase inequality (Van de Walle 2000).



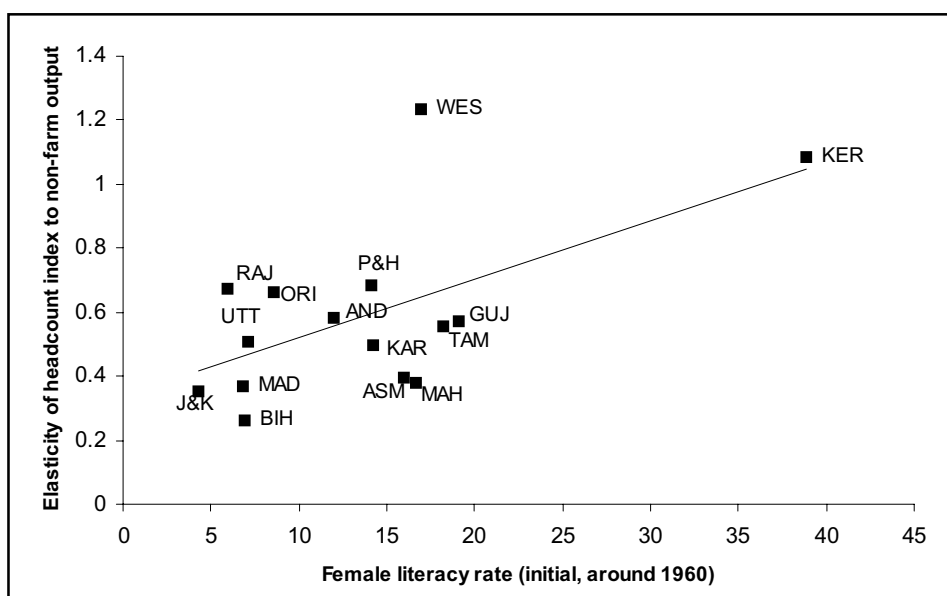
**Figure 2. Schooling and road impact**

Ravallion and Datt (2002), testing an empirical model that allows for multiplicative interactions of the sectoral composition of growth with initial conditions, found that higher initial farm yield, higher initial female literacy rate, lower initial infant mortality rate and lower initial landlessness amplify the responsiveness of state-level poverty measures to non-farm growth in India. Of these variables, literacy (plotted in Figure 3 with each state's headcount elasticity) exhibits the most significant interaction effect with non-agricultural output growth. An illustration was made for the state of Bihar, which had a female literacy rate of 6.9 percent in 1960. If it had Kerala's literacy rate of 38.9 percent, Bihar would have had an absolute elasticity of headcount index to non-farm output per person of 0.79 instead of 0.25.

Thus, the benefits that the poor (as well as the non-poor) can derive from the provision of a certain asset are influenced by initial conditions in other assets. From the viewpoint of public finance, this suggests that in assessing the poverty impact of a specific type of investment or when ranking the returns to various types of investments, these interactions must be accounted for.

Even if the complementarities are addressed by the economic model used, one must additionally be cautious of prescribing the same set of public spending policies to countries or regions within countries. The response of poverty to public investment (and growth) varies significantly across areas and depends on initial conditions. In China, for instance, the marginal returns of public spending are much higher in the western region – where road density, telecommunications access and labour productivity are lowest and illiteracy and poverty rates highest – than in the central and coastal regions (Fan *et al.* 2002).

What is needed then to maximize the poor's benefits from government spending is a prioritization of public expenditure programmes that build on the synergies among different assets and cater to the specific needs of each area or group.



**Figure 3. Absolute elasticities of headcount index to non-farm output and initial female literacy rates, Indian states**

AND = Andhra Pradesh; ASM = Assam; BIH = Bihar; GUJ = Gujarat;  
 J&K = Jammu and Kashmir; KAR = Karnataka; KER = Kerala; MAD = Madhya Pradesh;  
 MAH = Maharashtra; ORI = Orisa; P&H = Punjab and Haryana; RAJ = Rajasthan;  
 TAM = Tamil Nadu; UTT = Uttar Pradesh; WES = West Bengal  
**Source:** Ravallion and Datt (2002).

### **Institutions, policies and rural development**

The prevailing wide disparities in income between rich and poor countries have engendered varied explanations as to the fundamental causes of growth and poverty.

One view maintains the overwhelming role of geography in income determination. Geographical and ecological variables such as climate zone, disease ecology and distance from the coast are held to be strongly correlated with per capita income and other economic and demographic variables (Sachs 2003a). For instance, zones with tropical climates, which are typically weighed down by many infectious diseases and which face special problems of agricultural management, are characterized by low agricultural productivity and levels of income (McArthur and Sachs 2001). Remote regions with few natural resource endowments, high disease prevalence and immobile factors of production are disadvantaged by high transactions costs of trade, tourism, migration and technological diffusion (Sachs 2003b). Indirectly, unfavourable geography apparently leads to even lower levels of welfare if it comes with a “predatory or exploitative government” (Gallup, Sachs and Mellinger 1998).

The second view upholds the preeminent role of institutions in explaining differences in income and welfare, arguing that prosperous countries tend to have good institutions characterized by:

“enforcement of property rights for a broad cross section of society, so that a variety of individuals have incentives to invest and take part in economic life; constraints on the actions of elites, politicians, and other powerful groups, so that these people cannot appropriate the incomes and investments of others or create a highly uneven playing

field; and some degree of equal opportunity for broad segments of society, so that individuals can make investments, especially in human capital, and participate in productive economic activities" (Acemoglu 2003).

Proxied by measures of property rights and the rule of law, the quality of institutions is found to be the only positive and significant determinant of income levels (Rodrik *et al.* 2002)<sup>2</sup>. After controlling for this, geography has at best weak direct effects on incomes though it has a strong indirect effect through the quality of institutions. Likewise, trade or openness (to which the integration view assigns the dominant role) is found to have no direct positive effect on income, but it has an indirect one through institutions. Additionally, institutional quality has a positive and significant effect on integration while the latter also has a positive impact on the former (Rodrik *et al.* 2002). Better governance enhances growth (Kaufmann *et al.* 1999; World Bank 2000), reduces its volatility (Edison 2003) and improves the availability and quality of public services and the extent to which the poor have access to them (Deolalikar *et al.* 2002).

While the importance attached to policies varies, the observed correlation between institutions and policies suggests that sound policies need to be supported by good institutions while weak institutions reduce the likelihood that policies adopted are good and will be effective (Edison 2003). The Asian financial crisis, for example, showed that policies unaccompanied by strong institutions were incapable of preventing the fall in incomes and welfare. In some countries, secure property rights over land cushioned the adverse effects of the crisis.

If there is one point of agreement among the different views, it is that geography, institutions and policies are all interlinked and jointly determine the levels of income and welfare. But what do the above findings suggest for agricultural and rural development?

Where geography is unfavourable, there is even greater need for productivity-enhancing investments in agriculture. Land, the essential factor of production, is immobile. This implies that complementary inputs have to be brought in. Farm output meanwhile has to be transported to the markets. Also, farmers need market information, which is costly to acquire and transmit given the spatial dispersion of agricultural production (Binswanger and Rosenzweig 1986). To improve the welfare of the poor, the necessary transactions costs of trade, migration and technology and information diffusion must be brought down through, for instance, the provision of good rural infrastructure.

Good institutions are even more crucial for agriculture, which is replete with market failures and risks. The seasonality and synchronic timing of operations in agriculture require adequate provision of credit and insurance to small farmers, who are most vulnerable to income shocks. But markets for credit and insurance are least developed in rural areas due to incentive problems, high information costs and the default, yield and price risks associated with agriculture. Moreover, small farmers need to be given secure property rights over land. Insecure tenure creates uncertainties and leads to suboptimal outcomes both for short-term agricultural output and sustainable development. While ownership of land can be the surest way to have access to land, it does not have to be the only way. In fact, with competing uses of land, ownership may not even be affordable. The more important thing though is that property rights are properly defined; that there are regulations pertaining to leasehold and even tenancy arrangements is vital. Institutions addressing these issues must be strengthened to ensure a more level playing field for the poor.

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<sup>2</sup> Rodrik and Subramanian (2003) refer to those that protect property rights and ensure that contracts are enforced as market-creating institutions since, in their absence, markets either do not exist or perform very poorly. Supporting institutions are classified as (1) market regulating – those that deal with externalities, economies of scale and imperfect information (e.g. regulatory agencies); (2) market stabilizing – those that ensure low inflation, minimize macroeconomic volatility and avert financial crises (e.g., central banks, exchange rate regimes and budgetary and fiscal rules); and (3) market legitimizing – those that provide social protection and insurance, involve redistribution, and manage conflict.

Contrary to persistent claims that agricultural supply is not responsive to price incentives, evidence and the Asian experience prove that it is. For instance, relentless pursuit of import-substituting strategies during the 1960s and 1970s and overvaluation of the foreign exchange in most Asian developing countries depressed the domestic price of tradables, including agriculture, relative to non-tradables. This encouraged movement of resources away from agriculture. The premature shift of resources away from agriculture has resulted in the dampening of growth of employment opportunities and output in rural areas. At the same time, real incomes of rural workers fell as demand for commodities they produce decreased. Hence, in terms of policies, efforts towards agricultural development should involve reforming incentives in the agriculture sector and the rest of the economy.

### **Globalization, trading regime and WTO agriculture negotiations**

While geography, domestic policies and institutions play a significant role in promoting pro-poor rural growth, so do the global trading regime for agriculture and the external forces associated with globalization.

Many contend that the twin forces of globalization and agricultural trade liberalization are a bane to the poor in developing countries. The main argument is that developing countries have neither the broad infrastructure nor the institutions to effectively gain from globalization and trade liberalization; that they, in fact, have experienced increases in inequality and poverty.

Recent evidence, however, does not lend support to this contention. Developing country globalizers actually experienced accelerated growth rates, from 2.9 percent per year in the 1970s to 3.5 percent in the 1980s and 5 percent in the 1990s. In contrast, the corresponding per capita GDP growth rates for non-globalizers were 3.3 percent, 0.8 percent and 1.4 percent. The number of poor people in globalizing, developing countries dropped by 120 million between 1993 and 1998 while it increased by 20 million in the non-globalizing developing world. Poverty reduction in rapidly globalizing China and Viet Nam, in particular, is unprecedented in history. The reduction has also been substantial in India (since the late 1980s) and other globalizers in the region. While the Asian financial crisis reduced incomes in the two worst hit countries, namely Indonesia and Thailand, the gains in poverty reduction during the past quarter century of growth and trade liberalization have largely remained intact. Though factors other than integration affect growth, trade openness (expanding agricultural exports, in particular) has nonetheless been shown to contribute to the improvement of overall incomes, which benefits the poor (Dollar and Kraay 2002; World Bank 2001, 2003).

As regards trade and inequality, while there are winners and losers as well as risks associated with globalization, the evidence shows no systematic relationship between the two: Some countries that opened up did experience increases in inequality, others did not. Dollar and Kraay (2002), for instance, found no significant correlation between changes in trade to GDP ratio and changes in the Gini coefficient. A simulation made for globalizers reveals that if trade volumes are increased by 34 percentage points of GDP and inflation is decreased by 12 percentage points, the growth rate of income of the poor would be 2.6 percentage points higher. Of this, 2.2 percentage points are due to increased trade openness, with the bulk coming from growth effects; distribution effects are not significantly different from zero.

Even more fundamental is the additional argument that in practice “free trade” in agriculture is not “fair trade” since the developed countries continue to provide enormous subsidies to their farmers (thereby limiting the access of developing countries to their domestic markets) while the developing countries have taken great strides in fulfilling their part of the bargain (i.e. opening up their domestic markets).

Substantial reductions in tariffs, domestic support and export subsidies have been the main issues tackled in the World Trade Organization (WTO) agriculture negotiations. Adding to work undertaken

since the start of negotiations in early 2000, the November 2001 Doha Ministerial Declaration reconfirmed the objectives of establishing a fair and market-oriented trading system through a programme of fundamental reforms encompassing strengthened rules and specific commitments on support and protection in line with Article 20 of the Agriculture Agreement. The declaration also made non-trade concerns and special and differential (S&D) treatment for developing countries integral to the WTO negotiations, emphasizing that all S&D provisions should enable developing countries to meet their needs, particularly food security and rural development.

While the global trade talks also dwell on non-farm trade, services, dispute settlement and the “Singapore issues” of investment, competition, trade facilitation and government procurement, agriculture is of primary importance to the development promise of the Doha Agenda, given that the majority of the poor work in the sector and that agricultural products are subject to the highest barriers to trade.

Recent World Bank estimates reveal the extent of protection of agriculture in developed countries. About 28 percent of domestic production in OECD countries is protected by tariff rate quotas. Support to producers in these countries in the form of higher domestic prices and direct production subsidies amounted to \$248 billion in 1999-2001, two-thirds of which came from border barriers or market price support mechanisms. Imports from developing countries face tariff peaks as high as 500 percent.

Calls from poor countries for rich countries to eliminate these trade barriers and the latter’s firm stand of keeping them have resulted in a standoff in the agriculture negotiations and the overall failure of the September 2003 Cancun Ministerial Conference, which sought to “take stock of progress in the [Doha Development Agenda] negotiations, provide any necessary political guidance and take decisions as necessary”. No agreement was made on the agriculture negotiations’ modalities – i.e. targets (including numerical ones) and issues related to rules that members are to use in achieving substantial improvements in market access; reduction (and eventual phase-out) of all forms of exports subsidies; and sizeable reductions in trade-distorting domestic support.

The conference, which also welcomed Cambodia and Nepal as the first of the least developed countries to accede to the WTO since its establishment, concluded instead with a ministerial statement, instructing officials to “continue working on outstanding issues with a renewed sense of urgency and purpose”, taking into account all the views expressed in that meeting.

While the Cancun Conference has proven that, collectively, developing countries can make a lot of difference in the outcome of the negotiations (no deal in this case), it has also shown how unrealistic it is to expect developed countries to completely undo their policy of protecting local producers from international competition. Domestic support and export subsidies did not come out of a vacuum but evolved out of changes in the balance of political influence among competing groups in society (farmers, consumers and industrialists) in the course of economic development.

More importantly, both sides apparently have yet to recognize the losses engendered by the status quo. The World Bank (2003) illustrates a scenario where tariff peaks in agriculture are cut back to a maximum of 10 percent for rich countries and 15 percent for poor countries and those in manufacturing scaled down to a maximum of 5 percent for developed countries and 10 percent for developing countries. Combined with elimination of export subsidies, decoupling of all domestic subsidies and the elimination of the use of specific tariffs, tariff rate quotas and anti-dumping duties and sanctions, the global economy would derive \$291 billion in gains – about three-fourths of the total potential gains from full merchandise trade reform. An estimated \$193 billion of this would come from reforms in agriculture and food and the remaining \$98 billion from reforms in manufacturing.

Of the \$291 billion, about \$159 billion would accrue to developing countries. Of this, \$101 billion would come from lowering barriers in agriculture and food and \$58 billion from manufacturing. Eighty percent of the poor countries' gains from freer trade in agriculture would be derived from own reforms while 20 percent would come from reforms in rich countries. It thus appears that reforms even within developing countries have high dividends.

Not only would trade and incomes increase in the above scenario, but more importantly, the number of the poor would substantially decline. Globally, the number of persons living on less than \$2 a day would fall by 144 million. In East Asia and the Pacific, the reduction would be no less than 40 million; in South Asia, it would be no less than 10 million.

Clearly, the benefits of open and non-discriminatory multilateral trading systems are so enormous that for developing countries to withdraw from future agriculture negotiations or put back protectionist trade measures would be a big mistake. Their economies depend heavily on their export markets, and the linkages between agriculture and the rest of the economy cannot be overemphasized. Moreover, freer trade regimes and better government focus on support services will allow more efficient resource allocation among and within sectors of these economies, thereby providing an enduring foundation for sustained rural growth, food security and poverty reduction.

Regional blocks and/or bilateral trade agreements meanwhile are poor substitutes for a multilateral trade arrangement. Realizing that it is important to continue working towards an ideal world trade framework, what is needed in future negotiations is a practical approach that recognizes the reality of political and economic constraints to domestic policy reform. Proposals, for example, for a complete elimination of agricultural subsidies in developed countries are not credible and feasible.

### **Concluding remarks**

In many countries in Asia, domestic policies and institutions constrain efficiency and raise the "cost of doing business" in agriculture, thus blunting productivity growth and eroding competitiveness in the global marketplace. Liberalizing agricultural trade enhances the welfare of the poor, especially the landless workers and urban consumers, although the short-term cost to the sector in terms of reduced incomes and labour displacement may be quite substantial. However, if this is combined with public investment in productivity-enhancing support services (particularly R&D and irrigation), agricultural trade liberalization is likely to be a win-win proposition.

In addressing today's pressing issues vis-à-vis poverty and food insecurity, it is important not to lose sight of the key lessons in agricultural growth and development in Asia in the past half-century. One such powerful lesson has to do with enabling the rural poor through policy, investment and institutional reforms that enhance the efficiency of domestic markets and provide improved access to technology, infrastructure and education. This enabling environment allows rural growth benefits to be broadly based, thereby enhancing overall nutrition, human capital development and productivity and economic growth in the medium to long term. Almost invariably, the successful cases of rural development and poverty reduction are characterized by tenacity in the pursuit of efficiency-enhancing reforms. The key driver to these reforms has been neither globalization nor agricultural policy in developed countries. Rather, it is largely the internal realization that reforms are for the benefit of the country and its citizens.

Globalization has its downsides but it also offers potentially enormous benefits. Many developing country globalizers have shown that the benefits more than outweigh the costs; for example, the speed of poverty reduction is unprecedented in China, Viet Nam and India. The challenge for most countries in the region is to find the appropriate mix of policies and institutions needed to exploit the benefits while being on guard of the costs. Fortunately for agriculture and the rural sector, the key policy and governance reforms required for improved efficiency (i.e. increased productivity and income) – enhancing economic competition, investing in efficiency-enhancing infrastructure and



support services and enabling institutions to efficiently respond to changes in economic landscape – are largely compatible with globalization as well.

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# China's agricultural research system and reforms: challenges and implications for developing countries

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The expansion of real output of China's food and agriculture sector ranks as one of the nation's great achievements. Publicly funded agricultural research has been key to the impressive performance (Huang *et al.* 2003). Expenditures grew rapidly from the early 1960s to the mid-1980s, and the number of agricultural researchers increased throughout (Fan and Pardey 1992). The rising research investment resulted in a steady stream of productivity-increasing technology.

China was the first nation to extend semi-dwarf rice varieties and drought- and pest-resistant wheat cultivars in the 1950s (Stone 1988). Its scientists also developed hybrid rice in the early 1970s and a number of successful varieties in the 1970s and 1980s. Several studies conducted by the Chinese Academy of Agricultural Sciences (CAAS) show that technology contributed more than 40 percent of agricultural growth (Zhu 1997). Recent studies on agricultural total factor productivity (TFP) further confirm that agricultural productivity growth has mainly come from technology changes, including the expansion of high-yielding varieties (HYVs), other embodied input technology and improvement in farming systems (Huang *et al.* 2000; Fan and Pardey 1997; Jin *et al.* 2002). The major output of agricultural research – improved varieties and farming system management – has come from national, provincial and prefectural institutes as well as from agricultural universities (Huang *et al.* 2003).

There is concern, however, that the research system might have weakened after the late 1980s. The overall funding for agriculture research stagnated between 1985 to 1995 (Huang and Hu 2000). The long lag time between agricultural research expenditure and benefits mean that the adverse effects of spending slowdowns only become evident five or ten years later. This may partially explain the lower crop growth rates, particularly of grain yields, in the late 1990s and over the last three years.

On the other hand, the future demands on agricultural research in China will be substantial. The country has less than 10 percent of the world's arable land and one-fourth of world per capita water availability, but feeds more than 20 percent of the world's population. To keep pace with increased demands from projected population increases, food production in China will have to increase continually (Huang *et al.* 1999; World Bank 1997). Given the limitations on arable land, productivity increases will have to be the primary source of increases in output (Nyberg and Rozelle 1999).

To maintain higher food self-sufficiency levels, policy-makers tried to raise funding for agricultural research by shifting financial support from institutional support to competitive grants, moving more funds from basic research to research aimed at solving the problems of economic development and encouraging research institutes to be self-sufficient by selling their technology (Rozelle *et al.* 1997). However, these policies have given rise to several questions. Can China's public agricultural research financing maintain a strong agricultural research system? How can China manage the

commercialization of agricultural research? What is the role of the private sector in generating and providing agricultural technologies for farmers? What kinds of reforms are necessary to improve the efficiency of agricultural research?

Answers to these questions are critical to policy-makers, producers and the agricultural industry in China. The lessons and experiences of China with its agricultural research policies are also expected to have significant implications for developing countries, many of which face similar financing and institutional problems. The study attempts to shed some light on the questions listed above.

The paper is organized as follows. In the next section, the paper reviews the existing structure of the agricultural research system. The trends and structure of agricultural research financing and revenues are then examined and current reforms and policies subsequently discussed. The final section provides the conclusions, the policy recommendations for China's Government and the implications for other developing countries.

### **Agricultural research institutions: an overview**

#### *Public funding*

Agricultural research in China is overwhelmingly financed and undertaken by the public sector; private sector-led agricultural research is minimal. In 1999, the public research system comprised over 1 600 research institutes and more than 130 000 staff employees (Table 1), plus about 55 000 retirees who are dependent on research institute budgets for their pensions. Public agricultural researches are conducted in agricultural research institutes (i.e. the mainstream agricultural research system or MARS), universities and non-agricultural research institutes. MARS personnel accounted for 83 percent of the total number in 1999; the rest was about equally distributed among the universities and research systems under other ministries. It is estimated that the number of research personnel from the private sector engaged in agricultural research is no more than 500 (Pray 1998). Research expenditure of the private sector is only about 1.7 percent of the nation's total agricultural research budget.

**Table 1. Number of institutes and staff size of the public agricultural research system in China in 1999**

	Total	Univer- sity <sup>a</sup>	Others <sup>b</sup>	MARS			
				Sub-total	National	Provincial	Prefecture
No. of institutes	1 635	312	104	1 219	56	451	712
No. of personnel	131 439	10 200	12 457	108 782	10 706	51 609	46 467
No. of personnel per institute	80	33	120	89	191	114	65
Staff shares (%)	100	8	9	83	8	39	35
				(100) <sup>c</sup>	(10)	(47)	(43)

**Source:** Authors' survey; database from the Ministry of Sciences and Technology.

<sup>a</sup> Under universities, agricultural research staff consists of professors or lecturers who have research projects in agriculture-related fields. The numbers in the other columns include all professional and support (and other) staff working in and/or supported by the institutes.

<sup>b</sup> Others include those not working under the mainstream agricultural research system (MARS) or universities (i.e. Chinese Academy of Sciences).

<sup>c</sup> The numbers in parentheses are the staff shares (in percent) within MARS.

## Decentralization

Ninety-five percent of the research centres and more than 85 percent of research staff within MARS are found in subnational levels. Provincial and prefectural agricultural research institutes number 451 and 712, respectively (Table 1). National level research institutes accounted for only 10 percent of personnel in 1999 or about 8 percent of China's total number. Each province has its own provincial academy of agricultural sciences, at least one agricultural university and several other agriculture-related colleges at the provincial and prefectural levels. Most prefectures have their own agricultural research institute.

All core budgets of research institutes at provincial and prefectural levels are funded by the corresponding local governments. Research projects conducted at the provincial and prefectural institutes are financed mainly by local governments. In terms of budget allocation, national level institutes within MARS account for only 12 percent of China's agricultural research budget (Table 2). Provincial and prefectural institutes account for 51 percent and 34 percent, respectively. The budget per personnel at the national research institutes (77 000 yuan/personnel) is higher than those at the provincial (54 000 yuan/personnel) and prefectural levels (40 000 yuan/personnel).

## Staffing

Agricultural research in China is primarily built around the research institutes of the CAAS, provincial and prefectural academies and, to a lesser extent, the agricultural university research system.<sup>1</sup> Researchers in the universities account for only 8 percent of the total agricultural research staff while consuming 7 percent of the budget (Table 2). Overstaffing in agricultural research institutes and an underfunded agricultural research system may partially explain the underutilization of human resources in universities.

**Table 2. Total revenue of the public agricultural research system in China in 1999**

	Total	Univer- sity	Others <sup>a</sup>	MARS			
				Sub-total	National	Provincial	Prefectural
Total revenue (million yuan)	6 846	478	889	5 479	827	2 772	1 880
Revenue per institute (thousand yuan)	4 187	1 532	8 548	4 495	14 768	6 146	2 640
Revenue per staff (thousand yuan)	52	47	71	50	77	54	40
Revenue shares (%)	100	7	13	80 (100) <sup>b</sup>	12 (15)	40 (51)	27 (34)

**Source:** Authors' survey; database from the Ministry of Science and Technology.

<sup>a</sup> This category includes agricultural research institutes outside of the mainstream agricultural research system (MARS) and universities (i.e. Chinese Academy of Sciences).

<sup>b</sup> Numbers in parentheses are the revenue shares (%) within MARS.

<sup>1</sup> There are five major agricultural academies at the national level. They are the CAAS, the Chinese Academy of Fishery (CAFi), South China's Academy of Tropic Plants (CATP) under the MOA, the Chinese Academy of Forestry (CAFo) under the State Forest Bureau and the Chinese Academy of Agricultural Mechanization (CAAM) under both the State Machinery Bureau and the MOA. The CAAS is the largest in terms of staff and budget. In this paper, our discussions focus mainly on the CAAS, but policies and issues raised here can be equally applied to the rest of the national agricultural research system.

### *Research orientation*

Food security has been one of the central goals of China's national policy since the 1950s. Basic staples, particularly grains, had been the priority of research programmes in the 1960s and 1970s. The country's rising income has resulted in changes in diet, with demand for non-staple food increasing since the 1980s. Corresponding to these changes, the structure of agriculture has gradually moved towards non-staple crops, livestock and other agricultural products. Even with these changes in the agricultural production structure, however, about 68 percent of the research budget is still allocated to crops and only 18 percent to livestock (Huang *et al.* 2003).<sup>2</sup> These rates have been nearly constant over the last two decades. Because a large part of income of the poor comes from crop production, the crop-oriented public research system (i.e. the "pro-poor" system) contributes to both food security and poverty alleviation objectives.

## **Challenges**

### *Lack of institutional coordination*

A decentralized research system has potential merits as it could easily prioritize research programmes to meet local farmers' needs and develop appropriate technologies for specific environments. But there are also several disadvantages associated with this system. Low coordination among institutes can lead to duplication of research activities among regions, which may lower the overall efficiency of the country's research investments. Also, given the financial constraints of many less developed areas in China, the decentralized system may have significant implications for agricultural technology and farmers' incomes in poor areas. Inefficient resource allocation can easily result from management conflicts as well as from similarities of research priority settings between central and local governments, among various ministries (at the central government) or bureaus (at local government) within the same jurisdiction and among local research institutes in similar regions.

### *Overstaffing*

The inordinately large number of unqualified researchers together with lack of research funding is the dilemma that China's agricultural research system faces. Among the 130 000 personnel, about 70 000 are categorized as "active research" staff. In the absence of a national pension system, China's agricultural research also supports more than 55 000 retirees through the institutes' budgets. The number of active researchers is about three times that of the United States of America and the former Soviet Union (Table 3). This comparison does not intend to measure the research capacity but to highlight the fundamental problems in China's research system – namely, overstaffing and the employment of a large number of unqualified researchers. Table 3 also shows that China's number of agricultural researchers per million US dollar of agricultural GDP is higher than all the other countries except East Germany.

Such a resource distribution pattern is characteristic of the socialist economy regime. In the socialist economy, the strategy in resource allocation is to replace scarce capital with human resources paid depressed wages. With the transition from planned to a more market-oriented economy, the original wage level has lagged far behind the expectations of agricultural researchers. Consequently, agricultural researchers have shifted to other sectors as evidenced by the recent decline in their number.

### *Excess burdens*

The research institutes in China support a large proportion of retired staff. It is estimated that the ratio of working staff to retired staff has increased from 4:1 in the early 1980s to about 2:1 in 1999.

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<sup>2</sup> This is based on the authors' surveys of over 1 200 agricultural research institutes under MARS.



**Table 3. International comparisons of the number of agricultural scientists**

	Number of active researchers				Number of agri. researchers per million US\$ of agri. GDP
	Public agri. research institutes	Universities	Privates ector	Total number	
China (1999)	59 058	10 200	500	69 758	0.40 0.69*
India (1987)	4 052	5 800	600	10 452	0.16
Brazil (1995)	2 097	965	266	3 328	0.05
Argentina (1995)	1 051	61	110	1 222	0.07
Columbia (1995)	524	17	318	859	0.08
Mexico (1995)	1 365	464	901	2 370	0.14
Chile (1995)	189	50	13	252	0.05
USSR (1991)	23 144	0	0	23 144	0.46
East Germany (1989) (1995)	6 200	1 350	0	7 550	0.72 0.12
West Germany (1989) (1995)	1 300	2 410	404	4 114	0.16 0.15
Japan (1986)	11 154	3 605	8 850	23 609	0.13
United States of America (1991)	3 687	7 525	14 188	25 400	0.14

**Source:** Pray and Umali (1998); Huang *et al.* (2003); authors' survey.

\* Refers to total staff instead of to active research staff.

For the 1 219 agricultural research institutes under MARS, retirees comprise 49 percent of the existing staff. Because core funding from the government has not been raised enough to cover the requirements of the wage and pension system, an increasing portion of a research institute's budget is allocated to the payment of retired staff. For example, in the case of the CAAS, a fifth of the academy's budget – or 32 percent of the academy's core funding – is on average spent on about 4 600 retirees (58 percent of working staff). In other research institutes such as the Institute of Crop Breeding and Cultivation and the Institute of Vegetable Crops and Flowers, payments made to retirees account for almost the entire core funding allotted to these establishments.

### **Agricultural research financing**

Agricultural research financing has been undergoing fundamental changes since the 1980s. Before the research reforms initiated in the mid-1980s, the government provided all of the funding for research. Planners allocated most of the funds through five-year plans with supplementary funding given for special issues arising during the planning period. The former State Science and Technology Commission (SSTC), which became the Ministry of Sciences and Technology (MOST) in 1998, together with the Ministry of Agriculture (MOA) and other ministries wrote the research component of these plans with assistance from special committees made up primarily of senior scientists from various disciplines. Most of the funds were then allocated on a formula basis to research institutes found mostly at the national levels. A similar funding mechanism was followed at the provincial and prefectural levels.

There has been a gradual shift from formula-based financing to competitive grants. Lack of funding to maintain operations has pushed agricultural research institutes to generate revenue from commercial activities, which now accounts for 41 percent of the total budget.<sup>3</sup> The government

<sup>3</sup> Surveys show that only about 5 to 15 percent of commercial income of agricultural research institutes is invested in research projects. The rest is allotted to salaries and bonuses of research institutes' employees, most of whom work on commercial activities.

**Table 4. China's agricultural research investment in the public research system, 1985-1999**

Year	At current prices (million yuan)			At 1998 prices (million yuan)		
	Total	Fiscal	Commercial	Total	Fiscal	Commercial
1985	1 355	1 015	203	3 923	2 939	588
1986	1 346	958	200	3 676	2 617	546
1987	1 403	948	269	3 572	2 413	685
1988	1 782	1 189	366	3 827	2 554	786
1989	2 095	1 400	402	3 820	2 553	733
1990	2 050	1 243	499	3 661	2 220	891
1991	2 381	1 283	655	4 133	2 227	1 137
1992	2 761	1 442	840	4 548	2 375	1 384
1993	3 273	1 558	1 077	4 763	2 267	1 567
1994	4 409	2 072	1 322	5 272	2 478	1 581
1995	4 856	2 441	1 541	5 058	2 543	1 605
1996	5 238	2 754	1 580	5 143	2 704	1 551
1997	5 377	2 789	1 588	5 237	2 717	1 547
1998	5 847	3 060	1 687	5 847	3 060	1 687
1999	6 368	3 358	1 810	6 565	3 462	1 866
Annual growth rate (%)						
1985-95	13.3	8.4	21.8	3.6	-1.3	12.1
1996-99	6.5	7.4	3.9	6.5	7.4	3.9
1985-99	12.5	9.6	17.6	4.0	1.1	9.1

**Source:** Ministry of Sciences and Technology.

fiscal budget accounted for only about 50 percent of the budget of institutes by the late 1990s (Table 4).

#### *Trends in agricultural research investment*

China's agricultural research system has remarkably expanded in the past five decades. The rapid growth of the agricultural research system has benefited from unrelenting efforts of the government. Expenditure for agricultural research grew by 13.5 percent annually in real terms between 1976 and 1985 (Huang *et al.* 1999). From the mid-1980s to the mid-1990s, however, government investment in agricultural research did not increase and even declined in many years (Table 4). This raised concern over China's ability to meet the growing demand for agricultural products resulting from rapid economic growth. To make up for the slow growth and even decline in agricultural research spending after the mid-1980s, China restarted its growth in public investment in agricultural research after the mid-1990s.

Following is a brief summary of the trends:

#### 1. Slow growth of total agricultural research investment

Total investment (including government fiscal expenditure and research institutes' commercial income) in agricultural research<sup>4</sup> grew from 1 355 million yuan in 1985 to 6 368 million yuan (current prices) in 1999, representing an increase of about four times the original figure (Table 4). However, measured at the real value (i.e. deflated by the general price index), the annual growth rate was only

<sup>4</sup> Includes agriculture, forestry, animal husbandry, water conservation and agricultural services.

3.6 percent in 1985-1995 or about 4 percent in 1985-1999; these rates fell below the growth rate of agricultural GDP, which exceeded 4 percent in the corresponding periods.

## 2. Resumption of fiscal expenditure growth after the mid-1990s

Table 4 shows that fiscal spending on agricultural research declined in real terms in 1985-1995. Annual growth rate was -1.3 percent. Growth resumed at a rate of 7.4 percent annually in 1996-1999 (Table 4). Recent interviews with officials from the Ministry of Finance (MOF) revealed that the annual growth rate of agricultural research expenditure had exceeded 10 percent in 2000-2003.

## 3. Rising commercial income with declining growth rate

Non-government fiscal investment or income generated by research institutes from commercial activities – a major source of research institutes' revenues from 1985 to 1993 – declined drastically after 1993 (Table 4). While annual growth rate reached 12.1 percent in 1985-1995, it fell to 3.9 percent in 1996-1999.

### *Intensity of agricultural research investment*

Internationally, agricultural research investment intensity (i.e. agricultural research investment expressed as a percentage of agricultural GDP) is often used to gauge the level of investment in agricultural research. Table 5 shows that this indicator declined for China during the period of 1985-1996 and resumed growth only recently.

**Table 5. Intensity of investment in agricultural research and technical extension service in China, 1985-99 (%)**

Year	Agricultural research			Agricultural technical extension
	Government fiscal expenditure	Commercial income and others	Total	
1985	0.40	0.13	0.53	n.a.
1986	0.35	0.14	0.49	0.41
1987	0.30	0.14	0.44	0.40
1988	0.31	0.15	0.47	0.37
1989	0.33	0.16	0.50	0.36
1990	0.25	0.16	0.41	0.33
1991	0.24	0.21	0.45	0.34
1992	0.25	0.23	0.48	0.34
1993	0.23	0.25	0.48	0.32
1994	0.22	0.25	0.47	0.30
1995	0.20	0.20	0.40	0.27
1996	0.20	0.18	0.38	0.29
1997	0.20	0.18	0.38	0.31
1998	0.21	0.19	0.40	0.42
1999	0.23	0.21	0.44	0.46

**Source:** Ministry of Finance; Agricultural Policy Research Centre, Chinese Academy of Agricultural Sciences.

Based on government budgetary allocations for agricultural research (excluding income generated by research institutes through commercial activities), the percentage dropped from 0.40 percent in 1985 to 0.20 to 0.23 percent in the late 1990s. If income generated by research institutes and investment in agricultural research by foreign companies and private enterprises are included the analysis, investment intensity in agricultural research still amounted to only 0.44 percent by 1999.

**Table 6. Intensity of agricultural research investment in the mid-1990s**

Regions/countries	Investment intensity (%)			Share (%)	
	Gov't.	Non-gov't.	Total	Gov't.	Non-gov't.
Mainland China (1999)	0.23	0.22 <sup>a</sup>	0.45	51.1	48.9
Taiwan Province of China	4.65	n.a.	n.a.	n.a.	n.a.
Other Asian countries					
India	0.37	0.06	0.43	86.0	14.0
Malaysia	0.58	0.15	0.73	79.5	20.5
Thailand	0.69	0.10	0.79	87.3	12.7
Indonesia	0.24	0.02	0.25	96.8	7.2
Pakistan	0.47	0.02	0.49	95.9	4.1
Latin America					
Argentina	0.82	0.05	0.88	94.3	5.7
Brazil	0.83	0.12	0.95	87.4	12.6
Chile	0.64	0.05	0.69	92.8	7.2
Columbia	0.26	0.15	0.41	63.4	33.6
Mexico	0.36	0.28	0.64	56.3	43.7
Peru	0.76	0.14	0.91	83.5	16.5
Venezuela	0.82	0.08	0.90	91.1	8.9
Developed countries					
Japan	2.1	2.22	4.32	48.6	51.4
Australia	3.54	1.54	5.08	69.7	30.3
United Kingdom	2.29	3.80	6.09	37.8	62.2
France	2.24	2.52	4.76	47.1	52.9
Germany	1.88	2.66	4.54	41.4	58.6
United States of America	2.02	2.34	4.36	46.3	53.7
16 high-income countries <sup>b</sup>	2.37	1.86	4.23	56.0	44.0

**Source:** Rozelle, Huang and Pray (forthcoming); Pray and Umali (1998).

<sup>a</sup> The figures refer to private investment (0.01) and income generated from development activities by research institutes (0.21).

<sup>b</sup> The figures for the 16 high-income countries are based on data from the late 1980s.

This remains as one of the lowest investment intensities in the world, particularly among developing countries (Table 6).

#### *Investment in biotechnology research*

China considers agricultural biotechnology as one of the primary measures by which the country can improve national food security, raise agricultural productivity and secure its competitive position in international agricultural markets. To achieve these goals, China has been immensely improving the innovation capacity of its national biotechnology programmes since the early 1980s. In contrast to the stagnation or even declining trends of public agricultural research staffing and expenditure in 1985-95, the number of plant biotechnology researchers more than tripled in the past two decades.<sup>5</sup> It is estimated that there were already about 2 700 researchers (including support staff) working on plant biotechnology by 2003 (Table 7). If the animal sector is included, the number of agricultural biotechnology researchers may be more than 4 000, probably among the largest in the world.

<sup>5</sup> This is based on a survey of 29 research institutes in plant biotechnology in 2000, interviews with the ministries and research institutes in 2002 and the most recent research institute survey in 2004.

**Table 7. Estimated size of research staff and annual expenditure on plant biotechnology research in China, 1986-2003\***

Year	Staff	Research expenditure		
		Million RMB at current prices	Million RMB at 2000 prices	Million US\$
1986	740	14	38	4.2
1990	1 067	40	68	8.3
1995	1 447	88	87	10.5
2000	2 128	322	322	38.9
2003	2 690	462	463	55.9

**Source:** Huang *et al.* (2004).

\* Expenditures include both project grants and costs related to equipment and building.

The growth in agricultural biotechnology research investment in the public sector has been substantial. The estimated investment in plant biotechnology research was only US\$4.2 million in 1986 when China formally started its “863 Plan” (Table 7). The investment grew to US\$8.3 million in 1990, US\$10.5 million in 1995 and US\$38.9 million in 2000. The increase in 1995-2000 represents an annual growth rate of about 30 percent. Investment in plant biotechnology research continued to grow in the first few years of the 21<sup>st</sup> century. Spending on plant biotechnology reached US\$55.9 million in 2003 or about 44 percent higher than that in 2000. Nearly all investment in biotechnology in China comes from government sources (Huang *et al.* 2002).

Bt cotton is one of the most often cited examples of progress in agricultural biotechnology in China. In addition, other transgenic plants with resistance to insects, disease or herbicides and plants of improved quality have been approved for field release. Some of them are nearly ready for commercialization. These include:

- transgenic cotton lines resistant to fungal disease;
- rice resistant to rice stem borer or bacteria blight, diseases and herbicides;
- wheat resistant to barley yellow dwarf virus;
- maize resistant to insects and with improved quality;
- poplar tree resistant to Gypsy moth;
- soybeans resistant to herbicides; and
- transgenic potato resistant to bacterial disease or Colorado beetle (Huang *et al.* 2004).

From 1997 to 2003, the National Agricultural Biosafety Committee received a total of 1 044 (821) cases of GMOs (GM plants) for field trials, environmental release, preproduction and commercialization, of which 777 (585) cases were approved. Eighteen transgenic cotton varieties generated by Chinese institutions and five varieties from Monsanto with resistance to bollworm were approved for commercialization in China in 1997-2002. While several GM varieties of tomato, sweet pepper, chili pepper and petunia have also been approved for commercialization since 1997, the areas under these four crops are very small.

#### *Challenges ahead*

While there has been increasing investment in agricultural research since the mid-1990s, China is still underinvested in this area. An insufficient research budget may severely affect the stability of the country’s research system as well as the enthusiasm of researchers. Based on interviews, the time spent on research activities by agricultural researchers has dropped from 74 percent in 1985 to about 50 percent in the late 1990s.

Improvement of agricultural research capacity is the other challenge that China has to hurdle. For the country as a whole, Ph.D. degree holders averaged only 0.57 for every 100 agricultural research personnel in 1999 (Table 8). The percentage of researchers with doctoral degrees differed largely among research institutes. It was 2.84 percent for national research institutes in 1999 and 0.58 percent for provincial research institutes. Although prefectural research institutes employed more than 46 000 people, only 12 researchers held Ph.D. degrees (or 0.03 percent of the total) in 1999. A similar pattern held for researchers with M.Sc. degrees (Table 8).

**Table 8. Agricultural research staff by education and position in national and local research institutes under MARS in 1999**

	Total Number	Ph.D.	M.Sc.	B.Sc.	Professor + associate professor	Senior research assistant
Total	108 782	615	2 871	22 323	11 816	19 747
National	10 706	304	754	2 805	1 763	2 244
Provincial	51 609	299	1 836	11 374	6 572	9 426
Prefecture	46 467	12	281	8 144	3 481	8 077
As percentage of total staff (%)						
Total		0.57	2.6	21	11	18
National		2.84	7.0	26	16	21
Provincial		0.58	3.6	22	13	18
Prefecture		0.03	0.6	18	7	17

**Source:** Ministry of Science and Technology.

The need to beef up research capacity is as urgent for the less developed regions under China's highly decentralized research system. While the decentralized system has its own merits, it may also present some constraints to agricultural productivity growth, food security and poverty alleviation in poor areas as local ability to invest in agricultural research depends on local income and financial capacity.

Table 9 presents agricultural research investment intensities by region, which shows negative correlation between investment intensity and economic development or income. Western China had the lowest investment intensity value (0.26 percent) followed by Central China (0.30 percent) and Eastern China (0.36 percent). The difference between Western and Eastern China is even larger if investment in national institutes located in the regions is included.

Western China is the least developed region with average per capita income of 1 502 yuan in 1999 (Table 10). Nearly half of China's rural poor is located in the region. Western China's poverty incidence (7.3 percent) was nearly 6 times as high as that in Eastern China (1.3 percent).

**Table 9. Regional agricultural research investment intensity under MARS in 1999 (%)**

Region	Excluding national institutes in the region	Including national institutes in the region
Total or average	0.32	0.37
Southwest	0.20	0.21
North	0.26	0.35
East	0.29	0.33
Central	0.34	0.35
Northwest	0.39	0.51
South	0.41	0.46
Northeast	0.49	0.56
Western	0.26	0.30
Central	0.30	0.33
Eastern	0.36	0.43

**Note:** Eastern China includes Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, Guangxi and Hainan; Central China includes Shanxi, Inner Mongolia, Jilin, Heilongjiang, Anhui, Jiangxi, Hunan, Hubei and Henan; Western China includes Sichuan, Chongqing, Yunnan, Guizhou, Tibet, Shaanxi, Gansu, Ningxia, Qinghai and Xingjiang.

**Table 10. Regional income and poverty in rural China, 1999**

	Average per capita income (yuan)	Population under poverty (million)	Percentage of poverty in nation's total (%)	Poverty incidence (%)
Western	1 502	16.44	48	7.3
Central	2 003	12.67	37	3.9
Eastern	2 929	5.01	15	1.3
China	2 210	34.12	100	3.7

**Sources:** Ministry of Agriculture, 2000; National Statistical Bureau of China, 2000.

### **National strategy to reform the agricultural research system**

The reforms in the agricultural research sector vividly illustrate the propensity of the leadership to implement deep reforms in even the most tradition-bound sectors (Maddox and Swinbanks 1995; Rozelle *et al.* 1997). As part of China's general move to distance itself from the rigid, closed planning system, reformers have gradually implemented a series of science and technology policies designed to fundamentally alter the behaviour and output of research institutes. In addition to opening up to the outside world, agricultural research reforms of the 1980s and 1990s targeted two main areas. The first involved changing the basis for distribution of research funds into a more competitive system, focusing resources on the most productive scholars and institutes. The second area highlighted policies that encouraged research institutes to commercialize the products of their research, allowing them to retain profits and reinvest these as a major source of revenue for their research work. Since the late 1990s, a new reform aimed at modernizing the agricultural research system has been initiated.

## 1. Competitive grants and focused research programmes

Beginning in the early 1980s, national research policy gradually increased the proportion of funding allocated competitively by encouraging funding agencies to award grants and fellowships to researchers who put forth the best proposals. Prior to this, directors of research institutes and their department heads allocated the funds provided by the SSTC to projects, laboratories and individual scientists. Currently, most research funds from national sources can only be accessed through competition. National leaders also competitively allocate funds to priority research areas such as biotechnology research through programmes such as the 863 programme and the Special Foundation for Transgenic Plants. Most of the national and provincial STCs (Science and Technology Committees) have expert committees made up primarily of scientists who rate proposals on the basis of defined criteria (e.g. the expected contribution to farmers, proposed methodology and research originality).

While the gradual trend towards competitive grants characterize the funding of agricultural research projects in the 1990s, institutes still get “administrative fees” (*shiyefei* or core funding) on a formula (or non-competitive) basis from the MOA or their local budgetary authorities. These cover base salaries, pensions and other operation costs. For the most part, administrative fees are used for the research staff’s basic salaries and benefits such as housing subsidies and medical assistance. One of the biggest uses of administrative fees has been to support retired personnel. Frequently, when administrative funding from a unit is insufficient to support welfare needs, an institute’s director will invariably divert research grants by raising overhead rates or allowing project members to have the right to withdraw a portion of the grants (normally ranging from 5 to 15 percent) as a “bonus” for their project staff in order to meet the fiscal need.

Shifting the criteria for dispensing research grants away from the old formula to a more competitive selection standard is expected to significantly impact on research productivity and the government’s priority areas for research. Research productivity may increase with this reform as larger funding can be allocated to more productive research institutes and individual scientists. Meeting the government’s targets in such areas as food security, poverty alleviation and environmental protection can also be easily incorporated into research programmes chosen competitively.

## 2. Commercialization reforms

Policy-makers began encouraging research institutes to earn their own income through commercial activities in the mid-1980s. In 1987, the SSTC chairman announced a plan to push scientists to think like entrepreneurs. MOA officials soon copied the SSTC moves and likewise encouraged agricultural research institutes to earn money (Liu 1991). Researchers interviewed recall that they initially gave little credence to the new directive since seed prices were heavily subsidized and there was little prospect of making a commercially viable product except for seed.

As budgets became increasingly tight and the need to reform grew, the nature of commercialization evolved. Reformers originally designed the policy changes as a way to encourage institutes to capitalize on breakthroughs in research. It soon became an accepted practice, however, to make money in any way possible. Income generated from commercial activities rose rapidly in the late 1980s and early 1990s (Table 4). In the early reform period, commercial activities ranged from institutes selling products they themselves produced (e.g. plant breeding institutes selling new plant varieties) to activities that were far from their traditional discipline such as running hotels and restaurants or selling industrial products. Recently, more income has been generated from the technologies closely associated with the area of expertise of the individual agencies.

Unfortunately, a weak intellectual property rights (IPR) system makes licensing of a technological breakthrough a non-viable option for manufacturing enterprises or technology development firms.



Licenses and technology contracts typically are not honored for very long. For an economy with hundreds of millions of small farmers, the cost of enforcement or strict implementation of a strong IPR system may be extremely high. More frequently, a research establishment can partially capitalize on a breakthrough by manufacturing and distributing the product itself.

### 3. Impact of reforms

Rozelle *et al.* (1997) found that China's agriculture reforms were only partially successful. Although the real income from commercial enterprises increased rapidly from 1985 to 1994, only a small amount of that income was used to fund research. The funds generated from commercial activities were insufficient to offset the shortage of government support for research. Moreover, the growth of income generated from commercial activities slowed down after the early 1990s.

On the other hand, while competitive grant funds may have focused resources on the better scientists, funding for agricultural research projects did not increase in real terms for all types of research institutes. Since a number of staff members in commercial enterprises had not been removed from the rolls, funds per scientist did not go up as the officials had hoped.

While there has been an increase in technology transfer because of the commercialization process, the change has not been significant. In fact, much of the commercialization activities by public agricultural research institutes in the early reform period had little to do with the technology for which they were responsible. IPR and contractual laws in China are apparently too weak for technology to be profitably and successfully licensed.

Because of these reasons, the common perception by the late 1990s was that the reforms, though perhaps successful in the beginning in terms of changing the structure of China's research institutes, had only partially reached the goals or targets that the reformers expected.

#### *A new push for reform*

### 1. Strategy and plan

The perceived failure of earlier reforms to provide new technologies to producers and cure the twin problems of duplication of research among institutes and overstaffing has created a new impetus to launch another round of research reforms. In addition, the needs arising from China's move to a more market-oriented economy and the challenges of research in the new high technology fields occasioned further reforms in the agricultural research system. In this new round, the challenge that officials have set for themselves is a daunting task – namely, to create a modern, responsive, internationally competitive and fiscally sustainable agricultural research system (State Council 2000). The goals to better commercialize its products and raise funding per scientist are necessary to attract and retain the best people engaged in agricultural research.

To meet the above goals, the government laid down several measures to modernize the agricultural research system. The reforms have attempted to separate current research activities into those that can be commercialized (most are pure applied research) and those that should be maintained in the public "research innovation base" (applied-basic and basic researches and those with strong public goods nature). For those left in the non-commercial sector, outstanding research staff and researchers with potential are separated from those without potential. Additionally, those identified as high quality scientists have received receive higher salaries and a large increase in per capita support.

Based on the above principles, officials from the MOST drew up a 1/3-1/3-1/3 plan for agricultural research reform in the late 1990s. Reformers believe that by fully commercializing some agricultural research institutes, specific research programmes or activities in each research institute, a third of those institutes' staff can be separated from the research system. During the transition phase of

reforms for the institutes or programmes/activities to be commercialized, the core funding can be gradually reduced until the revenues of the institute-cum-enterprises become fully dependent on outside sales. On the other hand, those institutes and programmes in the institutes that partly provide public goods (named as non-profit public institutes which are also believed to account for about one third of total staff) receive public funding to cover part their expenses. The rest of the agricultural research system is maintained and placed into an innovation base and given a raise in both core funding (particularly researchers' salaries) and research budgets.

The ultimate objective of China's research reform is to have a modern, state-of-the-art, internationally competitive agricultural research system. With such high competition, they hoped to be able to attract the better scientists. Higher levels of funding for the qualified researchers are expected to keep them from diverting their attention from research to other areas such as consulting or commercial activities. The MOST predicted that in such a system (which would also give the research institute's director more discretion over salaries and hiring), more scholars from overseas would also be attracted to return.

## 2. Challenges of recent reforms

A recent study shows that institutes have faced several challenges during the reforms – even with considerable additional investment (Huang *et al.* 2003). Support for retired staff has been a serious problem. In the CAAS, for example, pension and medical payments to retirees in 1999 on average took up 32 percent of the core funding. The average ratio of retired staff to currently active staff was 0.6:1 in 1999, ranging from 0:1 in newer or growing research institutes (e.g. the biotechnology research institutes) to nearly 1:1 in older research institutes (cropping-oriented research institutes). In the traditional institutes that have been around for many years and which typically have an aging staff and many retirees, more than half of the core funding has been allocated to pensions and health care. Active scientists in these research institutes relied mostly on project funding or consulting for their salaries.

National research directors also pointed out that without a firm commitment to increase funding, the national research system might not follow the path directed by the MOST. Some institutes in the rich regions that initiated the commercialization reform in the late 1990s have gradually returned to the government for support. In the less developed provinces where local government financial revenue generation is weak and investment in agricultural research not viable, leaders have used research reform as a mechanism to cut the budget. Quickly, however, reformers in the less developed provinces and even in the more developed coastal provinces have discovered that a few agricultural research institutes can succeed commercially. Those that struggled included institutes originally thought to be engaged in "applied" research. The main question is whether or not newly commercialized institutes can survive in China's current institutional and legal system.

Management problems were bound to arise as academics do not always make good businessmen and managers were seldom given real authority to restructure the firm. According to interviews, managers were almost always prohibited from laying off workers. In the minds of institute managers, commercialized enterprises must continue to take care of their retirees and other employees, otherwise they will become the burden of the institute.

Another problem that has hampered commercialization efforts has been the unfavourable business environment for many firms in the agriculture sector. A poor IPR system, fragmented technology markets (e.g. for seed) apart from other factors keep agricultural technologies from prospering. Low profit rates, high transaction costs for servicing small producers and other high costs of doing business limit the commercialization of many firms.

### 3. Lessons and new policies

In facing the problems confronting agricultural research, China's leaders have realized that while reforms are needed, increasing financial support is a necessary condition for success. Even with successful commercialization, large increases in budgets are needed to fund the elite scientists at levels needed to modernize the research sector and attract the best minds in the country. Recently, commodities and technologies that have strong public goods features and positive social implications have been strengthened within the public research system. Meanwhile, other commodities and technologies that have high possibility of private sector entry have been gradually commercialized with support from the public sector.

Although commercialization of many of the institutes can succeed and contribute to budgetary savings, policy-makers recognize that the process may take time. A longer time period with more support is needed to allow for a redirection of efforts and a restructuring of firms. Recently, managers have been given authority in some institutes to lay off workers and provide a better incentive system for the enterprises to operate profitably.

#### **Concluding remarks**

China is highly acclaimed for its ability to feed its growing population despite its extremely limited natural resources. Over the last four decades, per capita availability of food, household food security and nutrition have all improved significantly. Increased domestic production is almost solely responsible for increased per capita food availability, significantly contributing to poverty alleviation and farmers' incomes.

China's experience shows that technological change in developing countries is the main engine for agricultural growth, increased farm incomes and poverty alleviation. Publicly funded agricultural research has played a critical role in generating the technologies to meet the needs of hundreds of millions of farmers. However, the success of research-led technology changes in the past does not imply that agricultural research will be necessary to effectively meet the farmers' demand for agricultural technology in the future. Many things are undergoing changes.

This paper shows how China has been trying to reform its overburdened, public-dominated and decentralized research system in order to establish a modern, responsive, efficient and internationally competitive agricultural research system. The study shows that commercializing agricultural research does not imply a weakening of government's role in financing agricultural research. Agricultural research driven by commercial interests will naturally be directed towards the most commercially viable products and technologies. A market-driven research system will lead research directed towards food security, poverty alleviation and environmental sustainability. The crucial role of agricultural research necessitates that government be a primary source of funding in the decade to come. The efforts and costs involved in enforcing a strong IPR system also imply the importance of a viable public financial support system for agricultural research.

There are a few other lessons from China's experiences in agricultural research investment and sectoral reforms, which may also have implications for other developing countries under similar situations. Following are some of the more important lessons learned:

- The commercial component of research reforms may not be successful if other reforms (such as output, input and technology market reforms) have not taken place in the rest of the economy.
- Not all agricultural research institutes and technologies can be commercialized.
- The commercial businesses of research institutes require a market-oriented institutional and management system.

- Academics need to learn marketing and management skills to successfully operate commercial enterprises.
- The importance of public and local research on biotechnology is recognized.

The fact that Bt cotton was developed by government researchers in parallel with its development by international companies clearly made it more palatable to the government and ensured that there was a strong lobby in favour of the technology.

China's leaders recently raised agricultural research investment substantially and took a decisive step to reform and strengthen its public agricultural research system. These have many implications for developing countries that are facing similar financial and efficiency problems in the public research system. Although funding through various possible sources from non-government financial channels is expected to increase in the future, a thorough reform of the existing public agricultural research system should be accompanied by the implementation of other policies and reforms, particularly those related to lifting the barriers to private participation in research and technology transfer. To increase the ability of commercialized research institutes to generate income and attract private investment in agricultural research, reforms should continue to focus on: i) liberalizing agricultural input and output markets; ii) implementing and enforcing the policies related to IPR and ownership; iii) reducing barriers to market access of private participants in the research and technology sector; and iv) providing greater government funding for research to assist local firms in the initial stages of private development.

The research capacity and technology gaps between rich and poor regions and their implications for income distribution have not been adequately addressed in the current research system in China. As the bulk of funding of local research institutes comes from the corresponding local government's fiscal revenue, it is expected that the technology gap between the rich and poor regions will increase if the lack of coordination among national and inter-regional institutes continues to plague the current decentralized system and if policy-makers neglect regional research investment in the future.

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# Rural institutions, agricultural development and pro-poor economic growth

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## Conventional wisdom: invest and intervene

According to conventional wisdom, the ideal form of pro-poor economic development is through investment in agriculturally led growth.<sup>1</sup> In the early stages of growth, greater production decreases food prices and shifts out the demand for labour. Inasmuch as poor households disproportionately consume food and earn a relatively large share of their income from labour, both mechanisms benefit the poor. Agricultural economists typically recommend a panoply of government interventions to go along with the investments in new technology and infrastructure, including price support and stabilization schemes, credit and input subsidies and crop insurance. The interventionist policy recommendations, however, are based on a variety of misconceptions and misinterpretations about farmers' behaviour and rural institutions.

The interventionist doctrine for agriculture and rural development has remained remarkably resilient in the face of policy liberalization and globalization that took place in the 1980s and 1990s. Agricultural economists continue to justify regulations and subsidies of all kinds, presumably contributing to agriculture's resistance to the liberalization and globalization of industry. Concurrently, donor support for agricultural development has waned. Three factors may account for this. First, the interventionist doctrine was at odds with prevailing "neo-liberal" attitudes. Second, there was growing dissatisfaction with the performance of many of the agricultural projects and programmes. Third, many observers concluded that low agricultural prices signaled success and that further efforts were unnecessary.

The following section reviews some of the intellectual failures contributing to the popularity of interventionism in agricultural development circles and provides specific examples of how faulty reasoning has led to policy failures in factor and output markets. The paper then shows how some of the very institutions and phenomena that have been used as evidence of inefficiency are in fact consistent with efficiency. The review so provided exemplifies a fundamental framework for policy analysis known as the "new institutional economics" (NIE).

## Intellectual failures and challenges

In the 1950s, 1960s and 1970s, the economics of agricultural development called for a major role of government in providing **essentials** (incentives, transportation and marketing, new technology and access to inputs) and **accelerators** (extension, credit, irrigation, farmer cooperatives and development planning).<sup>2</sup> Johnston and Mellor (1961) and Mellor (1966) emphasized the positive linkages between

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<sup>1</sup> "(If) there is not economic growth, there isn't going to be an elimination of poverty....you cannot deal with food security, hunger and malnutrition, unless you invest in agriculture," said Natsios (2003) for USAID. See also Roumasset (1992a, 2002, 2003). The neoclassical model of agriculturally-led growth was pioneered by Jorgenson (1961). Johnston and Mellor (1961) articulated the linkages between agricultural and economic development.

<sup>2</sup> Mosher (1966).

agricultural growth and economic development and continued to presume that a wide variety of government regulations and subsidies were appropriate to get agriculture moving. This legacy continued even into the 1980s as agricultural economists continued to argue for pushing the agricultural sector but were somewhat indiscriminant about the appropriate instruments for doing so. For example, a major collection of readings (Eicher and Statz 1984) failed to note the excess burden and dynamic costs of agricultural protection even as these became the focal point of industry and trade policies.

In the late 1980s and 1990s, new theories that took account of imperfect information augmented intellectual support for interventionism. The most general interventionist doctrine was based on the Greenwald-Stiglitz (1986) theorem which states that a competitive equilibrium is not constrained Pareto-optimal, i.e. is not on the feasible utility-frontier, whose limits are determined by feasible government actions as well as technology, factor endowments and consumer preferences. This theoretical result was interpreted to mean that government can always find a coercive intervention to increase economic efficiency over that achieved by voluntary contracting and competitive markets. Stiglitz (1993, 2002) himself has often used the institution of share tenancy to exemplify how economic organization can be in equilibrium but massively inefficient, asserting that a landlord's share of one-half would have the same disincentive effects as a 50 percent income tax. In this new information economics, market failures are not limited to the usual cases of externalities, public goods and non-convexities, but also include the far more pervasive failures due to moral hazard, adverse selection and other information problems.<sup>3</sup>

Similarly, de Janvry *et al.* (2001), while acknowledging the role that transaction costs play in rural organization, nonetheless concluded that "indirect sources of market failure need to be eliminated" including those that plague credit and insurance markets. This and the paper by de Janvry and Sadoulet (2000) have been misconstrued to mean that government should intervene in such markets with mandates and subsidies (see e.g. Weber *et al.* 2002). Some investments in agriculture, notably in agricultural research, were prematurely rejected in this view as mere "technofix".

These propositions are subject to Nirvana Fallacy (Demsetz 1969), however. The equilibrium concept in question is a straw man in two important respects. First, it doesn't admit multilateral voluntary contracting. Second, it doesn't admit private governance of moral hazard and other information problems, e.g. as described in Jensen (2000). Even if the Greenwald-Stiglitz theorem were generalized to allow for multiple distortions and even if some pervasive efficiency-improving interventions were found, the results would still suffer from "blackboard economics". (Note that "blackboard economics" should not be taken as a general condemnation of rigor but rather of equilibrium concepts that abstract from real world institutions and which internalize spillovers and mitigate information problems.)

In the following section, I review some of the intellectual failures in the context of agricultural and rural development. All of them result from misplaced exogeneity and a failure to provide a fundamental explanation for the phenomenon at issue.

#### *Land and labour institutions*

Asian agriculture displays the coexistence of disparate property, tenure and contractual institutions that connect labour to land. While most Asian agriculture is smallholder in character, with notable exceptions of growers of tree crops such as oil palm and coconuts, there has recently been an increase in the number of larger commercial farms, e.g. for the production of sugar in Indonesia (Fairhurst 2003). Instead of explaining the diversity, however, much of the economics of agricultural development have sought to identify which behaviours and institutions are inefficient, much as the old industrial economics regarded market structure as exogenous and proceeded to examine the conduct of different organizational forms and to evaluate the efficiency of their performance.

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<sup>3</sup> Stiglitz (1993).

For example, most agricultural economists assert that smallholder agriculture is inherently more efficient than large-scale commercial farming because it economizes on hired labour.<sup>4</sup> Utilizing family labour economizes on recruiting and supervision costs – the latter is said to be so because hired labour supposedly suffers in terms of both quality and an inherent tendency for effort shirking. These labour market imperfections supposedly result in the “productive superiority of family farms” (Deininger 2003, p. 84) and to the characterization of hired labour as inefficient (Otsuka 2002). Using the ICRISAT village data, Frisvold (1994) finds that family labour is indeed more productive than hired labour even before deducting the costs of supervision. The inefficiency of hired labour is also said to be at least partially responsible for the notorious inverse relationship between small and large farms, assuming that the latter are relatively more labour-dependent (Otsuka 2002; Deininger 2003). Similarly, Hayami (2003) finds that while plantation agriculture was an efficient institution for the exploitation of Western colonies in Asia, family farms have more recently “proved to be equally or more efficient producers of tropical export crops using family labour of low supervision costs, relative to plantations based on hired labour.”

However, these studies fail to account for why labour is hired (and for which tasks) and for the incomplete substitutability of hired and family labour. They also fail to account for the role of land quality in crop choice and intensity of cultivation. It is not surprising, therefore, that one can find contradictory empirical results. Indeed, Benjamin (1992) finds that hired labour is significantly neither more nor less productive than family labour. This may simply be because there are both gains and losses involved. For example, hired labour facilitates specialization. In a prototypical farm where both family labour and hired labour are employed, rational choice implies that there will be a non-random division of tasks between the two types and that, at the margin, the difference in their productivities will be equal to the difference in opportunity costs.

Share tenancy is another institution that is commonly attacked for being inefficient. The literature has been unduly influenced by Stiglitz’s (1974) canonical model wherein sharecropping is viewed as a pairwise-efficient means of providing labour greater incentive to work (or not to shirk) relative to wage contracts but without the cost of risk-bearing that would be imposed under rent contracts. After reviewing the leading theories of share tenancy, Hayami and Otsuka (1993) conclude that the risk-aversion vs. moral hazard model indeed “justifies the existence of share tenancy in the theoretically most consistent manner...” As noted above, Stiglitz (1993, 2002) remains convinced that the Marshallian effort disincentive of share tenancy is socially inefficient. The inefficiency hypothesis has been further buttressed by econometric studies, most notably Shaban (1987) for the case of India. Jacoby and Mansuri (2002) report similar results for Pakistan. Bautista (1991) observes that share tenancy in the Philippines is less productive as well as inequitable.<sup>5</sup>

As is the case with the literature on the inefficiency of large farms and hired labour, however, this conclusion is premature. First, the canonical model does not imply, as originally claimed (by Stiglitz, in 1974), that the optimal landlord’s share varies positively with the tenant’s degree of risk aversion, because risk aversion also blunts the tenant’s incentive to shirk. Second, the model is incapable of explaining the empirical or actual distributions of tenant shares, which cluster around of 50 percent, with a smaller cluster around two-thirds.<sup>6</sup>

A more fundamental problem is that the canonical theory treats share tenancy as a mere labour contract and thereby misses its essence as a typically long-term contractual arrangement for bringing management together with land that facilitates the tenant’s learning-by-doing of production decisions

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<sup>4</sup> See, for example, Binswanger and Rosenzweig (1986) or Binswanger, Deininger and Feder (1995).

<sup>5</sup> See Ray (1998) for additional examples, especially studies of tenancy in South Asia.

<sup>6</sup> Deweaver and Roumasset (2002) show that for parameters representative of the Philippine case, the model predicts that optimal tenant’s share declines from one to four-fifths as the tenant goes from risk neutrality to moderate risk aversion and increases back to one as risk aversion increases further.



(Reid 1976; Murrell 1983; Eswaran-Kotwal 1986; Roumasset 1995). Share tenants themselves hire substantial amounts of labour, especially for the more arduous and routine tasks. Share contracting is a popular labour contract for specific tasks. Indeed, share tenants often hire casual workers on a share basis to do harvesting, weeding and transplanting. But receiving a share of the harvest does not make such workers tenants.

The persistent fallacy in all of the inefficiency arguments is one of misplaced exogeneity.

Trying to judge the inherent efficiency of particular institutions is tantamount to the old structure-conduct-performance paradigm whereby a market **structure** was taken to be exogenous, its conduct diagnosed and its resulting **performance** judged. For example, the **conduct** of monopoly is characterized as increasing price by lowering quantity below its competitive level and its performance is judged to be inefficient. As the above examples illustrate, this paradigm, while now defunct in industrial organization, is alive and well in development economics.

Even leaving the identification problem aside, the tenant's compensation is not necessarily limited to his share of the harvest. Asian tenants often receive credit from their landlords at concessionary rates (often zero interest) and landlords help with tenant family's needs and emergencies (Roumasset 1976; Sadoulet *et al.* 1997).

#### *Credit and marketing*

Credit and marketing institutions are similarly castigated as exploitative and inefficient. The stereotypical middleman charges excessive interest rates for credit and pays the farmer pitifully low prices. The following description (about Pakistan) is typical:

...owing to the involvement of many layers of middlemen between the growers and the consumers, every year the government has to intervene in the agriculture commodity markets to rescue the farmers from the clutches of the middleman by acting as a second buyer. (Badar 2002)

In Southeast Asia, such claims are often directed specifically at ethnic Chinese: "It is not unusual to hear ... that farmers or consumers are exploited by ...Chinese middlemen."<sup>7</sup>

Hayami and Kawagoe (1993) have documented how, in general, "the stereotype has not held up under empirical tests", particularly so in Indonesia.<sup>8</sup> They go on to document the nature of marketing operations in Western Java and Sumatra. The stylized marketing organization relies on village collectors (often themselves farmers), intervillage collectors, traders and processors. Because the village collectors have a low opportunity cost of time, traders readily adapt to the demands of marketing entrepreneurship, and because institutions and dynamic relationships are developed to provide quality control and mitigate the "holdup" problem, the marketing system tends to efficiency. The main obstacle to efficiency in this view is the tendency of governments, in the alleged quest to limit excesses of the ubiquitous middleman, to actually suppress entry and the natural evolution of appropriate institutions and entrepreneurship. Rather, government policy should be focused on increasing entry and fostering market integration through appropriate contractual and physical infrastructure as well as on providing market information and facilitating standards and grading.

In the current era of globalization, the efficiency of small-scale marketing systems may be in decline, however. In traditional marketing systems, production is indirectly coordinated with the marketplace only through successive layers of collection and distribution. Smoothing fluctuations in both demand

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<sup>7</sup> Mears (1981), quoted by Hayami and Kawagoe (1993), p. 10.

<sup>8</sup> *Ibid.* p.10. In so doing, they cite Bauer (1964), Lele (1971), Jones (1972), Mears (1981), Unnevehr (1984) and Timmer (1987), although Timmer left open the possibility of monopsony profits in outlying villages.

and supply is done through inventories and through international trade. With the rise of supermarkets and “big box” discount stores, however, Reardon *et al.* (2003) have shown that retailers often interact directly with producers for delivery of goods, processed and packaged to specifications, at particular places and times. This confers competitive advantages to larger producers and partially displaces traditional marketing systems.

The Berkeley/World Bank group of applied economists acknowledges economies of scale in agricultural marketing but denies that these undermine their conclusion that large farms are inefficient, asserting that farmer associations can exploit large-scale marketing opportunities.<sup>9</sup> This is a remarkable inconsistency. Small farms are said to be more efficient because they avoid the additional contracting costs associated with hired labour. But the proposition that small farms can simply overcome diseconomies through contracts blithely ignores the requisite contracting costs. Indeed farmer cooperatives are notorious for broken agreements and favouritism, both of which undermine the sustainability of group contracts.

The “evil middleman” syndrome has similarly led to widespread interventionism in credit markets, in particular the “directed credit” syndrome whereby interest rate ceilings are combined with concessionary lending to rural banks, which qualify for subsidies by targeting rural and agricultural clients. While this particular policy failure has been widely diagnosed, disagreement remains between intellectual supporters of interventionism and those who trust credit mobilization and allocation through competitive markets.

The “Ohio State School” asserts that the high rates in the informal sector are warranted by transaction costs and the risk of default. They note that the low interest rates mandated by government regulations direct credit primarily to larger commercial farmers and other borrowers with above average incomes (Meyer and Nagarajan 2000; Coleman 2002). Accordingly they advocate spontaneous institutions such as microcredit programmes and competitive market allocation of loanable funds.

The intellectual climate regarding credit policy may have swung too far towards the *laissez faire* extreme, however. For example, the donor consortium CGAP has come out with a set of “best practices” based on the “win-win” approach to rural credit.<sup>10</sup> In this approach (also called the “new paradigm” by Meyer and Nagarajan [2000]), rural lending institutions should attain financial sustainability by eschewing government and donor assistance and charging rates commensurate with the full cost of the loan and high enough to successfully mobilize savings. As Morduch (2000) points out, this approach is mandated neither by logic nor empirical evidence. First the goals of financial sustainability and growth through profitability are not coincident with maximum impact on the poorest of the poor. Moreover, microfinance success stories have tended to “stretch accounting data in order to claim profitability” (Morduch [2000], p. 627). As a result, microfinance organizations have attempted to replicate apparent success stories, albeit with disappointing results. “Some donors believe that little more than 5 percent of all programmes today will be financially sustainable ever” (Morduch [2000], p. 618). Morduch (2000) argues instead that financial sustainability and programme expansion are consistent with some degree of subsidy. What is important is that the subsidy be a “hard budget constraint” and that sound prudential management be maintained, including selection and monitoring procedures that emphasize repayment. If these fundamentals are kept, the resulting diversity of programme designs will contribute to the evolution of successful approaches.

On the other hand, “second-best” interventionists argue that market institutions are inefficient due to problems of imperfect information (e.g. Stiglitz and Weiss 1981). Ray (1998) reviews both the theoretical literature and empirical studies from Asia and concludes that rural credit institutions

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<sup>9</sup> See, for example, the review of literature and discussion in Deininger (2003), including the list of contributors.

<sup>10</sup> Consultative Group to Assist the Poorest of the Poor. See Morduch (2000) for a detailed description of the win-win approach.

display substantial inefficiency even after uncertainty and transaction costs are taken into account. Accordingly, Stiglitz and Uy (1996) argue for “mild” financial repression with both interest rate ceilings and policy discrimination across types of investors.

What is needed to progress from this impasse is a conceptual framework that is capable of evaluating the consequences of alternative credit policies. The theory must be able to explain the coexistence of formal and informal institutions for rural credit and other patterns that characterize the nature of credit institutions under a variety of policy umbrellas.

Among the many “market failures” and alleged justifications for government intervention, perhaps the most misunderstood concerns stabilization policy. One of the common justifications of a state trading enterprise to control domestic rice markets in Asia, for example, is that without government control, market prices would be unacceptably volatile. It is surprising how readily this justification is accepted without a compelling rationale that governments can and should control prices. It is also rather remarkable that while the intellectual climate regarding credit policy has largely swung to non-interventionism, the intellectual climate for stabilization (like that for intervention in land and labour markets) has proved to be more resilient.

The case for government stabilization of prices is weak at best. If the source of domestic price instability is international price variability, even costless stabilization would be welfare reducing. Consumers gain more from low prices than they lose from high prices. The reverse is true for producers. If domestic supply were the source of unstable domestic prices, price stabilization via a costless buffer stocking scheme would be welfare increasing, but of course no such free lunch exists. Feasible acquisition and release strategies are likely to be welfare reducing even when they work, due to the limited degree of stabilization and high costs. Moreover, empirical evidence suggests that attempts to stabilize grain prices do not succeed (Roumasset 2000, 2003b), and theoretical analysis shows that stabilization strategies involving buffer stocks tend to be destabilizing in the long run due to the probability that stocks, storage capacity or available budgets will eventually be exhausted (Wright and Williams 1990).

#### *Policy failures: a synthesis*

The intellectual failures reviewed above include market failure, behavioural failure and institutional failure. All of these result from misplaced exogeneity. A full understanding of policy failures, however, goes beyond diagnosing errors in economic reasoning. Political economy instructs us that bad policy results from rent-seeking as much as bad economics.<sup>11</sup>

Directed credit programmes, for example, may have been justified by defunct economics but served as viable mechanisms for political patronage in many Asian countries. Subsidized interest rates resulted in excess demand for loans. Inasmuch as the programmes are “directed”, there is room for rationing of loans to be done on the basis of various indicators of political loyalty instead of potential investment productivity. In an extensive review of several Asian economies, Meyer and Nagarajan (2000) characterize the predominant form of bank lending to the rural sector in the 1960s through the 1980s as targeted (e.g. to farmers), funded by governments and donors at subsidized rates and typified by negligible selection and monitoring procedures. Borrowers correctly perceived the programmes as entitlements, not obligations, and repayment rates were extremely low, with the exception of economies with “strong civil and professional traditions” such as Republic of Korea and Taiwan Province of China. As described above, this approach hampered the natural evolution of both the formal and informal sectors.

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<sup>11</sup> As Blinder (1987) notes, as long as there is sufficient diversity of economic analyses, policy-makers can select the economist who best defends their politically determined positions. But greater understanding certainly contributes to greater transparency about unintended consequences, which in turn weakens the political sustainability of bad policy.

Similarly in Pakistan, the Agricultural Development Bank of Pakistan (ADBP), which provides most formal loans in rural areas, lends to large landowners much more than to small landowners (Faruque and Khandker 2001). Large borrowers with lower marginal benefits use formal loans unproductively and have high rates of default. As a result, the ADBP's operations impose a heavy burden on the government because of large subsidies required to sustain its operations every year. The Asian Development Bank is now recommending not subsidizing interest rates in rural finance operations (Asian Development Bank 2003).

Rural credit programmes in the formal sector have expanded substantially in most Asian countries, but it has been mostly short-term credit targeted to farmers. Because of subsidized rates and poor prudential practices, these programmes have not been financially sustainable. Rather, programmes are renewed, renamed and revived through additional tranches from international donors or the general funds of governments. The "band-aid" response of international donors in the 1980s was to seek to make small farmers more creditworthy by subsidizing ambitious programmes on formal land titling (e.g. in Northern Thailand). Feder *et al.* (1988) argue that simultaneously subsidizing the establishment of formal land titles and otherwise expanding formal lending improves welfare by funding agricultural investments with high present values that had formerly been rationed out of the credit market. Econometric support for such claims is not founded on any viable theoretical construct, however, and remains suspect. Models are needed that can rationalize the coexistence of formal and informal credit markets and that can be used to examine the consequences of subsidies, regulations and changes in property rights.

Another area of policy failure in Asia is land reform. In the Philippines, for example, land reform outlawed share tenancy. As a result, land reform beneficiaries hired permanent workers who were paid a fixed amount for the season. Hayami and Otsuka (1993) conclude that this has been an inferior substitute for share tenancy.

Another Philippine example concerns the failure to consider properly basing landlord compensation on land quality. By basing compensation on the principle that 25 percent of yield is a fair rent, reform confiscates value from owners of good and average farms but actually over-rewards owners of poor quality land (Roumasset and James 1979). As a result, friends and relatives of owners of poor quality land submit bogus claims that they have been working the land as tenants so that the landlord receives more than the land is worth (and landownership remains in the family).

There is a good reason, however, why politicians embrace the bad analysis supporting land reform. The implementation of land reform has always been very spotty. The administration in power can be very strict towards its enemies in the implementation of reform and very lax with its friends. Thus land reform becomes a potent political weapon.

Another persistent policy cockroach<sup>12</sup> relates to the attempt to control agricultural prices through government parastatals, which are tasked with the impossible mission of maintaining high and stable producer prices as well as low and stable consumer prices (Roumasset 2000). Trying to distort and stabilize prices by prohibiting private trade and enabling parastatal monopolies has the undesirable effect of fragmenting markets and blunting incentives for farmers and the agribusiness sector. Attempts to control prices can decrease the welfare of consumers, producers or both. Moreover the inframarginal nature of price controls that results from limited parastatal resources implies that favourable inframarginal prices will be conferred on those who have gained a political advantage or whose political favour is curried by politicians and bureaucrats.

The antidote to so-called "blackboard economics" is methodological fundamentalism (Nozick 1975).

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<sup>12</sup> Paul Krugman once remarked that the purpose of economics is to flush bad ideas, but, like New York cockroaches, they keep coming back.

Economic cooperation in agriculture is more complex “than is imagined in your calculus, Horatio.”<sup>13</sup> The principle of comparative advantage implies that different characteristics of land and landowners will call for different intensities and composition of inputs and organizational forms with unlimited differences in architecture. Judging the relative efficiency of different organizational forms commits the most fundamental fallacy in economics – judging performance without understanding the nature and causes of the phenomenon of interest. Prescribing policy reforms based on the premise that politicians, bureaucrats and academics can socially engineer institutions superior to those shaped, tested and improved in the crucible of evolution is a recipe for government failure. The new institutional economics provides an alternative paradigm that encourages greater caution in tinkering with institutions that have evolved in the crucible of competition.

### The new institutional economics of agricultural organization

The alternative to misplaced exogeneity involves characterizing the true nature and seeking the fundamental causes of behaviour and organizational differences. In a cross section of farms, for example, questions to ask include: Which type of land is allocated in large parcels, to which economic actors, and why? How has the composition between family and hired labour changed and why? Under what conditions do landlords choose to contract with tenants to manage their land?

The central decision-making model of development microeconomics is the farm-household model. A simple version is depicted in Figure 1, which shows the household labour supply schedule of a representative farm-household and three possible labour-demand schedules, depending on (quality-adjusted) farm size.

For  $D_1$ , the family exports its excess labour and the relevant shadow price of labour is  $w_s$ , the “selling wage” after deducting journey to work and other necessary expenses from the nominal wage. For  $D_3$ , the farm-household imports hired labour, and the shadow wage is  $w_h$ , the hiring wage after including the employer’s agency cost, recruiting and supervision costs and the residual costs of labour shirking (see previous section). If labour demand intersects household supply in the intermediate range between  $w_h$  and  $w_s$ , the shadow wage rate is given by the household’s marginal opportunity cost of labour.<sup>14</sup> Accordingly, the rational farm household can be said to be maximizing shadow profits, based on the shadow wage schedule,

$$\begin{aligned} w &= w_s, L < L_1 \\ w &= w_h, L > L_2 \\ S_L, L_1 < L < L_2 \end{aligned}$$

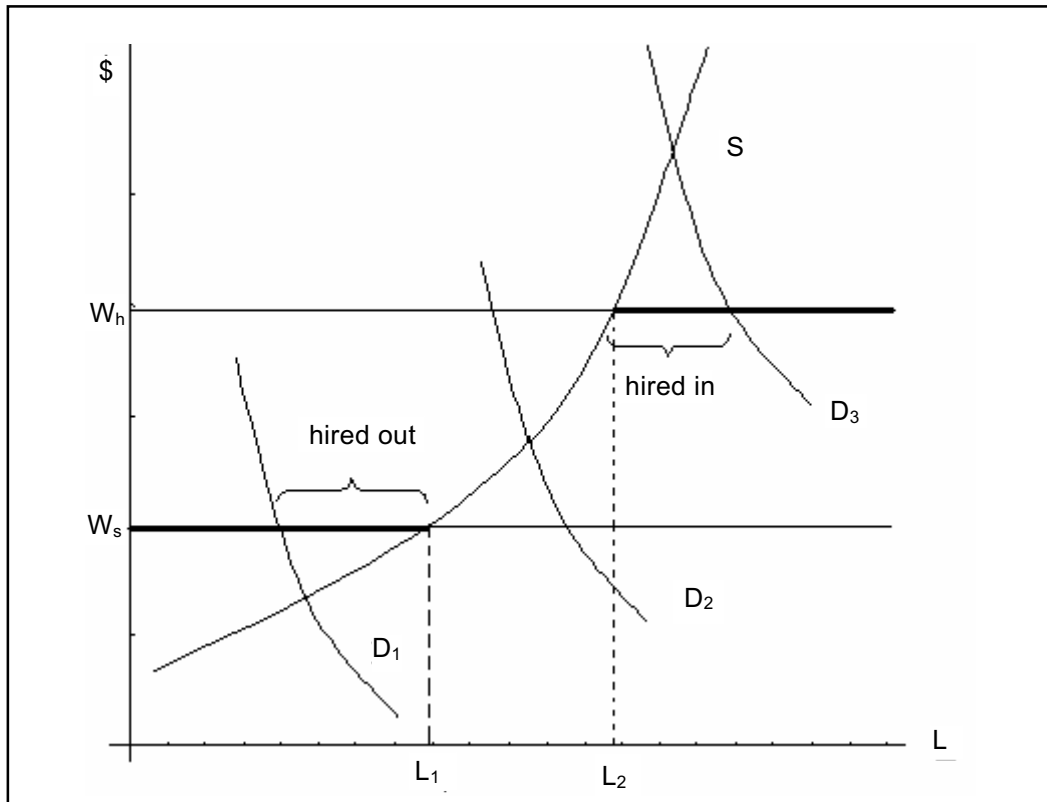
The profit maximization problem of the farm is only quasi-separable from the household utility maximization problem inasmuch as the labour supply schedule is not independent of farm income.

Similarly, the household-farm produces the (shadow) profit maximizing quantity of the agricultural commodity, where the shadow price is bounded by the buying price and the selling price and coincident with the household demand schedule in between. Again there is a limited source of non-separability inasmuch as household demand is dependent on farm income.

The “wedge model” – where transaction costs drive a wedge between prices – contrasts with the household-farm model of Lau *et al.* (1981) and Ahn *et al.* (1981) wherein household consumption is determined recursively, based on the profit-maximizing behaviour of the farm. Nonetheless a recursive algorithm can be employed to solve the wedge model, albeit by guessing household

<sup>13</sup> Quote from Shakespeare’s *Hamlet*.

<sup>14</sup> For further details of this model, see Roumasset, 1981. A similar model and circumscribed comparative statics are provided in de Janvry *et al.* (1991) and Sadoulet and de Janvry (1995). An extension of the model that includes behaviour under uncertainty can be found in Roumasset (1979).



**Figure 1. Quasi-separability of farm labour demand and farm household supply**

consumption and iterating until the guessed consumption level is consistent with both the household utility function and shadow-profit-maximizing farm income.

However, the wedge model begs the question regarding determination of the unit transaction cost wedge. That is provided by agency theory.

Figure 2 illustrates agency theory in the context of alternative labour contracts. Piece rates are commonly used in situations where the product of labour is easily observable, for example, sizing and sharpening the cane stalks prior to planting and planting stalks at uniform spacing. These tasks are tantamount to intermediate products delivered to the farm operator, who pays according to quantity. This institution economizes on minimum agency cost (MAC), i.e. the minimum sum of monitoring cost and (quality) shirking cost. For tasks that are not amenable to *ex post* inspection, supervision is used to concurrently monitor the labour activity in question and workers are paid according to the time spent on an activity, not its result.

The four panels illustrate the comparative statics proposition that if tasks are sufficiently easy to monitor through *ex post* inspection then the corresponding agency cost at optimal monitoring will be lower than the agency cost under wage contracts. The opposite is true for tasks that are hard to monitor. For each task, the unit transaction cost is given by the least of the two minimum agency costs for the task in question.

The wedge model can be used to explain behaviour of the household-farm, the basic building block for theories of agricultural development. The agency cost model can be used to explain rural institutions. Both are essential for understanding the consequences of contemplated policy reforms.

New institutional economics (e.g. Roumasset 1978) also recognizes that different levels of analysis may be appropriate for the analysis of different problems. Models that recognize transaction costs

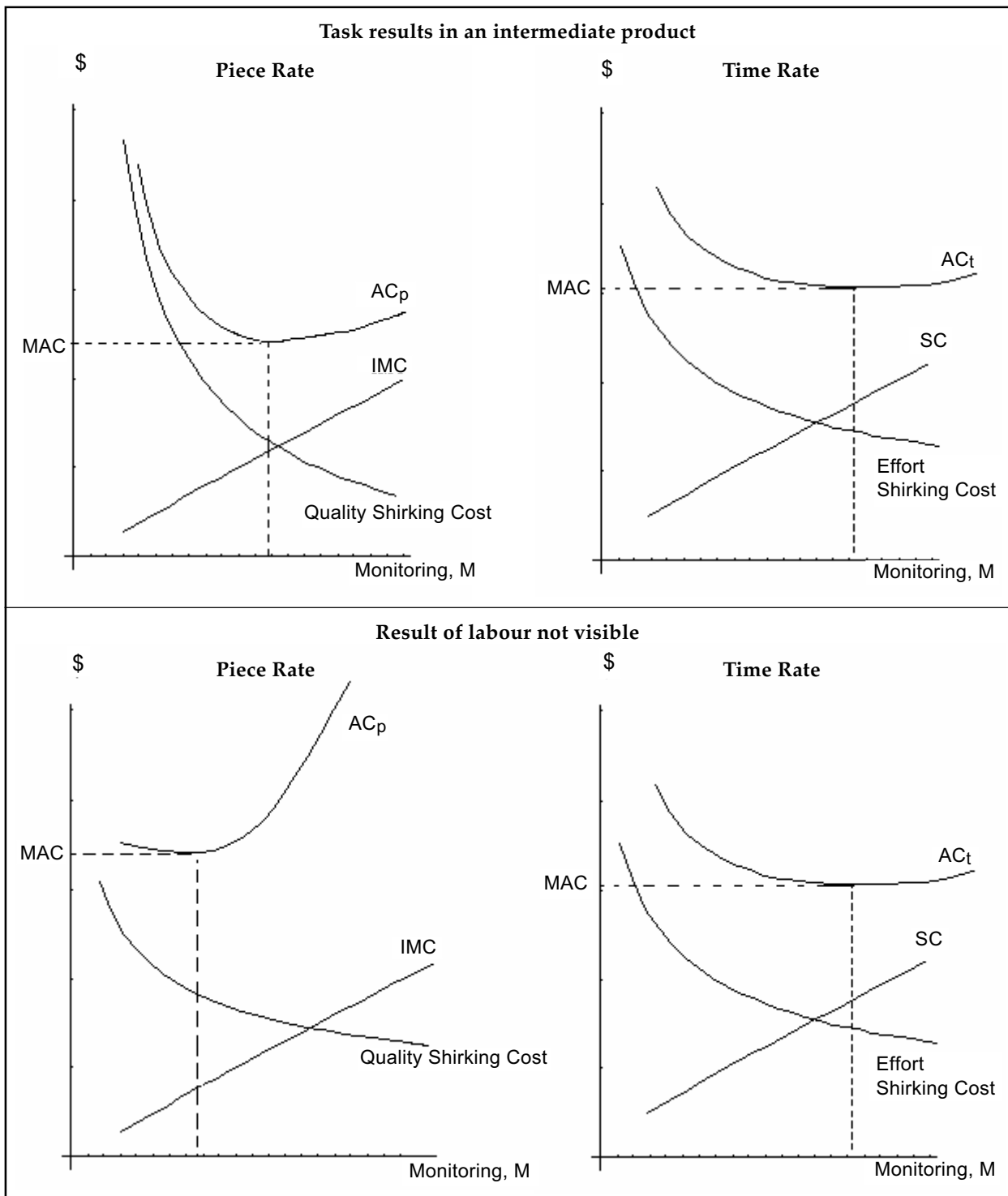


Figure 2. Specialization of contracts by task

such as the two above are classified as “second best”.<sup>15</sup> When the subject of inquiry is the terms of agricultural organization (e.g. tenants’ and harvesters’ share of production), the “first-best” model, which abstracts from transaction costs, has been found to be appropriate. In first-best analysis the terms of contracts are set such that factors receive their marginal products just as if there were

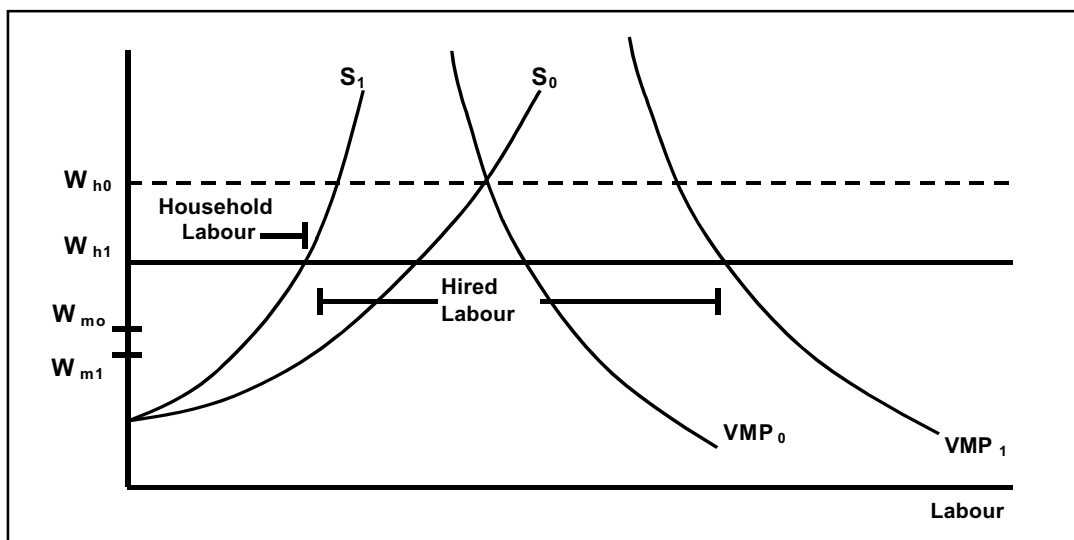
<sup>15</sup> Note that while both models accommodate transaction costs, the first (wedge model) regards them as being exogenous while the second (agency cost model) determines unit transaction costs endogenously.

competitive markets.<sup>16</sup> “Third-best” analysis or political economy allows for multilateral opportunism in the pursuit of favourable government treatment by special interests (Dixit 1996). The following three sections rely primarily on the second-best level of analysis. A brief synthesis using all three levels of analysis is thereafter provided.

*Land, labour and the nature of the farm*

Consider the evolution of hired labour. In Marxist view, the new rice and wheat technology that swept through Asia in the 1970s disenfranchised the peasantry and led to falling wages and increased unemployment. In the “induced innovation” view (Binswanger and Ruttan 1978; Ruttan 2003), the causation was just the reverse. Population pressure on limited land resources drove down wages thereby inducing land-saving technological change. In effect, this allowed “biological capital” (modern varieties and chemical inputs) and labour to substitute for land. The increased demand for labour had a positive effect on wages but was just not enough to offset the effect of population pressure (Hayami and Kikuchi 1982).

The induced-technological-change explanation just described is a first-best argument. However, not only did labour per hectare increase, its composition changed dramatically. In the ten years following the adoption of the new rice varieties in the Philippines, hired labour in weeding for example increased from less than 20 percent of total labour to more than 80 percent (Roumasset and Smith 1981). Figure 3 illustrates the use of the wedge model to explain this dramatic institutional change.



**Figure 3. HYVs and the advent of labour markets**

The graph represents a typical farm household in the province of Laguna and shows how four factors combined to increase hired labour dramatically. First, and most importantly, the intensification of production, ultimately caused by increasing land scarcity and accommodated by the new rice technology, increased the demand for labour per hectare. This is illustrated by the shift in the demand curve to the right. Second, increased farmer incomes resulted in increased schooling of farm children. This combined with the increased specialization among farm workers lowered the amount of farm-household labour per hectare. These higher opportunity costs and lower substitutability for skilled labour are illustrated by the shift in the labour supply curve to the left.

<sup>16</sup> This is the implicit theoretical underpinning of Hayami and Kikuchi’s (1982) study of rural institutions in the Philippines and Indonesia. Sufficient assumptions and a theoretical demonstration of market and contract equivalence are provided in Roumasset (1979).



Third, the market wage went down (from  $W_{m0}$  to  $W_{m1}$ ) as population growth, including in-migration, increased by more than enough to supply the increased labour demand. Fourthly, the transaction cost wedge between the market wage and the gross hiring wage decreased due to the advent of labour contractors and other new institutions of labour contracting (Roumasset and Uy 1987), illustrated by a downward shift in the gross hiring wage (from  $W_{h0}$  to  $W_{h1}$ ).

As hired labour increased, a menu of agricultural contracts emerged for “incentivizing” (i.e. providing incentives to) labour in different tasks. We have already discussed Figure 2, which shows how agency theory can be used to explain the tendency for piece rate contracts to be chosen when the task amounts to delivering an observable intermediate product. Statistical analysis of sugarcane contracts in the Philippines confirms this tendency (Roumasset and Uy 1980). For example, cane stalks are prepared for planting (uniformly sized and sharpened) and laid out for inspection. The farm operator simply inspects them for quality and uniformity. Next the stalks are planted, and the operator inspects for proper height and spacing.

*Gama* or *Ilani*, as practiced in the Philippines, is an institutional arrangement whereby the worker contracts to weed and harvest a specified parcel of land for typically one-sixth of the rice harvested for that parcel; *ceblokan*, practiced in Indonesia, typically requires transplanting in addition to harvesting and weeding for the same one-sixth share (Roumasset 1978; Hayami and Kikuchi 1982).<sup>17</sup> These arrangements were preceded by *hunusan* in the Philippines and *bawon* in Indonesia wherein only harvesting was done for the share of the harvest, typically one-sixth. Before the new institutions of *gama* and *bawon*, the share was sometimes lowered to one-eighth (Roumasset 1978).

Why did the share settle at one-sixth with the amount of work increasing instead of the share of the harvest simply declining? Hayami (1998) suggests that another function of *gama/ceblokan* was to provide an explicit selection mechanism for choosing who would weed/harvest and to allocate a specific parcel to each group of workers. In addition to selection, this provides improved incentives over the *hunusan/bawon* systems that were open to anyone in the village. Under the old system, a kind of free-riding occurred wherein workers would harvest faster than efficiency warrants just to be able to harvest more. Having workers harvest the same plot that they weeded (and sometimes transplanted) provided additional incentives to weed/transplant with greater care. Thus, while first-best principles can explain either the falling harvesters share or the increased work required, second-best considerations are required to understand why one institution was favoured over the other.

Figure 4 provides a second-best efficiency explanation of the institution of share tenancy.

The larger the tenant’s share, the lesser is the agency cost of labour shirking (monitoring cost plus residual shirking costs). On the other hand, the greater the tenant’s share, the greater the tenant’s incentive to overuse (or undermaintain) land quality. Share tenancy with a tenant’s share of roughly one-half minimizes the agency cost. There is nothing inherently inefficient in the contract, just explicit recognition of the contracting costs inherent in specialization.

Inasmuch as the tenant is the farm manager, not a worker, it is futile to classify “forms of tenure” as share tenant, lessee and wage worker. Rather, we need to classify organizational forms by which ownership, management and labour are connected. Figure 5 illustrates a taxonomy of firms classified according to degree of specialization. Note that pure owner-operator and owner-manager are on opposite sides of the specialization spectrum even though the conventional taxonomy classifies them both as owner-operator. The pure owner-operator household provides all the management and all the labour – i.e. there is no hired labour. The owner-manager hires most of the labour and reserves for himself only those tasks that are bundled with managerial discretion, e.g. fertilization.

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<sup>17</sup> Remarkably, a similar arrangement was documented in *The Constitution of Athens* almost 3 000 years ago. Workers contracted under a sharing arrangement in ancient Greece were called *Hectomori* or “sixth partners.”

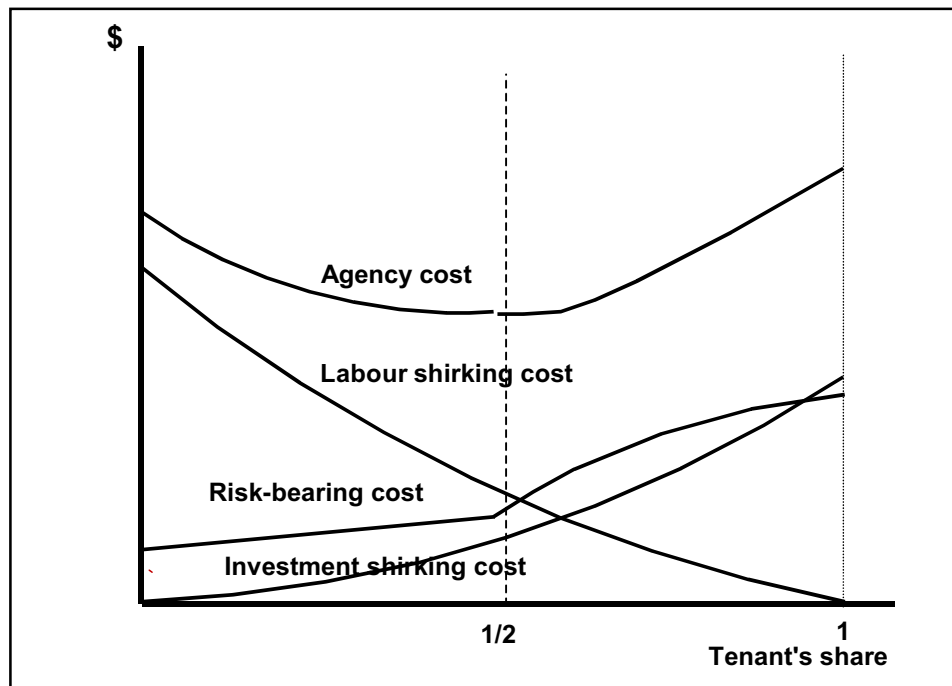


Figure 4. An eclectic theory of share tenancy

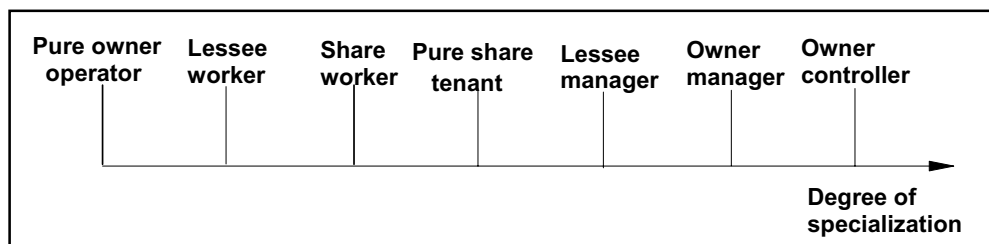


Figure 5. A spectrum of agricultural firms

Share tenancy is characterized by an intermediate amount of specialization – the tenant does most of the management, all discretionary tasks and some other tasks, e.g. land preparation.

Evidence from the Philippines and Nepal confirms that specialization is driven by intensity of cultivation, which is driven in turn by favourable land quality, location and economic environment (Roumasset 1995). Intensification can also be driven by population pressure, demand growth and rising land values. Not only does intensification warrant more specialized agricultural firms, but the organization of hired labour itself becomes increasingly specialized. This is elaborated further in the succeeding sections.

*The evolution of lending institutions*

In applying the new institutional economics to credit markets, the first task at hand is to rationalize the coexistence of the informal and formal sectors. It is natural to assume that the formal sector specializes in enforcement through the formal sector (e.g. through legal foreclosure procedures) and that the informal sector specializes in more personalized mechanisms such as repeated transactions, reputation and idiosyncratic bonding devices.<sup>18</sup> Formal institutions such as rural banks concentrate

<sup>18</sup> For example, moneylenders in Northern Thailand sometimes hold borrowers' land titles even though they have neither the ability nor the inclination to possess the land in question. But holding the title is of sufficient value to the borrower to incentivize or encourage repayment (Siamwalla et. al., 1990). See Roumasset (1986) for further discussion of the credit model described.

on production loans. The informal sector lends to relatively poorer households for both production and consumption purposes and at high unsubsidized rates.

The widespread policy of usury laws and subsidized rural banks in Asia has perverse effects on both the formal and informal sectors from the perspective of the model just described. The natural evolution of banks will be directly jeopardized by subsidizing banks that charge low interest and compete for the same customers as banks that rely on savings mobilization, charge borrowers higher rates and aim for financial sustainability. Inasmuch as mobile factors such as loanable funds and skilled labour are drawn from the unprotected sector to the protected sector, subsidizing the formal sector also stunts the growth of the informal sector instead of expanding it so as to widen access to commercial credit.<sup>19</sup> But instead of letting these failed credit programmes die a natural death, donors have subsidized new programmes (e.g. formalizing land titles) and have justified new tranches of funds for directed lending, thereby inhibiting natural market development for an even longer period.

Moreover, the new loans are disproportionately given to those with previous dealings in the formal sector; these displace informal loans whose enforcement depends on personalized information and repeated interactions. Thus the interventions tend to shrink the informal sector and its high shadow price of credit and expand the formal sector, characterized by a low shadow price.

Instead of measures that artificially fragment credit markets and penalize the informal sector, what are needed are policies that deepen credit markets by building on existing institutions. At any given level of market development, shadow prices of credit differ across both market lenders and borrowers. Institutional development occurs when the benefits of arbitraging across different shadow prices is greater than the additional governance costs of the new institutions.

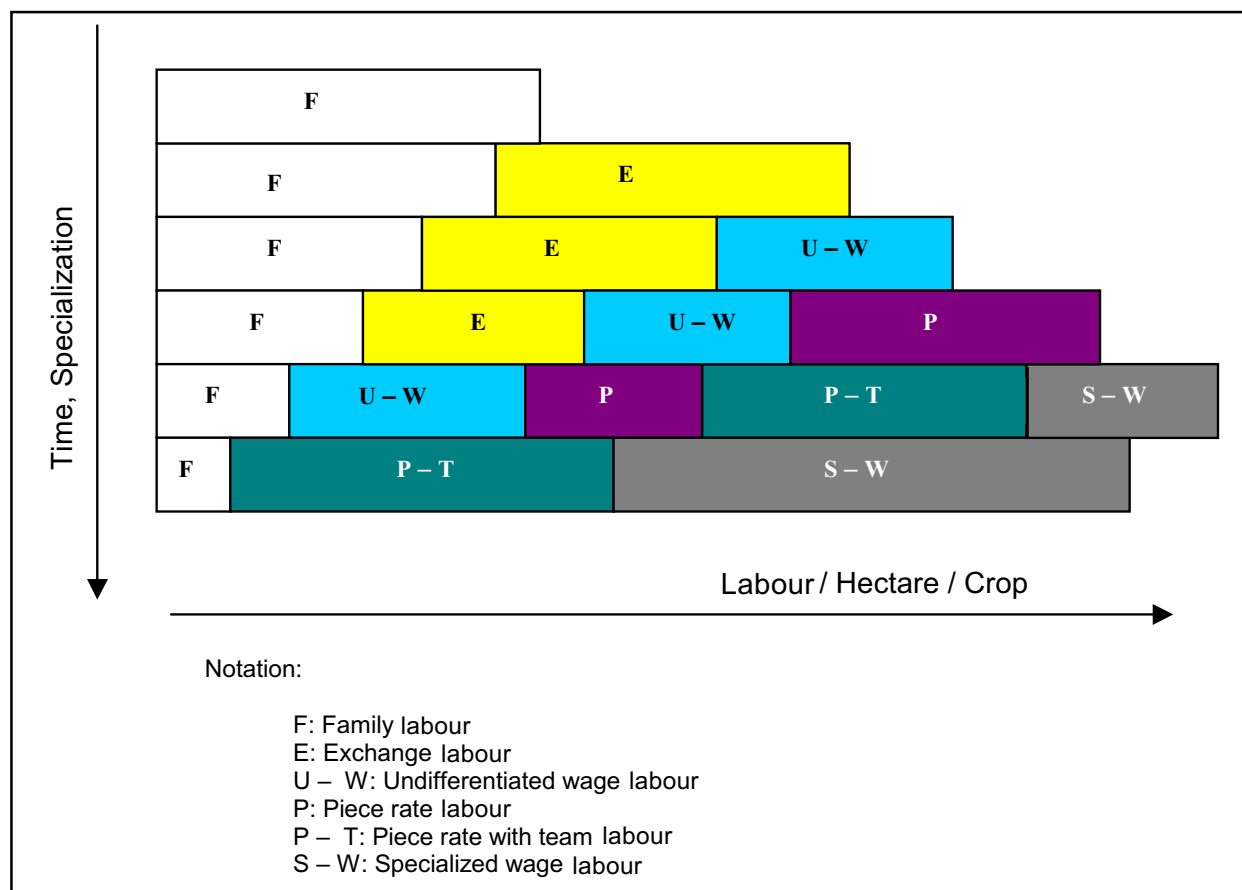
#### *The nature of economic integration: transaction costs and specialization*

In modern parlance, the classical engine of growth ala Adam Smith is “falling unit transaction costs”, which facilitate ever-increasing transactions and specialization of economic organization (Yang and Ng 1993). This proposition emanated from the new institutional economics and was used to explain the role of labour specialization in agricultural development (Roumasset and Smith 1981). In Yang’s formalization (2003, ch.4), unit transaction costs are driven down by the endogenous emergence of middlemen, whose specialization is warranted by the extent of the (growing) potential market. For example, the institution of piece rates with teams (Roumasset and Uy 1980) economized on labour recruiting and supervision costs by relying on direct contracting between the farm operator and the team leader, who maintained a reputation for reliability.

Figure 6 provides a stylized evolutionary pattern of labour contracts. During Stage I, labour is provided by the farm household; exchange arrangements are then additionally made with residents in the same village. During Stage II, i.e. the next three rows of Figure 6, hired labour emerges. At first, labour is hired on a wage basis and workers are not differentiated with respect to task. As horizontal specialization increases, piece rate workers are hired for selected tasks (those which are relatively easy to monitor) and undifferentiated wage labour declines. The third phase of Stage II involves a further decrease in undifferentiated wage labour, a decline in individually hired piece workers and the advent of two new contracts. In “piece rate with team labour”, the farm operator negotiates with a labour contractor who also serves as team leader and supervisor. The other new form (specialized wage labour) involves skilled labourers who specialize in particular tasks and get paid in wages. These new forms come to dominate the other forms of hired labour in Stage III. Piece rate with teams continues to replace individual piece rate contracts whereas specialized wage labour replaces undifferentiated wage labour and most of household labour.<sup>20</sup>

<sup>19</sup> Hoff and Stiglitz (1998), Bose (1998).

<sup>20</sup> For statistical documentation and further discussion, see Setboonsarng (1991), Roumasset *et al.* (1995) and Roumasset (2001).



**Figure 6. Intensification and specialization**

The explanation of the above dynamic pattern of labour contracts is similar to the agency theory explanation of the spectrum of agricultural firms (Figure 5). In both cases, the objective is to explain a spectrum of contracts ranked according to specialization. In the cross section case, the same preconditions for production intensity (e.g. land quality) also predispose a more specialized organizational form. As the profit-maximizing level of inputs increases, more production management is warranted, indicating an organizational form wherein the manager is rewarded with a larger share of the residual. That is, the agency costs associated with shirking of non-labour inputs increase moving towards better quality land, and these costs are best economized by supervising labour and incentivizing managers (Roumasset 1995).

As farm production intensifies, labour inputs increase, until the last stage wherein capital-labour substitution overcomes input intensification. Labour contracts are increasingly specialized, eventually with labour contracts made on a task-by-task basis. Thus intensification and specialization are coevolutionary. The diagram also helps to resolve the fundamental paradox that total transaction costs increase as economic development proceeds (North and Wallis 1982). In this scenario, unit costs of transportation and communication (unit transaction costs) tend to fall while improved institutions tend to lower agency costs (supervision plus residual shirking costs) per unit of labour hired, but because more labour is hired and because specialization increases the number of contracts (even if normalized by yield per hectare), transaction expenditures rise.

Note, however, that economic efficiency does not imply that shadow price differences across space and time disappear altogether. The efficiency condition is rather that such differences cannot exceed the cost of transport and storage, respectively (Kratz and Roumasset 2001). Econometric tests for market integration, using modern techniques of cointegration, appear to have failed to specify this

integration hypothesis correctly. Moreover, shadow prices of inputs and outputs can vary across agents in the efficient solution according to the household wedge model discussed above.

### *Summary and implications for development policy*

Policy failures result from a combination of bad economics and rent-seeking behaviour of politicians. Through “blackboard economics” – including misplaced exogeneity – analysts unwittingly assume inefficiency in order to conclude that market inefficiency exists while naively presuming that government actions will not be plagued by the very transaction costs that limit markets. When donors and politicians alike are in denial about their failures and throw more money at the very problems they have exacerbated, “band-aid” and “black-hole” cycles of ever greater public spending and worsening distortions are promulgated.

The key to avoiding misplaced exogeneity is to capture the essence of institutions and to provide fundamental explanations thereof. New institutional economics provides an explanatory framework with three levels of analysis. First-best analysis abstracts from transaction costs. Second-best analysis incorporates transaction costs. Third-best analysis incorporates the costs of political action and other elements of public choice. For example, the case for land-to-the-tiller reform, which is based on the inverse correlation between farm size and yield-per-hectare, can be refuted at both the first and second-best levels. On the first-best level, it can be shown that efficient organization of family farming requires that good quality land be organized in larger farms than poorer quality land (Roumasset and James 1979) thereby revealing the fallacy in the inverse-relationship-implies-inefficiency thesis. On the second-best level, the wedge model can be used to show that smaller farms face higher shadow prices of labour (Sah 1986) such that second-best efficiency implies the inverse relationship, thereby undermining the interventionist logic once again.

Third-best analysis is exemplified by the explanation of why agricultural protection increases with a country's per-capita income (Balisacan and Roumasset 1987). In this arena of public choice, we must explicitly consider the costs and benefits of coalitional investment in political influence in order to get the appropriate comparative-static results.

One source of confusion regarding the new institutional economics concerns the plethora of definitions of transaction costs. Transaction costs have been defined most broadly by Nobel Laureate Kenneth Arrow as costs of running the economic system and are the economic equivalent of friction in physical systems (Williamson 1985). Sublevels of transaction-like costs can also be distinguished. The first is unit transaction costs, e.g. the cost of one man-hour of supervision. Another is agency cost, e.g. the unit cost of supervision times the man-hours of supervision plus the residual shirking cost. (This concept was illustrated in the agency diagrams above.)

These distinctions make it possible to explain the essence of economic development as envisioned by Adam Smith in *The Nature and Causes of the Wealth of Nations*. As social capital (including infrastructure) increases, unit transaction costs fall, thereby facilitating greater specialization. In particular, the number of both final and intermediate goods increase as does the number of distinct labour tasks and opportunities for learning-by-doing. Thus economic specialization and integration are part of the same evolutionary process (Yang 2003). Total transaction costs, in the broadest sense, increase with efficient development, i.e. the income elasticity of transaction costs is greater than one. This means that economic organization gets more complex and market deepening proceeds, faster than unit transaction costs decline.

However, natural market deepening is impeded by market-distorting interventions including trade restrictions, price interventions, shipping and other regulations and failure to provide public infrastructure, including quality standards. Marketing regulations, such as those embodied by parastatals, exemplify how government policy can stagnate the natural evolutionary process and impede an industry instead of promote it. Economic integration can be enhanced by removing

these policy distortions and by focusing on facilitating actions such as agricultural research and the provision of transportation and communication infrastructure.<sup>21</sup>

The best stabilization programme would be to abolish parastatals that monopolize international trade in grains and eliminate government-imposed barriers to entry. This policy would not only render the industry competitive but also create a rapid-response capability to import in times of unexpectedly high domestic prices by removing the elaborate contracting, procurement, bidding and other administrative requirements that delay government purchases.

It may also be appropriate for governments to assure the maintenance of a small strategic reserve for emergency purposes. But a maximum size should be established for the strategic reserve based on the conceivable number of regions that can be in deficit at the same time, the availability of rice in the local market and the minimum delivery time of foreign-sourced grain. It is difficult to imagine how such considerations can justify stocks greater than 15 times the daily consumption rate.

By considering specialization and institutional choice as endogenous, we can understand two beneficial effects that are often overlooked. First, inasmuch as institutional change is induced by changing factor prices (Ruttan 1978, 2003) – e.g. falling wages relative to rents – it allows greater substitution of labour for land, thus partially ameliorating downward pressure on wages. Second, to the extent that institutional change facilitates specialization and the external economies associated therewith (Yang 2003), it may actually overcome the original downward pressure on wages (Roumasset and Van Assche 2003).<sup>22</sup>

### **Conclusion: stop, push and facilitate**

There has long been a tendency among economists and others to use statistical evidence and stylized facts to castigate behaviour and organization in developing countries as sources of inefficiency and inequity and to propose coercive mechanisms for reshaping the economy. These attempts illustrate that empirical analysis cannot be stronger than the underlying theory. Unless the theory accounts for the nature and causes of economic organization, econometric analysis can only deliver statistical patterns. It cannot be used as the basis of policy recommendations.

The assertion that government intervention can always improve efficiency is based on a straw man version of the market in which neither private governance nor multilateral agreements are allowed. Even if such circumscribed characterizations were accepted, the theory leads only to the claim that some kind efficiency-improving intervention exists. However, the nature of the theory and the available evidence make it infeasible to prescribe specific policy reforms or to determine their consequences (Besley 1994).

When a more fundamental approach is taken, we find substantial evidence that institutional change evolves in much the same way as would be warranted by efficiency. A healthy respect for institutional

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<sup>21</sup> Note, however that statistical tests of “cointegration” do not provide a valid measure of market integration. The naive measures used presume that equality of shadow prices across space and across economic agents is the efficient benchmark. Even more sophisticated theory that equates shadow price differentials with transport costs is correct only for location pairs between which transportation of the good in question is non-zero. Moreover it is misleading to separate space from time. For example optimal trade and transportation of grain in the Philippines calls for exporting from the south following their peak harvest and importing to Manila preceding the wet season harvest on Luzon. During periods when efficient transportation is zero, shadow prices differentials can be less than transport costs.

<sup>22</sup> Econometric studies showing that hired labour is less productive than family labour fail to account for the specialization going on and for the fact that the farm operator’s labour is considerably more valuable than the shadow price of hired labour. In other words, the inefficiency arguments ignore the principle of comparative advantage.

evolution leads us to the conclusion that governments should stop trying to engineer behaviour and organization. Rather the focus should be on facilitating economic cooperation through the provision of information, legal infrastructure and opportunities for multilateral cooperation. The prerequisites for cooperation will render the time-honored strategy of pushing agricultural development through investments in research and infrastructure even more effective, especially if modern principles of public administration are employed.<sup>23</sup>

The first priority for policy reforms should be to roll back those regulations, excessive taxes and subsidies that inhibit the normal evolution of rural institutions and markets. Beyond this, reforms should be focused on increasing entry and fostering market integration through appropriate contractual and physical infrastructure. The benefits of such facilitation derive from equilibrium differences in shadow prices that prevail – e.g. due to communication and transport costs and limitations in the rule of law. This does not mean, however, that developing countries should imitate the modern institutions of high income economies, e.g. by spending vast sums on modern cadastral surveys and court proceedings in order to confer Western-style land titles before their benefits warrant their costs. Rather, appropriate rules regarding property and contracting should be allowed to evolve along with the increasing specialization and intensification of production.

The economics of rural organization with endogenous behaviour and organization is in its infancy. There is a promising body of theory featuring specialization as the central pillar of economic organization (e.g. Yang 2003) and a rich tapestry of rural institutions waiting to be described and explained. Much remains to be done.

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<sup>23</sup> Laffont and Tirole (1993).

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# Korean agricultural cooperative development

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## **Agricultural Cooperatives in the Republic of Korea**

As stated in the Agricultural Cooperative Law, the objective of Korean agricultural cooperatives is to increase agricultural productivity and enhance the socio-economic status of member farmers to achieve balanced national development. However, in the early 1960s, the realities of agrarian rural life were very harsh. Development efforts had to be efficiently organized with very limited resources. In order to optimize these resources, therefore, Republic of Korea chose a multipurpose cooperative system to meet the diversity of needs of farmers, most of who were living on small-scale farms of only about 0.9 hectares (ha) on average. During this time, the National Agricultural Cooperative Federation (NACF), the umbrella organization of farm cooperatives, was launched and merged with the Agricultural Bank, which provided financial support to the various programmes.

There are now two million member farmers in the 1 360 member cooperatives in the Republic of Korea, comprising almost all of the Korean farm households. In serving members and acting as the agricultural and rural development agency for the country, agricultural cooperatives provide diversified business services and activities. These include cooperative marketing, provision of farm inputs and consumer goods, credit and banking, insurance, warehousing, transportation, extension and other social and cultural activities.

The NACF now operates more than 800 bank branches and over 600 business centres for marketing and processing as well as various subsidiary enterprises while managing institutions (e.g. training institutes, an agricultural cooperative college and the Farmers Newspaper). In banking alone, the NACF network holds the largest amount of deposits in the Republic of Korea totaling US\$160 billion, including mutual credit for member cooperatives which would be ranked top among domestic banks, including all commercial banks. In marketing, more than 40 percent of total farm production volume is handled by agricultural cooperatives.

Our achievement over the past 43 years has been remarkable and the institution has now become a model for agricultural cooperative movements around the world. However, as is true for the international cooperative movement today, we must meet the challenges that confront our member farmers internally as well as those presented by the overall agricultural economy in order to make future progress. Particularly, ongoing negotiations following the World Trade Organization Doha Development Agenda (WTO-DDA) will present more painful challenges to Korean agriculture, which had already been hit severely by the Uruguay Round ten years ago.

It is important for agricultural cooperatives in the Republic of Korea to become more competitive in this rapidly changing globalized economy. We should meet the challenges of a changing environment – e.g. in agricultural structure, competitors, technological innovation and globalization – and work to devise a strategic plan to respond to these changes.

In this paper, I first discuss the development of Korean agricultural cooperatives. I then focus more on the emerging trends in the cooperative movement worldwide and the challenges that it must face. Some of them can be seen in your cooperative movement; others may still happen in the

future. I hope this paper will help you understand better the situation of your own cooperative system and possibly contribute to making them stronger to meet imminent challenges.

### **The development of Korean agricultural cooperatives**

Every country has its own organization and management system for cooperatives. The development stages of cooperatives differ from one another. This diversity can be traced to the environment of these organizations. Korean agricultural cooperatives formed and developed on the basis of small-scale farming. Meanwhile, the Korean agricultural cooperative system has been influenced by government policy and its political, economic and social surroundings.

Agricultural cooperatives are the most prevalent type of organization in the Republic of Korea. Therefore, their business and management systems have had a significant influence on other cooperatives. They also lay claim to large business volumes and organizational structure and thus contribute considerably to the rural and national economy.

The reason why the cooperative movement in the Republic of Korea is still led by agricultural cooperatives in this highly industrialized society can be understood by examining the historical, political and cultural background of the country.

After Korea's independence from Japan in 1945, government policy allowed agricultural cooperatives to take over previously established facilities and organizations, including national credit cooperatives and agricultural associations. It became easy for Korean agricultural cooperatives to become the prominent organization in the cooperative movement in the country. In the 1960s, agricultural cooperatives implemented agricultural policy and were given substantial support from the Korean government, which made rapid cooperative development possible.

#### *From a top-down to a bottom-top system*

In the 1950s and 1960s when Korean agricultural cooperatives were established, Korean farmers generally did not have the will or the means to develop a cooperative system. At that time, rural communities were devastated and suffered from chronic food shortages. Most Korean people felt it was important to build up a government-led cooperative system to facilitate the recovery of the rural economy. Thus, the Korean agricultural cooperative system was established in a top-down fashion. First, the Agricultural Cooperative Law was enacted. The establishment of the national federation followed. Finally, county-level cooperatives were organized. Korean agricultural cooperatives constructed their business system in a short time by taking over previously established agricultural organizations such as the former Agricultural Bank.

Looking back on the development and experience of Korean agricultural cooperatives over the last 43 years, it is believed that this top-down organization had been the best choice for the early stages of the cooperatives. However, the top-down method could not always be justified because a democratic and autonomous agricultural cooperative system was also considered important. The year 1988 marked another milestone with the enactment of the new Agricultural Cooperative Law. This law introduced the direct election of presidents of regional cooperatives as well as the chairman of the federation. It also did away with the right of local governments to supervise regional cooperatives.

#### *Multipurpose cooperatives*

The Korean agricultural cooperative system is unique in its diversity of business and activities, which include banking, insurance, agricultural marketing and extension services. Furthermore, its banking business is similar to that of commercial banks in supporting financing for other businesses. Initially, a multipurpose system was adopted because extensive support for Korean farmers was

essential. Korean farms were then small (i.e. under 1 ha farming, itself not specialized); therefore, Republic of Korea considered the Japanese case where small-scale farming was also dominant and used multipurpose cooperatives to achieve agricultural development.

This multipurpose character of Korean agricultural cooperatives is counted as another reason for their widespread success. In the 1970s, credit unions and consumers' cooperatives were rare in rural communities. But Korean agricultural cooperatives eventually became involved in mutual credit and retail business, which made them an important part of the rural community.

#### *Agency for government policy*

It is natural for Korean agricultural cooperatives to have a close relationship with the government because the establishment of the cooperative system depended largely on government policy rather than on farmers' voluntary will. Agricultural cooperatives have been involved in the implementation of agricultural policy for the government – e.g. supplying agricultural funds and farm supplies, stabilizing agricultural product prices, purchasing harvested rice and providing farming technology programmes. If profit-oriented private corporations had carried out these programmes, the farmers might have become victims of unfair business practices and monopolistic behaviour. The government also benefited since it could cut costs by using the cooperatives, which had direct contact with farmers, to implement various agricultural programmes.

Considering the current environment surrounding the country's agriculture industry and rural communities, a close relationship between the government and agricultural cooperatives has gained importance once again. Globalization and market liberalization have increased the competition Korean farmers now face. In this scenario, government should expand its financial and institutional support for agricultural cooperatives to protect the domestic agricultural industry and rural communities. Korean agricultural cooperatives should actively support and implement agricultural policy to benefit member farmers.

### **World agricultural policy**

#### *Focus on multifunctionality and the environment*

The main ideology of farming and agricultural policy today entails moving away from a production-oriented concept – which focuses on production volumes, profitability and producer income – to a wider concept that appreciates the need to improve the quality of food and farm products, promote the multifunctionality of agriculture and enhance the environmental role of agriculture. The European Union is trying to change its agricultural policy to integrate agriculture, environment and regionalism. It has been promoting the multifunctionality of agriculture through Agenda 2000 and subsequent agricultural reform. Responding to globalization, Japan introduced the “New Policy” in 1992, which aims to change the goals of domestic food and agricultural policy in light of consumer interests rather than just the interests of producers or farmers. In the United States of America, they also recognize that environmental protection, rural development and safe food supply are important policy objectives.

#### *The introduction of direct payments*

Direct payments have an important role as market involvement is minimized in state agricultural support policy. There seems to be strengthened tax adjustment crossing borders and increased restrictions on subsidy policies including domestic price support. The practice of providing direct payments represents the main farm support policy today; it aims to balance the national economy by publicly paying farmers for the various benefits the multifunctionality of agriculture provides. Large amounts of direct payments have been given to farmers even in developed countries in order to implement satisfactory environmental protection and control the negative affects agriculture may have on the ecosystem.

### *Partnerships and regionalism*

The regional nature of planning and policy implementation in agriculture has drawn much attention. Partnerships among various groups including community members and policy-makers within a region are growing in number. The European Union's LEADER, Japan's direct payment to farmers in semi-mountainous areas and the United States of America's rural promotion programme all place importance on understanding the unique characteristics of rural communities and collaborating among various groups. We can thus witness the changes in policy planning and implementation of rural development programmes from a top-down method initiated by government to a bottom-up approach led by rural people.

### *Emphasizing consumers and food safety*

Establishment of policies that ensure food safety at all levels (i.e. production, marketing and consumption) now holds the highest priority as concerns about food safety increase – especially so after recent BSE outbreaks, overusage of antibiotics and evidence of chemical residues such as dioxins in food. Measures are being undertaken to ensure safety of food in all European Union member countries. The issue is increasingly gaining more attention in each country's agricultural ministries as manifested by changes in labeling and in the roles and structures of government agencies responsible for food safety. In addition, the Codex Alimentarius Commission adopted the Hazard Analysis Critical Control Point (HACCP) and recommended member countries to implement the system.

## **Trends in the cooperative movement in the 21<sup>st</sup> Century**

### *Challenges and opportunities in agricultural cooperative movement*

The modern cooperative movement emerged from the Industrial Revolution. Human history showed us that we could build a sound economic society based on cooperative values. Cooperatives competed with corporations during the growth and development of a capitalist society but were different in their objective, concept and method.

Cooperatives are an effective way of promoting rural development in many developing countries. They contribute to enhancing the social and economic status of members, serve as a countervailing force against monopolies of corporations and increase the bargaining power of relatively weak members.

Cooperative management unfortunately shows some weaknesses relative to corporate management. Although cooperatives have many advantages, they experience difficulty in coping with a rapidly changing environment, which requires flexibility. The worsening situation caused by the economic crisis in Asia in 1997 and the opening of markets after the Uruguay Round in 1993 gave a fatal blow to many of the cooperatives. Many small cooperatives in Southeast Asia went bankrupt and member involvement deteriorated. The debt of farm households doubled during this tumultuous period, and the index of terms of trade for farmers decreased by 13 percent from 1995 to 2002. Members of our own organization, the NACF, experienced similar hardships.

On the other hand, globalization and free markets provided large multinational corporations good opportunities to expand their operations, as the whole world was busy emphasizing the importance of free trade and an open economic system.

Cooperatives need to overcome the new challenges: namely, an influx of multinational corporations and the inflow of their capital into domestic or local markets, where cooperatives work beyond their capacity. Considering the characteristics of cooperatives, which are usually organized and operated in a familiar rural community, expansion of local markets can make a big impact.

Since the end of the 20<sup>th</sup> century, the rapid development in technology, globalization and trade liberalization have been the driving forces behind the creation of a global village. This movement presents many threats to traditional cooperatives, a lesson we had learned in the Industrial Revolution 150 years ago. The question then is whether the global cooperative movement will kneel to this new revolution or take advantage of challenges to upgrade the cooperative movement in the 21<sup>st</sup> century.

The answer to the question is quite obvious. I dare say that one of the most significant findings in modern civilization is the “cooperative identity”, which states that: The cooperative is an organization operating a business through cooperation to benefit members and improve the value of life. A cooperative member is hence owner, controller, beneficiary as well as customer of the business. The value and principle of a cooperative varies depending on the present paradigm. The concept of cooperative identity however can be adopted into the cooperative movement of the 21<sup>st</sup> century.

In spite of their theoretical strengths, globalization and trade liberalization have weak points as well. These movements have generated concentration of capital and resources through principles of unrestrained competition and survival of the fittest. With regard to business administration, cooperatives need to be adventurous enough to adopt management-improvement techniques of the business enterprise. Needless to say, broad strategic alliances among domestic or international cooperatives are essential in order to compete with multinational corporations and overcome regional limits.

#### *Recent trends in cooperatives*

##### 1. Promoting utilization of the business

Members’ utilization of the cooperative business is both a right and an obligation included in cooperative law and articles. Membership can be revoked or limited if these regulations are not followed and if cooperatives place greater emphasis on member relations. With strict conditions on food safety, for example, only qualified farm products can be delivered Under the Aglian Produce Ltd, the potato cooperative of United Kingdom. The Sunkist cooperative is likewise intensifying requirements on quality. The New Generation Cooperative is associating stock with the right of shipment and making contracts with member farmers under certain conditions (e.g. the obligation of shipment, quality requirements and financial settlement and sanction measures). Therefore, the emphasis is on moving from “equity” to “equality”.

The “free rider” problem is also being overcome. New businesses have been introduced that allow differential application of prices and costs according to utilization in contrast to traditional practices (i.e. wherein every member is entitled to equal prices and equal costs). Accordingly, the relationship between the cooperative and its members is developing into one that is increasingly “business-oriented”. Cooperatives are looking to give member benefits by focusing more on contract-based relationships (i.e. between cooperative and member) and fulfilling the rights and obligations designated in the contract.

##### 2. Changes in membership systems

The cooperatives in many countries are changing their membership system to improve stability and competitiveness of their businesses. Changes include widening the door for potential members and introducing an “associate member” system. This is mostly practiced by cooperatives specializing in mutual credit. For example, the Credit Agricole Group in France opened its membership to almost every customer who patronizes local banking branches.

The associate member system is already quite popular. Most cooperatives in the European Union as well as in Japan have adopted this system. The “Overseas Associate Member System”, which entitles members of overseas agricultural cooperatives to membership in domestic cooperatives,



was adopted as a strategy by cooperatives in the United States of America and Europe (particularly those involved in the processing and sale of farm products) to reduce costs by sourcing raw produce from overseas. Moody's, the world's third top-rated credit rating company, emphasizes "stability in the number of members" in rating agricultural cooperatives.

### 3. Mergers and subsidiaries

Some cooperatives have been merging in order to attain economies of scale. Denmark has a strong cooperative movement in the swine industry. There were around 50 slaughterhouse cooperatives in 1970 but the number fell to only two in 2002. In Japan this year, there are 944 agricultural cooperatives in operation, down by 1 691 cooperatives from eight years ago. Local cooperatives in the United States are becoming bigger, forming what are called "super local cooperatives".

Cooperative federations have likewise been expanding their business operations. Credit Agricole of France and Rabobank of the Netherlands are examples of cooperatives that have grown into global financial cooperative enterprises.

Cooperatives are also using subsidiary companies in conducting business. Cebeco of the Netherlands operates more than 100 subsidiaries; Bayern agricultural cooperative has 27 subsidiaries including Byawa; Credit Agricole has 298 subsidiaries; and the Japanese agricultural cooperatives operate around 1 000 subsidiaries.

### 4. Increasing capital

Cooperatives have been seeking methods to increase operational funds in order to solve the common problem of capital restrictions. The Cmapina Melkunie milk cooperatives of the Netherlands solved this problem by increasing the portion of internal reserves from patronage dividends to members. Other livestock and dairy cooperatives in Europe introduced the per unit capital retained; in certain areas, some part of transaction fee from members is set aside as capital reserve. Some Danish dairy cooperatives (e.g. MD Foods) use the base capital plan as means of increasing internal capital. Members invest an additional 2.7 euros per tonne of milk delivered to the cooperative. Selling shares without voting rights is a very well known method used by agricultural cooperatives in Saskatchewan, Canada. Disposing of unnecessary assets is also one way of expanding cooperative capital.

### 5. Cooperative governance

Cooperatives engaged in farm product processing and sale are now trying to attract new management and professional CEOs even from their rivals in businesses ranging from food processing companies to large-scale consumer goods marketing complexes. Land O'Lakes, the dairy cooperative in the United States of America, recruited its new CEOs from large-scale food marketing companies such as Kellogg, Kraft, Pillsbury and General Mills. Welch's, the subsidiary of the National Grain Cooperative in the United States, selected four of its ten board members from outside the company.

Education and training of management and staff members have become increasingly more important. It is generally true that directors from the farming profession have abundant knowledge about farm production but they lack experience and skills needed to manage a business organization and cope with changes in the market. Agricultural cooperatives in France in alliance with ESSEC business graduate school opened the "Seneque" (educational course for management strategy) nationwide to boost the effectiveness of their board of directors. Agricultural cooperatives in the United States of America encourage members and young staff to participate in cooperative leader training courses or workshops hosted by the Missouri University or Columbia University and run by the Young Farmers/ Cooperative Movement Conductor Programme.

## **Conclusion**

Cooperatives are business enterprises that need to cope with problems on their own in the future. They should become market-oriented enterprises as members will not support them if they do not receive any economic benefit. Cooperatives should accept the need to shift from the traditional model to one that is more effective while maintaining the fundamental identity of cooperatives. We need a new financial plan to increase funds of cooperatives in order to increase owners' equity, but this plan should be in harmony with cooperative principles. Cooperatives should increase their business competitiveness by hiring professional managers and board members and strengthening the training of staff members. They should obtain government support by adopting market-oriented business methods while holding on to their core identity.

# Japanese agricultural cooperative development

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This country report shares how our organization, JA-ZENCHU, sees the policy issues relating to food security and Japanese agricultural cooperative development.

Japan has hitherto held the maintenance and strengthening of the free trade system under the World Trade Organization (WTO) at the centre of its international trade policy. However, it has recently adopted a policy stance to promote bilateral Free Trade Agreements (FTAs), with a view of supplementing the WTO trading system. As an example (see Figure 1), the first ever FTA for Japan was concluded with Singapore in November 2002. This agreement is currently being implemented. Negotiations with Mexico are also being pursued. Discussions are now at the final stage. Furthermore, negotiations have started with four countries – Republic of Korea, Thailand, Philippines and Malaysia –with an eye to concluding FTAs with each of them. A study is being conducted to see if it is appropriate to launch FTA negotiations with Indonesia as well.

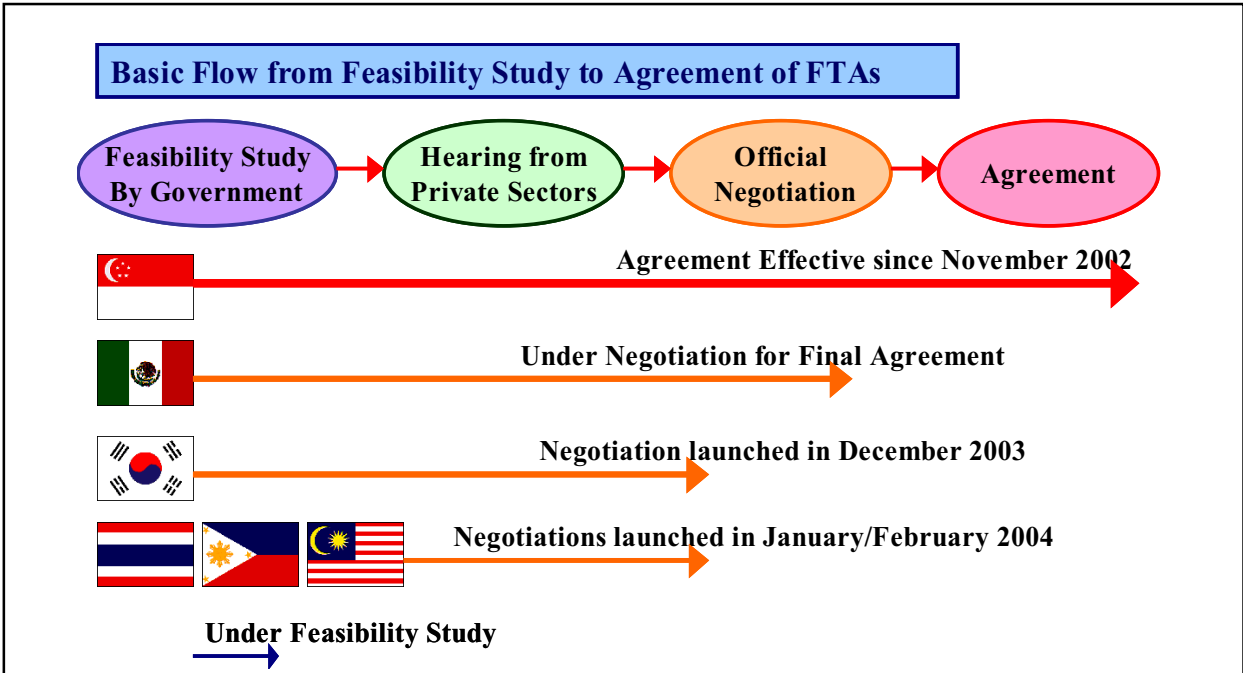


Figure 1

Overall trade balance with Asian countries is currently in Japan’s favour, with exports predominantly made up of industrial products. With regards to agricultural trade, Japan is a large net importer.

There are similarities and differences in agricultural and rural situations of Asian countries, which all belong to monsoon Asia. First, labour-intensive, small-scale family businesses centring on paddy culture predominate agriculture in the region. The average size of farms in Asian countries including Japan is about one hectare per farm household. Asian agriculture cannot survive price

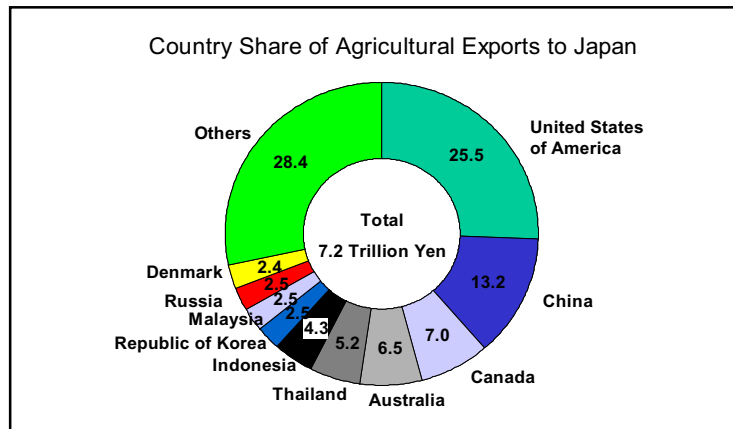


Figure 2

competition with its low productivity and it may not be incorrect to say that countries tend to increase dependence on imports.

Second, we can take the climatic conditions as a common feature of agriculture in Asia. Cities such as Seoul of Republic of Korea, Bangkok of Thailand and Calcutta of India receive more than 150 mm of monthly rain during the period from May to October – a situation typical of monsoon Asia. Rainfall (Figure 3) is indispensable for paddy farming in the region. Asian nations have taken advantage of rainfall over their long history and have developed agricultural production centred on paddy culture. They have thus been able to supply Asia's large population with rice as staple food.

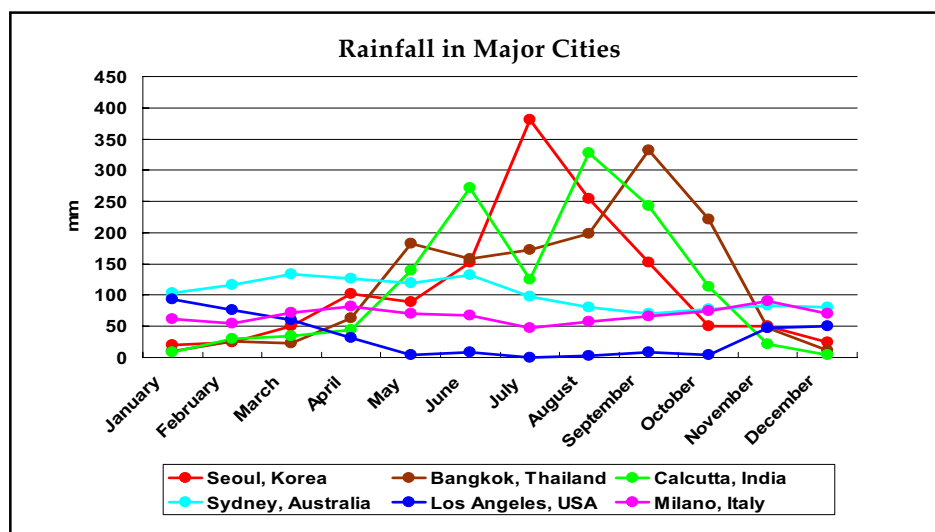


Figure 3

The third commonality of Asian countries is that all are experiencing, albeit in various ways, the adverse impacts of the Uruguay Round Agreement on Agriculture. From the foregoing, it is to be feared that still a larger number of Asian countries will be swallowed by the wave of internationalization in the future given that their agriculture is small in scale.

In negotiating FTAs among countries of monsoon Asia, two issues arise in the context of the aforementioned characteristics of the region. One is the question of how we can assure ourselves of the security of food supply in densely populated Asian countries where rice is important in terms of

both agricultural production and food consumption and where poverty prevails in rural communities. The second is the question of how we can help agriculture survive under circumstances that are unique in Asia – i.e. small-scale family operations under similar conditions of land, nature and climate.

In the light of this, the views of JA-ZENCHU on FTAs among countries of monsoon Asia are the following:

- (1) Negotiations between two countries must be conducted with the aim of bringing about mutual development and prosperity. One is apt to think that problems faced by an Asian nation are unlike those confronting Japan because of the difference in level of economic development. However, all countries share the long history, culture and values of Asia. Instead, it would be more helpful to think of how such common features can be mutually enhanced so as to move the economic partnership forward.
- (2) Negotiations should also be conducted with the aim of enhancing the quality of life and incomes of farmers. While we are engaged in agricultural production under common climatic conditions, it is feared that the new continent type of agriculture (e.g. farming in the United States of America and Australia) may drive out Asian agriculture under the WTO system in the long run. Therefore, FTAs ought to be considered from the angle of how Asian agriculture can survive.
- (3) A new approach should be taken so as to secure a nice balance between farm trade liberalization and cooperation in agriculture in the form of assistance for rural development and on matters of food safety.

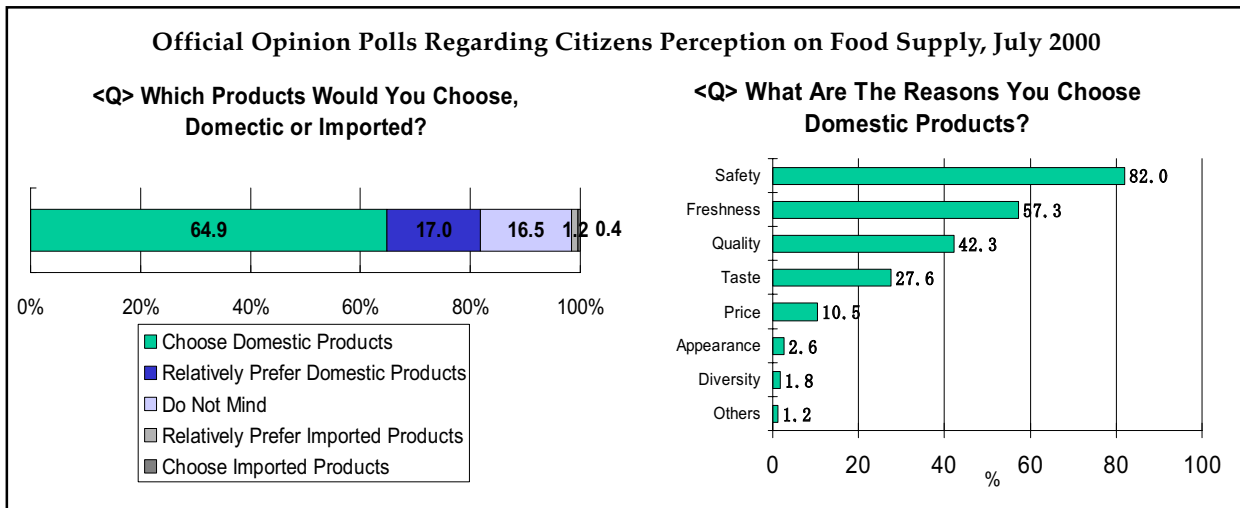
How does JA-ZENCHU view possible “cooperation” in agriculture within a framework of economic partnership or FTA with countries of monsoon Asia? We can think of three areas for cooperation: (1) international movement of damaging pests and insects; (2) food safety; and (3) rural development.

First, there is room for cooperation in addressing the problem of cross-border movement of pests and insects that are foreign to and do not exist in the country. Several outbreaks of pest- and insect-related diseases have occurred in Japan in recent years. Asian countries witnessed, for instance, the case of the foot-and-mouth disease in 2000, the BSE outbreak in 2001 and the avian flu this year.

The two countries party to negotiation will need to set up a framework of cooperation in the FTA negotiations from the viewpoint of: (1) how to prevent entry of harmful pests and insects into partner countries and (2) how to contain the damage of an outbreak (i.e. measures to prevent them from spreading).

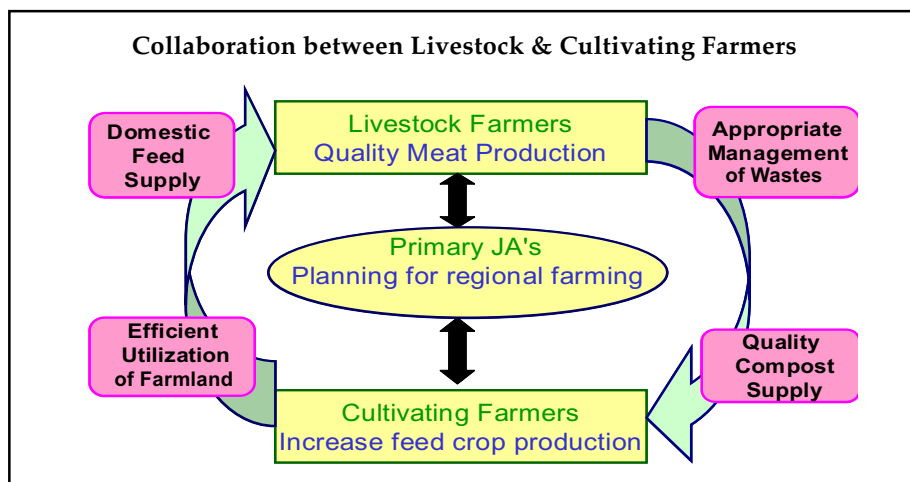
In connection with cooperation on food safety, consumers’ concern over this issue has been noticeably rising in Japan. According to public opinion surveys (Figure 4) of the government conducted in July 2000, 81.9 percent of the respondent opted for domestic produce when asked to choose between domestic and imported produce; 1.6 percent said they would choose the latter. About 82 percent said they would choose domestic produce for safety reasons, followed by freshness (57 percent), quality (42 percent) and taste or flavour (28 percent). This indicates that Japanese consumers have a stronger attachment to safety and quality than to prices when it comes to their food choices.

The outbreak of BSE in 2001 numbers among the reasons behind the heightened concern of consumers. Japan has also often experienced incidents of excessive farm chemical residues in imported foods. It is clear that rather than simply eliminating each others’ import tariffs, an important challenge under the FTA framework is to arrive at a situation wherein agricultural products can be mutually supplied and consumed with a sense of safety. Thus, cooperation needs to be advanced with respect to food safety as well.



**Figure 4**

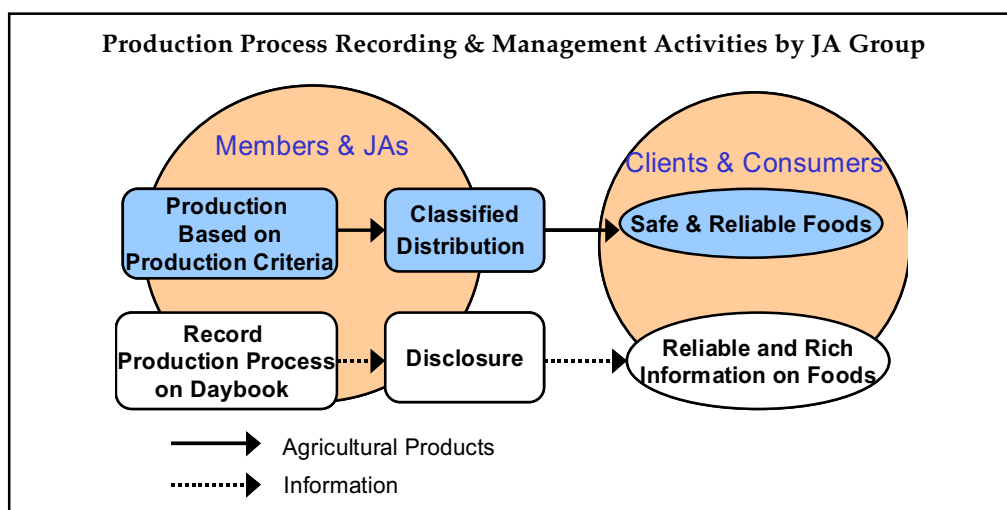
With regard to cooperation in the field of rural development, the JA group is already engaged in this field of activity. The group has been promoting an environment-friendly type of agriculture based on cooperation between crop farmers and livestock farmers. More concretely, the primary level JA cooperative formulates the agriculture development plan and promotes fodder crops production in areas within the paddy field that have been set aside based on the plan; when harvested, crops from these areas are then supplied to livestock farms. On their part, livestock farmers are encouraged to properly process waste of animals so that manures can be supplied to crop farms. Setting up such a system of interrelationships is being encouraged. (See Figure 5.)



**Figure 5**

The JA group is also promoting “the campaign for controlling and book-keeping of the production process.” (Figure 6) The upper part of the picture shows the flow of agricultural products. A primary JA first establishes the standard of production by taking the views and intents of member farmers. Farmers then grow the produce following this standard, place the harvest on segregated shipment and deliver these to buyers and consumers.

The lower section of the picture shows the flow of information. A JA cooperative first makes formats for the books and distributes them among member farmers. Farmers then keep records of



**Figure 6**

production activities (e.g. the state of farm chemical use) and submit it to JA. JA then double-checks what is written on the book and transmits the production information to the buyers and consumers. This campaign has been making substantial headway among the JA cooperatives all over Japan, its success driven by strong concern for and interest in food safety on the part of consumers.

Initiatives for rural development have been taken not only by the JA group in Japan but also in Thailand, where they are promoting the “one crop in one village” campaign, and Republic of Korea, where they are engaged in direct sales of domestic produce at “Hanaro Mart.”

JA-ZENCHU is concerned about the direction that Japanese agriculture should pursue in economic partnership agreements with countries of monsoon Asia.

An economic partnership agreement in Asia should incorporate in its agricultural provisions various forms of agricultural cooperation between the governments as well as between agricultural organizations. This is based on the criterion that any agreement must be truly beneficial to farmers and conducive to solving the problem of poverty.

By way of illustration, a good example of agricultural cooperation is on the issue of food safety. In tackling this issue, a healthy partnership would involve cooperation for the acquisition of necessary knowledge and the sharing of experiences with the partner country to be able to build a good system and appropriate legal provisions for securing food safety.

In order to mutually ensure sustainable development of agriculture, an agreement should not simply pursue trade liberalization but must also incorporate agricultural cooperation in the area of food safety and rural development to make it truly beneficial to farmers.

JA-ZENCHU strongly believes it is only through partnership and true cooperation – and not in an antagonistic fashion – that we can fulfill our aspirations for mutual benefit of countries and coexistence of agriculture in Asia and meet our goal of sustainable food security in the region.

# Social security, gender and food security in China<sup>1</sup>

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## Introduction

In many developing countries, agriculture contributes to social viability by relieving the urban sector of premature rural to urban migration and therefore reduces the social costs arising from congestion of urban areas. The institutional setting of the social safety net in China makes its agriculture crucial to ensuring social viability.

In the past, movement of rural labour to urban areas had been effectively restricted by the registration system and food rations. As a consequence, the share of farm labour in total employment did not decline in parallel with agriculture's GDP share. In recent years, the Chinese government began to relax restrictions. Rural to urban migration increased rapidly. The trend has accelerated along with China's economic reforms.

Nevertheless, due to the rural-urban separation in social welfare provision, agriculture in rural areas still retains a primary role in providing social viability to rural residents. This is because of rural China's unique nature where land is distributed much more equally than in many other developing countries. The land tenure system, though largely community-oriented, essentially functions as a substitute to the rural welfare system.

In general, the land tenure system contributed significantly to food security and the country's agricultural development. With WTO accession, new challenges and opportunities have emerged vis-à-vis food security and agricultural development, in turn posing new questions about the role of agriculture in providing a social cushion in possible downturns.

There is also clear evidence in rural areas recently of an increasing feminization of Chinese agriculture. Questions thus arise as to whether the feminization process has adverse impacts on agriculture and food security and how the role of women in contributing to food security in rural China can be appropriately recognized and taken into account in formulating agricultural policies.

The objective of this paper is to gain better understanding of the role of agriculture under the social and institutional settings of China given the new macroenvironment. Particular attention is paid to how women contribute to agricultural production and sustained food security. Some policy guidelines on how to enhance the role of agriculture in providing social viability and to recognize women's contribution to food security in China are also provided.

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<sup>1</sup> This paper is drawn from various previous studies by both the author and her collaborators in the past few years. Specifically, the author would like to thank Jikun Huang, Scott Rozelle and Chengfang Liu for their efforts and collaboration in the past works.

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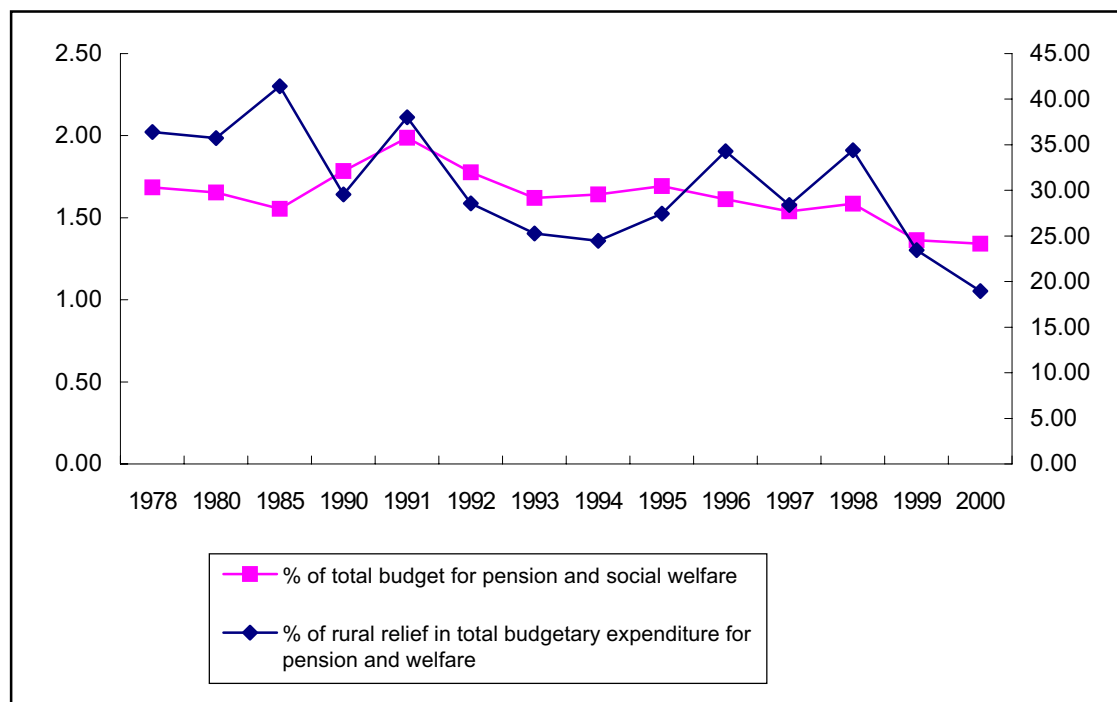
The paper is organized as follows. In the next section, a brief description of the social safety nets in China is provided with specific attention paid to implications of the system on rural residents. Analysis is then provided to identify the role agriculture plays in ensuring social viability and to describe how women contribute to agriculture and rural development via their participation in off-farm employment and agricultural production. The last section concludes with specific findings and corresponding policy implications, which illuminate how best to promote agricultural development and food security in China under the new global economic environment.

### Overview of the social security system in China

Institutionalized mechanisms of social welfare and security have been established in China in the past half century. One thing worthy of noting is that China has adapted the term “safety nets” for such mechanisms. Safety nets are used to refer to the provision of basic forms of social protection by the government, particularly relief provision for those who are not covered by the major systems of social security and insurance (Zhu 1999; Cook 2003). To put it another way, safety nets are taken as an extension of the formal system of welfare provision in China (Cook 2003).

Budgetary spending on pension and social welfare has been increasing since the late 1970s. As shown in Figure 1, the government allocated 1.9 billion yuan for pension, relief and other social welfare purposes at the beginning of the reform period. By 2001, this budget had increased to 26.7 billion yuan (current prices). However, this was surpassed by the increase in total budgetary expenditure during the period. As a result, the proportion of spending on pension and social welfare to the total budget decreased from 1.7 percent in 1978 to 1.4 percent in 2001.

The portion of budgetary resources for pension and social welfare that goes to rural relief has been disproportionately low in light of the massive number of people residing in rural areas. This was especially true in late 1990s. By 2000, the amount spent on rural relief funds accounted for only 19 percent of the total budgetary expenditure on pension and social welfare. Considering the



Source: calculated by authors based on China Statistical Yearbook, 2002.

Figure 1. Budgetary expenditure on social safety nets

various risks, insecurities and vulnerabilities faced by rural residents, this leaves much to be desired as to the state of social security provision in rural areas.

*Rural-urban separation*

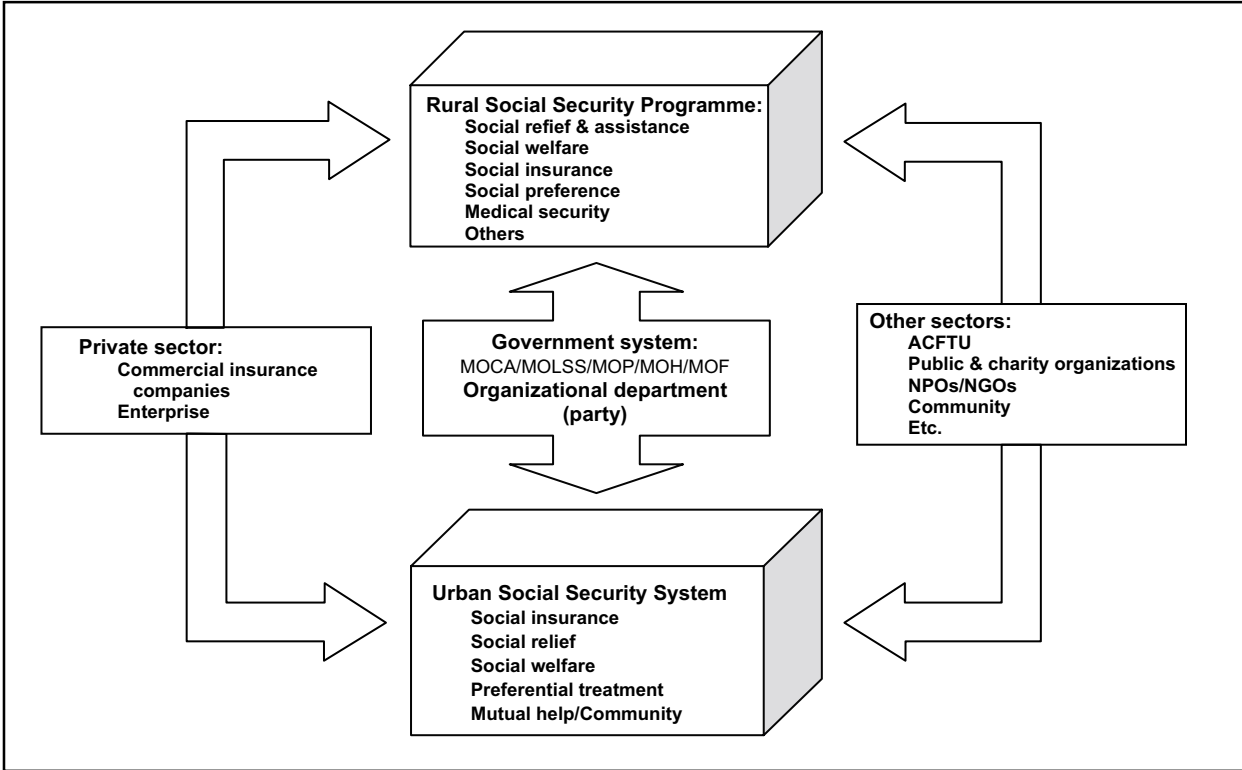
As Figure 2 shows, there exist institutionalized forms of exclusion and clear lines of demarcation between rural and urban residents in China. One prominent feature of the welfare provision system established in pre-reform China was the division between the systematic “three irons” security provided to urban workers and the much less generous (and ad hoc) programmes providing social relief and assistance to rural residents. In terms of coverage of social welfare provision by formal government and collective institutions, there is an obvious rural-urban inequality, with coverage of 90 percent in urban areas and 24 percent in the rural population.

*Sectoral separation*

Another distinct feature of the system is the separation between government line agencies, private institutions and other sectors with responsibilities for and involvement in welfare provision. The transition process has weakened the distinction and separation to some extent, but access to welfare entitlements remains quite limited for rural folk (Cook 2003).

*Formal social security system in urban areas*

The government has a strong commitment to mitigating the social impacts of potential major economic crises or disasters through a well-defined social security system. Figure 2 gives an overview of the social security system/programmes in China. Five out of the 29 departments/agencies directly under the State Council have special responsibilities for social security provision in the urban sector,



Source: Adapted from Cook (2003).

**Figure 2. Social security system and programmes in China**

including social or occupational insurance, social welfare, social relief/assistance, and social preference programmes administered by the respective ministries. These programmes include the following:

- Social or occupational insurance – including pension and health benefits for special categories offered by the Ministry of Civil Affairs (MOCA), the Ministry of Labour and Social Securities (MOLSS), the Ministry of Personnel (MOP) and the Ministry of Health (MOH); and unemployment insurance by MOLSS. In addition, the Organizational Department (OP) in the Chinese Communist Party system is responsible for pension insurance and health care for senior cadres.
- Social relief – including disaster and poverty relief, minimum living standards relief, and hardship relief programmes for special groups of people funded and implemented by the MOCA, MOLSS, MOP, OP and the All China Federation Trade Union (ACFTU), respectively.
- Social welfare services – including welfare homes/factories for special categories administered by MOCA, reemployment training programmes and labour market services provided by MOLSS and welfare for public servants by MOCA, MOP and OP.
- Preferential services – for special categories of people who have contributed to the country, such as veterans, disabled servicemen and families of martyrs during the revolution.
- Other programs – these include mutual help in communities, volunteer activities and donations.

One point worthy of noting is that among the departments and ministries involved in welfare provision, the MOLSS is the only one with stipulated responsibilities over unemployment insurance, hardship relief for enterprise employees and laid-off workers, re-employment and training programmes and labour market services. These security provisions mainly target the people within the work force. Urban migrant workers and those who fall outside of the formal social security system have to rely on irregular social relief/assistance (in kind or cash) or other informal resources such as commercial insurance companies, enterprises and non-governmental organizations (NGOs)/non-profit organizations (NPOs) for support.

#### *Social security programmes in rural areas*

In the transition from a centrally-planned economy to a market-oriented one, traditional rural collective safety nets have been eroded by decollectivization, market liberalization and (effective) privatization of health and education services (Cook 2003). Social security in rural sector is not as institutionalized as that in urban sector. Rather, it is mainly funded and implemented as programmes. These include:

- Social relief and assistance programmes – payments in cash or kind to poverty-stricken households and relief to victims of natural disaster; programmes of this category are mainly funded by collective welfare funds, donations and the MOCA budget.
- Social welfare – institutional care for special groups people such as the aged, the handicapped, and orphans and welfare factories providing employment for the disabled; financial resources include collective welfare funds, self-funding activities and local government subsidies.
- Social insurance – including pension schemes, community health insurance schemes, insurance against disasters, TVE employee insurance and public employee insurance; social insurance in rural areas is financed by individual contributions, collective welfare funds, employer provisions and government budget.
- Social preference for special categories of people based in rural areas – these programmes principally fall in the responsibilities of the civil affair lines and collectives.

- Medical security – includes curative, preventive and immunization services and schemes; funding comes from the MOH, user fees and collective welfare funds.
- Other programmes – including minimum living standards guarantee, childcare, etc. which are funded by individual contributions, the country budget and collective funds.

As indicated in preceding discussions, social security interventions in rural China are relatively ad hoc and limited in scope and coverage and are usually funded by local townships and village enterprises or by fees collected from rural households (Cook 1999). The availability, accessibility and efficiency of social security programmes are very much dependent upon the financial strength of the rural locality.

### **Social safety nets in China – implications for rural residents**

Rural farmers are exposed to two types of risks: output and price risk (Sadoulet and de Janvry 1995). Output risk refers mainly to unfavourable rainfall and climate and the unpredictable incidence of pest and disease outbreaks and other natural disasters. Price risk includes the undesirable movements and volatility in the prices of agricultural inputs and outputs. Besides exposure to market and price volatility, new forms of risk, insecurity and vulnerability are arising in the process of economic transition and restructuring in China. Other shocks to incomes or livelihoods faced by rural farmers include illness, illiteracy, poverty and loss of social connections after being resettled because of infrastructure and development projects.

Increased off-farm employment, especially migration, has become the most important source of household income increases. However, during the transition period characterized by a stop-and-go economy, the impact of employment expansion and retrenchment has translated into fluctuations of household income, which poses new risks and uncertainties to rural households.

### **Social viability role of agriculture**

#### *Importance of farming business*

As discussed in the previous section, the trend of out-migration has been quite obvious in rural China over the recent two decades, especially after the mid-1980s. As a result, off-farm income now plays an important role in increasing the incomes of rural households.

However, farming remains an important subsector of rural economy both economically and culturally. This is especially true in the marginal and remote mountainous areas. In those areas, people subsist on farming and agriculture thus sustaining local agro-ecosystems as well as the social systems that support the livelihoods of millions of rural households. Moreover, because of incomplete markets and welfare and service systems in the rural area – e.g. credit markets, health support systems and unemployment benefits – the farming business has been extremely important and crucial in providing overall insurance and protection to households.

#### *Land rights*

Many policy-makers in government tend to believe that an egalitarian *hukou*-based land distribution system provides a basic safety net for the rural population; however, even state and collective institutions withdraw from most welfare functions in rural areas. For most rural Chinese, land remains a basic entitlement and is a major resource they can depend on (in conjunction with labour resources) for their livelihood security. Even urban migrants maintain a close link with land in their home villages in that their remittances help overcome financial constraints faced by family members who stay at home and farm. On the one hand, land serves as the single most important means of livelihood for households that are mainly based on farming. On the other, it is also the basic source

of security for those who have migrated to urban areas but are still excluded from government social support systems. These are the major reasons why the Chinese Government is exerting effort to ensure rural farmers' land rights. Thus, there exist close ties between migrants and their rural households.

#### *Potential buffer role of agriculture*

It has been commonly observed that in developing economies, where unexpected macroeconomic shocks occur, the agricultural sector plays a buffer role, allowing people to cope with adverse effects of the shocks. Evidence of members of rural households in developing countries providing temporary shelter to relatives who lose their jobs in urban areas during economic slumps is accumulating. What can be vividly recalled among those interested in Asian economies are the recent examples of Southeast Asian countries such as Thailand and India, where large numbers of unemployed urban workers returned to rural areas and subsisted by rejoining the agricultural labour force during the unexpected 1997/98 Asian financial crisis (Richberg 1998).

In general, developing countries are more vulnerable to macroeconomic shocks compare with developed ones. These shocks can exert serious, sometimes even devastating impacts on people, especially the vulnerable groups in weak economies as shown by welfare indicators like nutrition, school enrolment and poverty. A well-functioning social safety net – which is the ideal – is expected to help those hit by shocks to recover and maintain a healthy and productive life. Unfortunately, governments in developing countries typically lack the resources needed to support an extensive social protection programme. In many cases, people have to rely on their links with the rural or agricultural sector. Thus, the potential of agriculture to act as a safety net during shocks has attracted a great deal of attention from researchers, international development agencies and policy-makers.

#### *Buffer role of agriculture in the Chinese context*

China numbers among the few countries in the world where a household registration (or *hukou*) system is still being maintained. The *hukou* system, which was an important part of the centrally planned system in the Mao era, classified individuals into two categories: rural and urban household members. Accordingly, two separate economic and social subsystems were instituted to maintain rural-urban differentiation in access to capital and other resources. The *hukou* system, in conjunction with other policy measures, has resulted in a pronounced rural-urban dichotomy in China since the 1950s (Liu and Reilly 1999). But with the reforms to open up the country launched in the late 1970s, it has been relaxed to some extent as evidenced by strong population mobility and rural-urban migration flows in recent years.

The peculiar rural-urban separation has made China a unique case in terms of rural-urban relations. Many Chinese, especially those now in their sixties, vividly recall the economic crisis of the 1950s when urban families turned to their rural relatives for temporary support (e.g. grain, meat or vegetables) to smooth their food consumption. This is one aspect of the buffer role of agriculture, which is similar to the original definition of the term and which has been observed in many developing countries.

However, the separation of the rural-urban system coupled with urban-biased policies and social welfare systems had made agriculture and the rural sector much more vulnerable than the urban sector. Thus, it was not easy to identify agriculture's buffer role under the Chinese context. Furthermore, given that the country has not experienced major economic crises in recent decades, the term "buffer role" of agriculture has to be adapted to the context of China in economic transition.

National economic policies targeted at promoting growth and development, along with the increased degree of integration between China and the world economy, have resulted in remarkable

economic achievements. China is undergoing a process of change, shifting from a planned to a more market-orientated economy. One significant characteristic of the economic development is the changing role of the agricultural sector and growing activity in the labour market. The linkages between rural and urban areas have broadened from pure commodity exchange to the inclusion of population movements.

Rural to urban migration has become a major part of labour mobility. However, under the existing institutional setting, the buffer role of agriculture can hardly go beyond the boundaries of the separate systems. Although migrants can work and live in urban areas, they are tied closely to their families in rural areas due mainly to security reasons. When economic fluctuations occur, migrants return to agricultural jobs in times of economic contraction and leave again when the economy booms. Thus, their rural families and agriculture serve a buffer role for them.

The buffer role of agriculture has its unique characteristics in that it is mainly a rural phenomenon. During early months of migration, rural households serve as an insurance against the possible risks facing migrants. When the migrants settle down and gain a foothold in the urban sector, they send remittances to family members who stay in agriculture in their home villages. Moreover, agriculture provides shelter for returning migrants during an economic recession and supplies labour during an economic boom.

#### *Migration and remittances*

With the rapid growth of China's economy, especially in the industrial and service sectors, a growing number of rural residents (young and old, male and female) have joined the army of migrant workers who work off-farm locally or outside the home village for better income opportunities. Empirical evidence indicates that migration has become the fastest growing portion of China's off-farm labour force in the 1990s (deBrauw and Rozelle 2002; deBrauw *et al.* 2002). But the links between migrants and their source families in remote villages do not become weaker (Liu and Reilly 1999). Instead, the bond between them tightens through the regular remittance payments migrants send home. This money has constituted a steady source of family income in the rural areas.

It is not rare for rural households to depend on regular remittances (in cash or kind) sent by members working outside the farm to make ends meet. Empirical analysis shows that about 20 percent of rural household income is generated by remittances (deBrauw and Rozelle 2002). This is especially the case when migrant workers have aged parents or much younger siblings. Increased rural-urban remittances allow rural households to improve per capita consumption and expenditures in health, schooling and food.

Remittances generated by migrants have been increasingly recognized as one of the major channels through which the agricultural sector can provide a buffer against macroeconomic shocks affecting other sectors. During the process of labour reallocation across the economy, the adjustment of intrahousehold remittances to external shocks is comparatively quicker. Thus, it is reasonable to say remittances can be one of the first to adjust against shocks that affect labour markets.

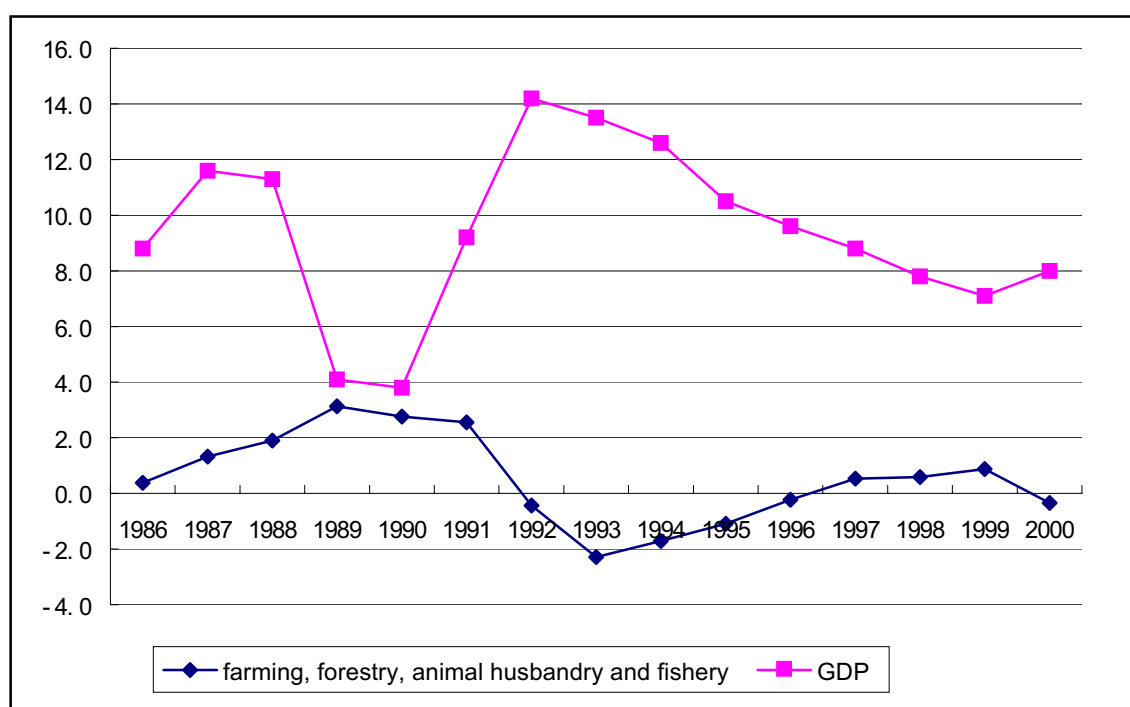
#### *Empirical analysis of agriculture's buffer role in China*

Because of the comparative advantage in the urban economic sector, it has become common for rural households in China to receive remittances from urban relatives. The reverse flow, however, is quite rare. Thus, when we talk about agriculture's buffer role in this paper, we will mainly focus on agriculture's ability to directly and indirectly provide protection and shelter to rural-based households affected by the shocks, especially considering the lowered rural-urban migration and the consequence of limiting unemployed migrant workers in urban areas.

## Macro level

There has been an overall increase in rural off-farm employment in the past two decades. Between 1980 and 2000, the percentage of rural labour employed in the non-agricultural sector increased from 5 to 32 percent. Further analysis shows that agricultural employment has typically risen and fallen along with economic cyclical growth. It increased as GDP growth slowed down in the late 1980s and 1990, decreased after a retrenchment of the national economy in 1991 and expanded after 1993 before it started to dwindle again in the late 1990s.

Figure 3 compares the growth trend of GDP with that of rural labour employment. A central point that can be drawn from this figure is that in China as a whole, labour leaves agriculture for off-farm jobs during booms and returns during recessions. This is illustrated by the counter-cyclical rural employment growth rates of GDP and agriculture between 1986 and 2000. This description based on macrolevel data supports the argument that agriculture can act as a buffer during economic slumps, which is consistent with Zhang *et al.* (1998).



Source: Calculated by author based on NBS and MOLSS, *China Labour Statistics Yearbook* (2001).

**Figure 3. Growth rate of GDP and rural labour force employed in agriculture (preceding year =100)**

## Micro level

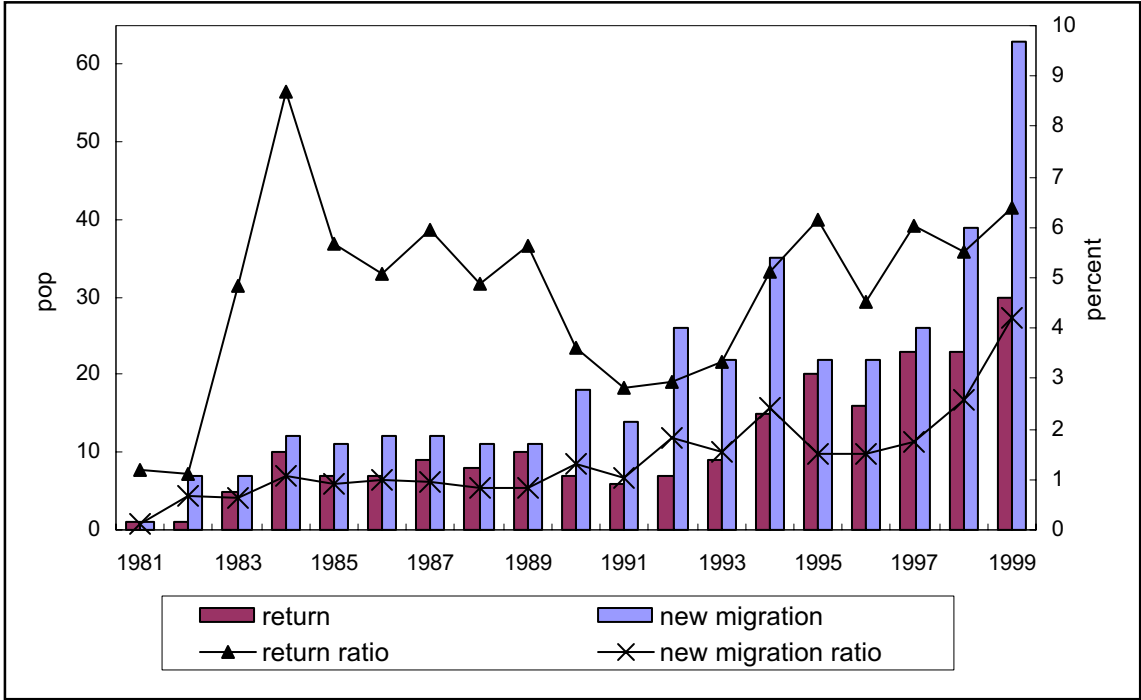
Evidence drawn from rural household surveys in China (deBrauw *et al.* 2002) shows that migration has become one of the most significant activities of rural households in terms of labour employment. Furthermore, it has also contributed significantly to the increase in rural household income.

The massive flow of rural workers to urban areas has received both positive and negative commentary. Those who are in favour of the move see rural migrants as having contributed significantly to urban and national development. The critics meanwhile view them as added burden to the already overloaded urban service system (e.g. in schooling and healthcare). Lack of an integrated service system for both migrants and urban residents has made the opportunity cost of migrants living in

cities much higher than that of urban residents. Thus, migrants are much more vulnerable to economic shocks and risks. Often, they become the victims of government interventions initiated in the name of social stability or urban worker protection. Although there are no official statistics to reveal this fact, one typical observation during the first stage of reform in the country involved some cities having to send rural migrants home and subsequently fill their job positions with urban workers who were laid off. Job security of migrants is apparently weaker than that of urban workers.

Therefore, constant cases of return migration now characterize the country’s employment scene. By analyzing the information from the same dataset collected in China’s National Rural Survey as deBrauw *et al.* (2002), one can find that among all the people who had migration experiences in the past 20 years (1981-2000), around 30 percent of them had returned to their rural home (and to agriculture) every year. Thus, the agriculture and rural sector acted as a buffer zone for those return migrants.

Figure 4 shows the number of return migrants on a yearly basis. We can see that about 6 percent of migrants return to their home villages on average per year. However, in recalling the overall economic development trend the past two decades, it is not difficult to see that high return migration appeared during the years when economic development was slow (e.g. 1988-1989 and 1991-1992). Again, from another aspect, this reveals the buffer role of agriculture.



Source: Authors’ survey.

Figure 4. Returning migrants

*Empirical evidence of linkages between migrants and rural (source) families through remittances*

Data source

In this section, we use the same rural household survey data that have been used by deBrauw *et al.* (2002) and Zhang *et al.* (2002b) to track how migrants maintain their ties with their source family in rural areas through remittances.



In general, there are two-way linkages between migrants and their source families. On the one hand, migrants need their family's financial support to finance their search for jobs outside of their villages. On the other hand, migrants send remittances back to their family once they become successful in finding off-farm employment and gain a stable source of wage earnings.

Our migrant sample shows that about 70 percent of migrants maintain financial links with their source families in that they send home remittances or get support from their families in kind or cash. Moreover, more than half of the migrants (55 percent, 267 out of 485) send remittances to family members who stay behind. On average, remittances account for roughly 38 percent (2253 out of 5906) of migrants' off-farm labour earnings. If we deduct the support migrants obtain from their family, the net remittances sent by migrants would account for about 36 percent of their off-farm employment earnings (2099 out of 5906) (Table 1).

**Table 1. Migrants and remittances**

	<b>Migrants not remit</b>	<b>Migrants remit</b>
No. of obs.	218	267
Age (years)	23.6	22.8
Trained (%)	30.7	31.5
Male (%)	53.9	54.9
Years of schooling	8.4	8.3
Labour earnings by off-farm job (yuan)	4 236.5	5 906.1
Duration of migration (month)	25.6	32.1
Remittances (yuan)	0.0	2 253.5
Disremittances (yuan)	177.4	138.7
Net remittances (yuan)	-177.4	2 099.4

**Source:** Authors' survey.

## **Role of women in agriculture and their contribution to food security**

### *Women and off-farm employment*

The development of the rural labour market in the past 20 years or so has been characterized by rapid expansion of the rural labour force's participation in off-farm employment both in the urban and rural areas.

In the same way that emerging rural labour markets may have numerous effects on the fabric of rural and urban economies, the benefits of women's participation in labour markets vary (World Bank 2001). By some metrics – e.g. enrollment in primary and secondary schools – indicators of welfare for women rise with the country's development (which by implication means better labour markets). However, by other indicators – e.g. the relative number of hours of housework performed by women versus men – there has been little improvement. In short, the effect of economic development on women's welfare is complicated and depends on many different factors.

In the rest of this study, we assume, as do Thomas *et al.* (1997) and Quisumbing and Maluccio (1999), that increased participation in the off-farm labour market and higher wages for those with off-farm jobs are metrics that are positively correlated with the welfare of women. The logic of this is that when a woman earns a wage that increases her assets, the income that is generated is directly attributable to her labour; because of this, she has more power to make her own decisions and increase her welfare.

In fact, according to our data, when examining the rate at which women have gained employment away from the farm, the newly emerging labour markets have already begun to positively affect women. Although women have participated at rates far below those of men throughout the entire 20-year sample period, participation rates have risen rapidly since the early 1990s. In the 1980s, consistent with the findings from the national community survey-based study reported in Rozelle *et al.* (1999), the participation rates of men (more than 25 percent in 1981) far exceeded those of women (less than 5 percent). Moreover, despite low initial levels of involvement in the off-farm sector, participation rates for women grew more slowly than those of men. In the 1990s, however, the participation rate of women in the off-farm sector increased faster than that of men.

The rising participation rate of women has been driven by increased entry into all job categories, although the most striking absolute gains have come from migration. Throughout the entire decade of the 1980s, less than 1 percent of women left to work for a wage. Since 1990, however, the rate of growth has been higher than any category of job types for either men or women. By 2000, nearly 7 percent of the female labour force worked as wage-earning migrants. One interpretation of this rise in the participation of women is that as labour markets became more competitive, the scope for managers to exercise their discriminatory preferences declined, therefore opening up new employment opportunities for those who had previously not been able to participate. Alternatively, the rise in women's work could have occurred as the types of industries that have a preference for the skills of women prospered.

The nature of the work of women, like that of the entire labour force, is also rapidly changing (Table 2). Not only were fewer women working in 1990, most of them tended to work at jobs in local factories, close to home. For example, in dividing migrant workers into three groups – those that worked at jobs within their own county; those that worked at jobs outside their county but within their own province; and those that worked outside of their province (frequently thought to be the highest paid and have the most secure jobs by migrants) – it can be seen that 47 percent of women migrants worked in their own county and only 26 percent migrated out of the province (Row 4). By 2000, however, the most likely destination of female migrants changed. The percent of women migrants working in their own county fell to 35 percent while the percent that worked

**Table 2. Comparison of location of migration employment by age and gender in 2000 and 1990**

	Migrant job located within:			
	Own county	Same province (another county)	Another province	Total migrants
All off-farm workers				
2000 Men	89 (29) <sup>a</sup>	87 (29)	128 (42)	304
2000 Women	58 (35)	52 (32)	54 (33)	164
1990 Men	51 (46)	30 (27)	30 (27)	111
1990 Women	9 (47)	5 (26)	5 (26)	19
Workers under 30 years old				
2000 Men	45 (25)	49 (27)	89 (49)	183
2000 Women	43 (32)	41 (30)	51 (38)	135
1990 Men	29 (39)	23 (31)	23 (31)	75
1990 Women	8 (47)	5 (29)	4 (24)	17

**Source:** Authors' survey.

**Notes:** The table compares workers who were, for example, 25 years old in 1990 with workers who were 25 years old in 2000.

<sup>a</sup> Figures in parentheses are percentages of the total number of migrants for the respective category. Percentages sum to 100 across rows, subject to rounding error.

outside of the province rose to 33 percent (Row 2). Although the rise in the percentage of migrants leaving their own province was relatively small (only 7 percentage points), the absolute number rose sharply by more than 10 times (from 5 to 54). For female migrants under 30, the shift in destination followed the same pattern (Rows 6 and 8). If the better jobs are in the labour markets that are far from home (typically in coastal area for the inland rural residents), the trend shows that females, like their male counterparts, are gaining access to the jobs.

Perhaps most poignantly, specialization of another type is emerging and becoming common, especially for younger women. While participation rates for all women are still lower than that for men in 2000 (by 41 percentage points; i.e. 72 percent for men and 31 percent for women), the gap narrowed for the younger age groups and disappeared for the youngest (Table 3). Both men and women in the 16-20 year old age groups have equal participation rates (74.7 percent for men; 75.6 percent for women). Like the men, in fact even more so, women in this category were increasingly specializing in off-farm labour. In 2000, for instance, when young women performed off-farm jobs, they usually no longer worked on the farm (i.e. 59 percent of those that worked off the farm worked only off the farm). This contrasts sharply with the situation in 1990 when most of those with off-farm jobs continued to work on the farm on a part-time or, at the very least, seasonal basis. The emergence of specialized modes of production in different villages across China's geographical landscape has been facilitated by the emergence of labour markets (Mohapatra 2001).

With older women, however, the gender gap in off-farm employment participation remains. These trends embody the roots of the feminization of agriculture (Table 3). For example, the difference (in percentage points) between male and females widens to 25.3 percent for 21-25 year olds; 39.1 for 31-35 year olds; and 48 for 41-45 year olds (Rows 2 to 6).<sup>3</sup> Moreover, the participation rates in agriculture of older women (either full time, part time or seasonal) are almost as great as in the 1990s. With men both working more (columns 1 and 3) and specializing more (i.e. not working in agriculture – not shown in table), this means that it is the older women who are being asked to do the farming. While it is beyond the scope of this paper to say if this is a good or bad thing, we will next examine the effect on production of having women heavily involved in farming.

**Table 3. Comparison of off-farm labour participation rates by gender, 1990 and 2000**

Age Range	Percentage (%) with off-farm work in:			
	1990		2000	
	Men	Women	Men	Women
16-20	21.4	13.1	74.7	75.6
21-25	47.3	13.1	78.8	53.5
26-30	47.9	8.8	72.8	33.7
31-35	44.4	6.8	70.5	22.5
36-40	37.3	3.6	70.0	20.3
41-50	33.3	5.2	61.2	18.7

**Source:** Authors' survey.

<sup>3</sup> In addition, women in the age categories between 21 and 25 and between 26 and 30 also have a higher probability of not being in the labour force at all. In our entire sample, 8 percent of the sample are neither working nor searching for a job; there are more than 10 percent of women between 21 and 30 falling into this category. However, in almost all cases this is explained by the fact that they have children who are two years old or younger.

Although the youngest age group of women (16-20 year olds) have caught up to their male counterparts in terms of access to off-farm employment and are not being discriminated against in any greater degree as regards wage earnings, older women have increasingly taken over the responsibility of managing farm work. This raises new questions on whether or not their participation in agriculture has led to lower earnings.

Internationally, women-headed households and women-cultivated plots have produced lower yields and revenues (World Bank 2001). Women were found to be less efficient producers for a variety of reasons (Saito *et al.* 1994; Quisumbing 1994). If this is so in China, then part of the gains that women have gained in the off-farm sector may have been offset by the lower incomes they receive in farming.

In order to answer the question of whether women-headed households are more, less or equally efficient in cropping, we use a fixed-effects regression approach. Specifically, total cropping revenue (and total revenue for rice, wheat and maize) for each household plot is regressed on plot, household and village characteristics that are thought to determine plot-specific income. The basic model is:

$$y_{hv} = \alpha + \gamma D_{hv} + X_{hv} \beta + Z_v \delta + \mu_v + \varepsilon_{hv} \quad (1)$$

where  $y_{hv}$  denotes total income per capita or from one of the three specific sources for household  $h$  in village  $v$ . The variable,  $X_{hv}$  is a vector of plot characteristics (e.g. relating to irrigation, land quality, topography, distance from the household and the size of the shock) and household characteristics (e.g. the value of household assets, farm size, number of household members and age and education of the household head). The variable,  $Z_v$  denotes village characteristics including a community's topography, its distance from the county seat, the number of phones per capita and the proportion of villagers that work off-farm or migrate during the year studied (1990). In addition to  $X_{hv}$  and  $Z_v$ , we also add a measure of the level of participation of women in farming. Since there is no *a priori* best measure of such a variable, we employ three different indicators in three different versions of our model. Specifically, we use an indicator variable that takes the value of one if the household head is female (and zero otherwise); a variable that measures the proportion of the household's total labour force that is female; and a variable that measures the proportion of the household's agricultural labour force that is female.

The coefficient of the women-participation variable,  $\gamma$ , provides the test for our hypothesis: holding all other things equal, women-run farms are equally efficient in generating farm income when compared to male-run farms.

Using more than 5 000 plots (observations) for the analysis that examines the effect of women-headed households on overall farming efficiency (Table 4), we find results that are somewhat at odds with results from other countries in other parts of the world (World Bank 2001). According to our data, when all of the other variables in our model are held constant, households in China are actually more efficient when women are more involved in farming. For example, women-headed households *ceteris paribus* produce 11.3 percent higher revenues overall than their male counterparts (Column 1, Row 1). The positive and significant coefficient on the women-headed household indicator variable in the analyses using observations on rice and maize plots show that the results are the same for these crops (Columns 2 and 4).<sup>4</sup> Moreover, coefficients on the alternative measures of the participation of women (columns 5 and 6) show that our estimations are robust. Although only the coefficient on the gender variable in column 5 is significant, the coefficient on the gender

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<sup>4</sup> The coefficient in the regression using wheat plots is positive (which is consistent with the rest of the findings) but not significant (Table 5, Column 3).

**Table 4. Analysis of the effect of women-headed households on the efficiency of farming, all crops (regression results with village-fixed-effects)**

Explanatory variables	Dependent variables: crop revenue					
	All Crops (1)	Rice (2)	Wheat (3)	Maize (4)	All Crops <sup>a</sup> (5)	All Crops <sup>b</sup> (6)
<b>Household characteristics</b>						
Female-headed	0.113 (2.81)***	0.065 (2.45)**	0.023 (0.55)	0.186 (3.25)***	0.001 (2.22)**	0.000 (0.83)
Asset value	-0.000 (0.38)	0.000 (1.56)	0.000 (0.15)	-0.000 (0.93)	-0.000 (0.39)	-0.000 (0.61)
Farm size	0.000 (0.34)	0.001 (0.65)	-0.002 (0.84)	0.001 (0.69)	0.000 (0.31)	0.000 (0.27)
Household size	0.016 (1.99)**	0.009 (1.71)*	0.009 (0.97)	0.006 (0.57)	0.010 (1.25)	0.014 (1.73)*
<b>Household head characteristics</b>						
Age	0.001 (0.57)	0.002 (2.43)**	0.003 (2.36)**	-0.001 (1.16)	0.001 (0.65)	0.001 (0.52)
Education	0.004 (1.22)	0.004 (1.95)*	0.008 (2.39)**	0.016 (3.51)***	0.004 (1.20)	0.004 (1.17)
<b>Plot characteristics</b>						
Irrigated	0.188 (7.14)***	0.012 (0.51)	0.086 (2.27)**	0.117 (3.40)***	0.186 (7.06)***	0.185 (7.03)***
High quality soil	0.214 (8.87)***	0.125 (7.69)***	0.125 (4.41)***	0.134 (4.26)***	0.214 (8.85)***	0.218 (9.03)***
Plain	0.074 (1.47)	0.020 (0.69)	0.027 (0.35)	0.074 (0.88)	0.078 (1.54)	0.077 (1.52)
Hill	0.025 (0.57)	0.021 (0.78)	-0.001 (0.02)	0.130 (1.82)*	0.026 (0.62)	0.028 (0.64)
Terraced	-0.218 (3.06)***	0.043 (0.67)	-0.216 (2.32)**	-0.237 (2.38)**	-0.210 (2.95)***	-0.213 (2.99)***
Distance from home	0.014 (1.21)	-0.004 (0.40)	0.030 (2.18)**	0.036 (1.66)*	0.012 (1.04)	0.014 (1.14)
Shock from weather, pests, etc.	-0.011 (17.16)***	-0.008 (13.35)***	-0.008 (10.10)***	-0.012 (17.79)***	-0.011 (17.09)***	-0.011 (17.18)***
Single season	0.562 (25.99)***	0.250 (11.15)***	0.086 (1.60)	-0.172 (4.04)***	0.562 (25.97)***	0.563 (25.98)***
Constant	5.484 (67.65)***	6.214 (109.07)***	5.651 (58.18)***	6.195 (53.53)***	5.447 (64.46)***	5.481 (64.81)***
Observations	5 353	1 673	1 030	1 111	5 353	5 349
Number of villages	60	37	43	47	60	60
R-squared	0.18	0.20	0.15	0.31	0.18	0.18

**Notes:** Absolute value of t statistics in parentheses. Estimates were corrected for clustering.

\* means significant at 10%; \*\* means significant at 5%; and \*\*\* means significant at 1%.

<sup>a</sup> Equation 5 is the same as equation 1 except we replaced the female-headed household indicator with a variable that measures the proportion of the household's total labour force that is female.

<sup>b</sup> Equation 6 is the same as equation 1, except we replaced the female-headed household indicator with a variable that measures the proportion of the household's agricultural labour force that is female.

variable in column 6 is still positive. Taken at face value, even this result means that women are at least as efficient as men in farming activities and agricultural feminization has no impact on crop revenue earnings. Additional evidence is found when running crop-specific regressions with the alternative measures.

Hence, according to our findings, although older women have been increasingly working in the agricultural sector during the course of rural China's recent development, farm earnings have not suffered with them in charge. The most direct interpretation of this result is, of course, that women are either better farmers or that they are more focused on cropping activities (unlike their male counterparts, who often work part time off the farm) and produce greater revenues per hectare.

However, we are unable to reject alternative interpretations. For example, it could be that since women-headed households are frequently (though not always) those in which the husband permanently works outside of the village, such households face fewer capital constraints and therefore are able to produce more. In addition, it could be some other unobserved household-specific factor that is associated with households in which the female is responsible for farming. But, regardless of the source, our analysis suggests that cropping revenues earned by women-headed households are not less than that of male-headed ones.

### **Major findings and policy implications**

In the past 20 years, China experienced rapid economic growth. In this study, we found that although China has not suffered a major economic crisis in the past 20 years, there exist fluctuations in economic growth. Agriculture experienced a decline in total GDP share. Thus, the employment structure has shifted accordingly. More and more rural labourers have been employed off the farm, away from their home villages and in the cities. This kind of population movement is what we have categorized as the migration population. Given the current social safety nets setting in China, under which rural residents seem to be heavily biased against, the social viability role of agriculture becomes extremely important. Indeed, the rural sector has shielded migrants from economic shocks as revealed by their frequent returns to home farms during downturns as well as rural-urban remittances.

In general, the findings of the study support the argument that agriculture plays a buffer or shelter role during economic fluctuations in China. Previous studies have shown that the decision to migrate is not only affected by individual characteristics but also by household and community traits. This, to some extent, reflects the close ties between migrants and their families.

Lack of long-term job security in the city has made agriculture more important. Farming businesses and agriculture have been acting as a buffer zone to accommodate return migrants. Our analysis of remittances also shows that both individual characteristics and family traits have an impact on decisions regarding remittances. The results show the coexistence of both an exchange and altruism motive in making remittances. However, due to the limitations on information availability, the study only uses cross-section data for one time period for empirical analysis. Thus, extension of the findings to other parts of the country or to other countries should be used with caution.

As an important part of this analysis, women's role in contributing to food security has been reflected by their participation in off-farm employment and their role in agricultural production. This study concludes that despite the existence of an obvious gap between men and women in off-farm employment participation, women (and especially young women) are catching up fast. Sending the household head away to work off the farm and leaving the female in charge of the farm does not have a negative impact on household crop production. Further analyses on the actual causes have yet to be made but a couple of explanations can already be given. First, household size is relatively small in rural China. Thus, the negative impact of migrants withdrawing their labour

force from agriculture would not be very large. Second, the increased remittances from migrants actually improve household production conditions by easing credit and cash constraints.

The analysis of the determinants of migration and remittances and women's participation in off-farm employment and their contribution to agricultural production lead to the following policy conclusions.

Given the existing social safety nets in China, agriculture is extremely important in contributing to social viability and ensuring food security. Policies that can have a positive impact on agriculture include improved land tenure arrangements, technological improvements that pay attention the changing role of women in the farm sector and provision of social services such as health care, credit assistance in rural areas. All these play a vital role in increasing the efficiency of agricultural production and sustaining agricultural growth, thus contributing to food security.

Labour market development in China has had equity impacts on both income and gender. Policies that can further promote rural labour migration and their participation in off-farm sector will have to include increased investment in human capital development and provision of rural credit services for the development of small rural enterprises.

Breaking the barriers between rural and urban areas such as removal of the *hukou* system will contribute to the increase in migration between rural and urban areas. China still has a two-class system where urban residents have access to social services in the city while farmers have none. Although complete elimination of the current system is politically impossible, there are many policy measures that have been and can be implemented in the future. Access to housing, education and health services are absolutely essential to allow the current rate of transition from rural to urban to continue. A concerted effort by national and regional leaders is needed to establish the rights of citizens in all parts of China regardless whether they are from rural or urban areas, in farms or in cities.

# Speeches

## WELCOME REMARKS

**By Mr He Changchui**

**Assistant Director-General and Regional Representative for Asia and the Pacific**

Distinguished participants,  
Colleagues,  
Ladies and gentlemen,

Good morning to all of you.

First of all, allow me on behalf of Jacques Diouf, Director-General of FAO and on my own behalf, to extend a warm welcome to you all in Thailand. My colleagues and I are greatly honoured and privileged to have you all here.

The 1996 World Food Summit (WFS) and the 2002 WFS affirmed that reducing hunger must be a central goal of the international development agenda. The United Nations Millennium Declaration adopted by the UN General Assembly in September 2000 reflected the WFS target by making hunger and extreme poverty reduction a primary development goal. This global commitment has been reaffirmed in the Millennium Development Goals (MDGs) and within these, MDG-1, calling for eradication of extreme poverty and hunger, is on the top of the development agenda.

On the occasion of your workshop and considering the presence of a large group of eminent policy institutes, I share with you my great hope in the growing momentum behind the MDGs and the repeated (re-) confirmations of the political commitment toward the reduction of hunger at various high-level fora. I am also encouraged by the growing expressions by many segments of civil society for the realization of the right to food and a more harmonized world. However, one notes with concern the lack of progress made in the region in reversing the growing disparity between rich and poor. At the start of a new millennium, when many countries including those in Asia were targeted by terrorist attacks, we are reminded of the urgency of being vigilant against the neglect of the plight of hundreds of destitute people. Indeed, the indifference towards the widening gap between the better-off minority and the economically deprived majority is the biggest development challenge of our times – one that could have potentially disastrous consequences for the region if left unattended.

On the occasion of the World Food Day 2003, the FAO Regional Office for Asia and the Pacific organized a Round Table for a Regional Alliance against Hunger (RAAH). Noting the initiative as timely and strategic, round table participants emphasized that hunger eradication requires policy reforms to empower the poor and to commit resources for agriculture and rural development. The RAAH Round Table recognized that governments have a major responsibility to improve the policy framework for agricultural and rural development and to make the required investments in rural infrastructure and agricultural research. Emphasizing the private sector role and agribusiness, *inter alia*, in developing and disseminating improved technology and ensuring remunerative farm prices, the RAAH Round Table recommended that FAO assign priority to providing countries with dynamic and mutually reinforcing framework of policies and actions in support of agriculture drawing from the experiences which have been successfully implemented by countries in the Asia-Pacific region.



In accord with the Rome and New York Declarations made by leaders of more than 170 countries around the globe and, more specifically, the roles and responsibilities delegated to FAO in this regard, strengthening food security through sustainable agriculture and rural development is the main mission of FAO. As experience has amply shown in several Asian countries – from Japan and Republic of Korea to China, India and Viet Nam – agricultural growth is a forerunner to the overall development of the nation.

Good performance of the agriculture sector played an important role in the past economic growth of Asia. Agricultural production in this region grew at rates faster than the world average. Indices of food, crop, cereal and livestock production increased more rapidly than the world average. During the 1980s and 1990s, the region achieved exponential agricultural growth rates of nearly 4 percent and above, and the growth during the last four decades averaged 3.49 percent. The Green Revolution process triggered in the mid-1960s was the engine of this transformation. Food production grew at a much faster rate of 3.57 percent than the growth of population (1.91 percent) causing a gradual increase in per capita availability of food and contributing to significant reduction in undernourishment in the region. Despite the addition of 1.4 billion people to the region's population, average per capita food availability has increased from about 2 000 kcal/person/day in 1965-66 to over 2 600 kcal/person/day in 1999-2000. In the 1990s, the proportion of the undernourished population in the region declined from 20 to 16 percent.

Notwithstanding these achievements, the present incidence of hunger means that every sixth person in the region is still undernourished. Furthermore, the region accounts for nearly two-thirds of the undernourished population in the developing world. The performance varies considerably among countries and sub regions. East and Southeast Asia have done better than South Asia. The gap between high achieving and underperforming countries is also very wide. This may be attributed to the differences in capacities as well as the approaches, policies and programmes adopted.

The population of the developing Asia-Pacific countries is projected to increase from 3.2 billion in 1997-99 to 3.9 billion in 2015 and 4.4 billion in 2030. There is an increasing trend of urbanization of the population and the pattern of food demand is changing rapidly with rising incomes. However, the relentless pursuit of intensification of agriculture, livestock and fishery to increase food production has caused adverse environmental effects. The recent outbreak of Avian flu has reinforced the need that sustainable agriculture, sound farming systems and food safety aspects be combined with the goal of economic efficiency in organizing commercial food production and processing systems. The region's agriculture sector is therefore faced with the multiple objectives of sustainable production growth and equitable access of food of the growing and urbanizing masses.

The FAO regional office in Bangkok initiated the establishment of a regional network of national and regional agricultural policy research centres to serve as a catalyst to strengthen policy analysis and facilitate the exchange of information and practical experiences in agricultural and rural development. Its initial focus was to understand the role and contribution of policies, markets and institutions in the dynamic transformation of agriculture in Asia and the Pacific in the 1980s and 1990s. The goal was to draw lessons and regional perspectives from the varied experiences in the region with regard to macroeconomic policy, structural adjustment, institutional reform and external shock.

FAO highly values the collaboration with policy institutes in the region. The depth and breadth of your knowledge of the countries you serve is an invaluable asset that we can draw on in policy work to our mutual advantage. Workshops with policy institutes are a great opportunity for sharing of experiences and perspectives and mutual learning. They are also distinct opportunities to know the emerging issues and priorities in different countries of the region.

The present workshop is expected to provide intellectual inputs to help shape and focus FAO country policy work in the region in coming years as well as lead to a common policy research

agenda among the institutes and centres, particularly with the Southeast Asia Research Center for Agriculture (SEARCA) and those comprising the Asia-Pacific Agricultural Policy Forum, with respect to enabling policies and programmes for sustained agricultural and rural development. It also provides a forum to discuss and prepare a regional proposal for FAO's collaboration with these institutes on identified priority issues. This joint work will assist FAO in enhancing the provision of effective policy assistance to member countries through strengthened collaboration and exchange of information between and among institutes from high, middle and low income countries.

In concluding, I would like to again emphasize that the topics you will be discussing today and tomorrow are critically important to sustainable agriculture, rural development and food security in the region. I am confident your deliberation will provide the required insight into the issues and how to address them.

I welcome you all once again, wishing you success in your endeavours and a pleasant stay in Cha-am.

Thank you.

## OPENING REMARKS

**By Mr Mafa E. Chipeta**  
**Director, FAO Policy Assistance Division**

I am honoured to have the chance to say a few words at the opening of this meeting, which offers an opportunity to listen to Asia's experts regarding priority topics in agricultural policy.

But let me start by recognizing the presence of Mr He Changchui who, as Regional Representative, is the personification of FAO in the Asia-Pacific region; of Mr Balisacan, Director of SEARCA, our partner in organizing this workshop; and of His Excellency Shin Sakurai of Japan who as a parliamentarian, represents a key and influential constituency that we need to have on our side. I also recognize the presence of my FAO colleagues from Policy Assistance Groups in Accra, Barbados, Budapest, Cairo, Rome, Samoa and Tunis; like them, I came to listen, with a view to learning for application in other regions.

Allow me to make some brief remarks on features of Asia that we should bear in mind as we discuss sectoral policies:

- In terms of economic output, current world shares are about 30:30:25:5 for the Americas, Europe, Asia-Pacific and Africa, respectively. Asia-Pacific is by far the most dynamic region and we can expect its share to reach a third by another decade or so and about half by mid-century, matching the region's share of world population. This large share makes it essential that we pay great attention to Asia-Pacific policy choices and developments.
- Within Asia-Pacific is great diversity with the poorest to the richest countries coexisting. FAO needs to have policy engagement with all these levels of development. FAO also needs to remember that despite economic dynamism, Asia still has the world's largest number of the poor and malnourished in absolute magnitude.
- The attributes of the region both for its large and small or rich and poor countries calls for a policy agenda tailored to its specificities but recognizing the region's connectedness to the world economy.
- FAO's role in all this is to be supportive and catalytic of national efforts. The region's experts in the countries and regional institutions should take the lead, but FAO itself should adopt a proactive stance. FAO therefore welcomes the kind of cooperation made evident through this workshop.
- Finally, policy work is fine and good policy work is essential. But it must be heard to be of value. It is of little use to do quality policy analysis if its results do not reach or help influence audiences such as the parliamentary class represented here by H.E. Shin Sakurai.

With these few remarks, I wish the workshop success and look forward to learning from it.

## OPENING REMARKS

**By Dr Arsenio M. Balisacan**  
**Director, SEAMEO SEARCA**

Mr He Changchui, Assistant Director-General of FAO-RAP;  
Mr Mafa Chipeta, Director of TAC, FAO Rome;  
H.E. Shin Sakurai, MP and Current Chair of the Food Security Committee,  
Asian Forum of Parliamentarians on Population and Development;  
Dr Arief Sadiman, Director of the SEAMEO Secretariat;  
Distinguished colleagues;  
Ladies and gentlemen;

Good morning.

It is my honour and privilege to welcome such a distinguished group of professionals who are bonded by one common goal – the eradication of poverty and food insecurity.

We are very glad and thankful that in the midst of your various commitments, you have come here, some traveling halfway around the world, to share with us your thoughts and experiences, and be one with us in identifying policy instruments and modalities that can be used by the various Asian governments to address the twin problems of poverty and hunger in their respective countries and in the Asian region as a whole.

Let me take this opportunity to also thank your organizations for their support to this endeavor.

While it was not planned to be so, this workshop comes at an opportune time for us because several countries in Asia will be having national elections during the year.

Whether we will see new or old faces in government (if the Madrid elections are any indication, we might be seeing “new” faces), I believe there is a general sense of anticipation to start things anew after elections.

Nevertheless, I see these elections as an opportunity because government officials, whether old or new, will want to offer their constituents something new as they start their new terms. And some of them will come to us for help, or will be open to our offers of help.

I believe we should grab the opportunity and use it to explicate that need for policy reforms for agricultural and rural development and to promote and advocate the adoption of the recommendations coming out from this workshop. That’s a tall order for all of us here, but one that we can carry out.

I would like to share with you that this workshop is one of the initial avenues by which my organization, SEARCA, is getting into the mainstream work of poverty alleviation. SEARCA is by and large a human resource development organization. It has been working for agricultural and rural development in general in the past 37 years of its existence.

However, starting with its Eighth Five-Year Plan, whose implementation formally begins this July, SEARCA boldly and clearly indicates poverty reduction and food security as the goals of its programmes in graduate scholarship and short-term training, research and development and knowledge management. Rural growth promotion and natural resource management are the channels by which it will contribute to the attainment of these goals.

We are excited and yet at the same time challenged by the directions we have taken and are ever so hopeful and serious in making a significant contribution toward our goals.

As I will be delivering the keynote paper in a few moments, let me conclude this welcome remarks by thanking FAO-RAPP for the opportunity to be its partner in this workshop, the output of which will hopefully be pivotal in our quest for eradicating extreme poverty and hunger.

Thank you and I wish us all success.

## REMARKS ON JAPAN'S COOPERATIVE ACTIVITIES

By H.E. Shin Sakurai, MP

**Current Chair of the Food Security Committee, Asian Forum of Parliamentarians on Population and Development (AFPPD)**

Good morning ladies and gentlemen. This is a great honour for me as the chair of the standing committee on Food Security of Asian Forum of Parliamentarian on Population and Development (AFPPD). Established in 1982, AFPPD is the parliamentarian's forum in Asia and the Pacific region that aims to contribute to peace in the world through the solution of population and development issues.

We have been working to mobilize parliamentarians on population and development not only in Asia but in the whole world as well. The parliamentarians are natural catalysts between people and the governing body. We believe that solving the population issues is essential for achieving sustainable development. Accordingly, we have been taking initiative through parliamentarians' activities on population and development in Asia and across the world.

Spirits of our activities are summarized by the saying "*No child should not be born into the world just to starve and die.*" This is the message of the late Mr Takashi Sato, the founder and first chairman of AFPPD.

At present, advances including the WTO system have been driving trade liberalization without exception. This driving force is economic profit. According to the comparative advantage principle, trade makes economical profit not only for developed countries but for developing countries as well.

Is this truly applicable? It is clear that there are still many big issues in the area of food security. Even the FAO World Food Summit in 1996 clearly states that food is a basic human right. Food is essential for human survival and vital for our very existence; thus, food should not be viewed merely as a commercial product.

The approach taken by FAO and UNFPA should be consistent with the World Trade Organization (WTO) and free trade agreements (FTA) otherwise international conferences such as this would be a futile exercise. I would like you to read The Hague Declaration of International Forum of Parliamentarians on Implementation of ICPD PoA and the United Nations General Assembly Declaration on Population (Unites Nations A/S-21/5/Add.1), which was adopted in 1999.

Asia is home to about 60 percent of the world population. The region has conditions that allow us to live and has the wisdom that supports this way of life. At present, Asia is facing difficulty to preserve the social institutions for these conditions. The surge of liberalization without exception of trade forces us to destroy these conditions and wisdom.

The world population is continually increasing. No one knows how many people the earth's resources can support, but everybody knows that the earth has also limited capacity. An infinite increase in food production is not expected. Shortage of food or a certain commodity changes its nature from economical goods to political goods. Meanwhile, the WTO's discussion does not include the possibility of shortage in food production in light of the carrying capacity of our planet and the trend in population increase.

We cannot survive beyond the limitation of the earth's capacity. We need to understand that the lives of all creatures are more important than economical profit.

Under the tireless competition, a number of people will be defeated while only a few with power will win. This kind of misery should not be allowed, as it will destroy human dignity.

It is essential that consistency of the WTO rules with the food security concept be always observed. Indeed, work is needed to make this conceptual consistency between WTO rules and food security especially at this time of review process of the WTO rules.

Creation of more advanced rules that allows cooperation under the principle of competitiveness is in order. Conditions that preserve food for a country located in an ecologically vulnerable and disadvantage region should also be in the priority.

I wish to ask all of you who attended this meeting to work in your respective countries and make new rules with harmony, cooperation and sound competition with one other. From these steps, we will be able to find our bright future.

I believe the theme of this workshop is to sustain and empower food production capacity. I would like to ask all of you eminent researchers to think about how we can make a good manner of living through cooperation from one another and what measures should be taken. I think this is a very important point of view on food issue.

I urge you to work for the results of this meeting to be reflected into the WTO and FTA agreements. Thank you for inviting me to this important workshop. I am expecting to get wonderful results from this workshop.

## CONCLUDING REMARKS

**By Mr Mafa E. Chipeta**  
**Director, FAO Policy Assistance Division**

Colleagues.

Colleagues from the various policy assistance branches and units of FAO outside of Asia-Pacific had come here largely to listen. I have tried very hard to maintain that and my colleagues also although at some point we could not help but share some of our experiences with focus on our work.

I would like to reassure you that we have not been disappointed. We have gained tremendously from this opportunity, not just in terms of the content of the meeting but in seeing the evidence of the capacity of the region and the continuing interest in agriculture issues even as the region moves towards industrialization and other ways of making a living for its people. I encourage you to continue this and I can assure you of a ready listening ear and ready interaction on the part of the whole network of FAO policy offices around the world.

Let me say that the free dialogue and professional stimulation that were started at this stage should be treated as a point of departure for greater cooperation and networking among us. You have heard the various stories. You have heard a number of things that my colleagues have said which may have relevance also to the Asia-Pacific region and therefore offer opportunities for cross-fertilization of ideas.

Two colleagues, Mr Felemi from the Pacific and Mr Groude from the Carribean, happen to be working in areas dominated by small islands developing states. In the case of the Carribean, nowhere can you see a more dramatic example of how globalization implemented without forethought can dislocate economies. You have there a very precipitate withdrawal of trade preferences in economies that have no option to fall back on. The equivalent for those economies is a cyclone and this cyclone is repeating itself everyday. Those economies, which used to depend on sugar and bananas, now have nothing to depend on. They have tourism and that puts them at the mercy of a very unpredictable lifestyle. These are issues that we have to keep in mind as we look at the way we do our work.

I would like to take this opportunity to thank very sincerely our partners in organizing this meeting. I extend those thanks through Dr Balisacan, to all that are in your party who worked behind the scenes as well as in front. We greatly appreciate it. I would also like to thank my own colleague, Mr Syed, and the Chairman at the Region Office. We had here a very congenial atmosphere and we were offered a great welcome. I'm sure my colleagues join me in this appreciation.

The question of "what next" is better addressed by others including those who organized the meeting. I would just like to assure you of FAO's readiness to cooperate, to maintain a sense of realism in our cooperation and to build on the diversity of the issues to really understand the principles that underlie agricultural development. Let us try to take advantage of our diversity.

I would like to appeal for one particular aspect in whatever we do. And that is: Let us find a way to get our message on policy concerns and policy opportunities beyond the audience who are already converted. In this room, we are all on one side of the fence. It is not we that need convincing but those on the other side – people who govern the bigger economy, people who decide on overall policy priorities in the countries. How do we engage them? How do we get them to support our case? We have to worry about the image of agriculture. We have to interest the young generation in it. We have to interest parliamentarians and politicians. How do we do it? I think that should be part of our agenda.

Again, thank you very much.



## CONCLUDING REMARKS

**By Dr Arsenio M. Balisacan**  
**Director, SEAMEO SEARCA**

Good afternoon.

Let me just take this opportunity to thank each one of you for the very impressive quality of your participation. The productive discussions we had today and yesterday have indeed elevated the discussions on food security and hunger in this part of the world.

Let me make two points. First is the publication plan. We intend to make the papers presented in this workshop accessible. The revised papers will be uploaded in the website of SEARCA and possibly also in FAO. We will ask our paper writers to submit their revised version by mid-April so that these can be made accessible as early as possible. The second point I would like to note is that we would like to see this exercise as a work in progress. The work done at the national level or at the national centres is evolving and we would like to see this grow even further. We hope to see further development on the regional collaboration that we have initiated. We hope this regional activity will help enrich our policy advice to national governments. I would also like to say that it is my wish that the points made and the discussions we have initiated here not end in this room but eventually be translated into policy advice and delivered to the appropriate venues – in the halls of congress, in the executive branches of governments – so that they can advance food security in this part of the world and elsewhere.

We will pursue further regional collaboration to enrich our policy advice as well as illuminate institutional development issues. I would like to highlight the following points, which surfaced in our discussion yesterday and today. First, there is a need to address the issues related to the World Trade Organization (WTO), the achievement of millennium development goals (MDGs) and the ASEAN-China-Japan-Korea trade agreements. Second, we must also focus on the concerns related to public investment, especially for the less developed countries in the region where the fiscal bind is a major constraint. Third, food safety was mentioned several times as a major policy concern and we hope that this will be followed up in subsequent workshops. Finally, there are the non-trade concerns. I think there is a good place and scope for enriching the discussions on this with our colleagues from Republic of Korea, Japan and many other countries that have a strong interest in the topic. We owe it to ourselves to understand and put the issues into their proper perspective.

And finally, let me say that as the head of SEARCA, we will continue to pursue cooperation and partnerships with organizations in this region, particularly with the FAO. I would like to express our gratitude, our sincere appreciation for this collaboration with FAO. I'd like to see it as just the beginning of a good partnership and we hope that with FAO-RAP, we will see the development of the issues discussed here and the deepening of collaborations between the research centres on the one hand and FAO and SEARCA on the other.

Again, thank you very much and have a safe return home.



FAO-SEARCA  
REGIONAL WORKSHOP ON



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