



PRIORITY TOPICS FOR FOOD ECONOMY RESEARCH IN THE NEXT 20 YEARS

Proceedings of an international research symposium

Beijing, April 7, 2010

Editors:

Ben Kamphuis and Yi Ling

The Hague/Beijing, November 2010

Priority Topics for Food Economy Research
in the next 20 years

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PREFACE

In the coming decades, the Chinese food economy will face huge challenges to feed its large and growing population. For this reason, the organizers of this symposium brought together leading economists from China to discuss the priority topics for economic research in the coming 20 years. The symposium was organized by the Agricultural Economics Research Institute, part of Wageningen University and Research Centre (LEI-WUR) in the Netherlands, the Chinese Institute for Agricultural Economics and Development, part of the Chinese Academy of Agricultural Sciences (IAED-CAAS) and the International Food Policy Research Institute Beijing (IFPRI).

The symposium was part of the 'China-SPAR' project, which was aimed at exploring the possibilities for integrating small-scale farmers into modern agri-food chains in China in general and developing strategies for improving the supply of fresh vegetables by small scale farmers to SPAR supermarkets in China in particular. The project was sponsored by the Netherlands Agency for International Business and Cooperation (EVD) and the research programme of the Netherlands Ministry of Agriculture, Nature and Food Quality.

This aim of this book is to share the knowledge gained during this symposium with a broader audience. It consists of summaries of the lectures presented at the symposium. These summaries are based on the notes made by students during the lectures and the respective PowerPoint presentations. In order to prevent further delay in publishing the results, the book has not been peer reviewed, nor have the lecturers been asked to provide comments. It is therefore, quite possible that the reporters have not understood the essence of the lectures completely, and for this reason we recommend you to contact the lecturers if you would like additional information or want to refer to these lectures. You will find the e-mail addresses at the end of each summary.

As the project manager of this project, I would like to thank the contributors to this symposium for their excellent and inspiring lectures. My special thanks goes to the organisers of the symposium, in particular Professor Hu Dinghuan of IAED and Professor Kevin Chen of IFPRI and their teams for organizing the symposium and bringing together leading Chinese economists.

Ben Kamphuis

Project manager China-SPAR project

1 INTRODUCTION

1.1 Theme of the symposium

The global food economy is changing rapidly under the influence of various factors, such as the on-going growth of the world population and income growth, the limited availability of natural resources and climate change, changes in consumers' demands and preferences, societal changes and technological innovations. All these factors are influencing the food economy and need to be addressed in the future agro-economic research agenda.

China plays an important role in the world food economy, due to the dramatic changes in its economy. The growing income of millions of people has led to an increasing and changing demand for food and food products, which could only partly be met by the Chinese agricultural sector, resulting in huge imports, for instance of soy bean. On the other hand, some sectors succeeded in exporting large amounts of products all over the world, in particular fish, fruit and vegetables.

In the decades to come, the Chinese food economy will face huge challenges, which was the reason for the organizers of this symposium to bring together leading economists from China to discuss the priority topics for economy research in the next 20 years. In addition to a number of renowned experts from China, researchers from Wageningen UR in the Netherlands were invited to present their vision on the future food economy and the new themes for food economy research in the next 20 years

1.2 Organization

The symposium was organized in the frame work of the Sino-Dutch project "Linking Science and Business to Enhance Chinese Agri-Food Chain Development" which was aimed at exploring the possibilities for integrating small-scale farmers into modern agri-food chains in China.

The symposium was one of the concluding events of this project and was organised by the Agricultural Economics Research Institute (LEI) which is part of Wageningen University and Research Centre in the Netherlands, the Institute of Agricultural Economics of IAED, which is part of the Chinese Academy of Agricultural Sciences and the International Food Policy Research Institute (IFPRI) in Beijing. The symposium was held on 7th April, 2010 in the IAED office at CAAS, Beijing.

1.3 Agenda

08:30 - 08:45 Welcome by Mr. Fei MA, Deputy Director of IAED-CAAS, and Prof. Dr Ruud Huirne, Director General of LEI-Wageningen-UR, and Mr. Ben Kamphuis, Project Manager of the China-Spar project

Chairperson Dr. Kevin Z. CHEN

08:45 - 09:15 Dr. Xiaoyong ZHANG, Agricultural Economics Research Institute, part of Wageningen University and Research Centre

09:15 - 09:45 Dr. Jikun HUANG, Center for Chinese Agricultural Policy, Chinese Academy of Sciences

09:45 - 10:15 Prof. Funing ZHONG, College of Economics & Management, Nanjing Agricultural University

10:15 - 10:30 Coffee break

10:30 - 11:00 Prof. Weiming TIAN, College of Economics & Management, China Agricultural University

11:00 - 11:30 Dr. Xiaoshan ZHANG, Rural Development Institute, Chinese Academy of Social Sciences

11:30 - 12:00 Dr. Myrtille DANSE, Agricultural Economics Research Institute, part of Wageningen University and Research Centre

Chairperson Dr. Xiaoyong ZHANG

14:00 - 14:30 Prof. Tiejun WEN, School of Agricultural Economics and Rural Development, Renmin University of China

14:30 - 15:00 Prof. Dinghuan HU, Institute of Agricultural Economics and Development, China Academy of Agricultural Sciences

15:00 - 15:30 Dr. Kevin Z. CHEN, International Food Policy Research Institute

15:30 - 15:45 Coffee break

15:45 - 16:15 Prof. Xiaodong YU, Public Nutrition and Development Center, Macro Academy, State Development and Reform Commission

16:15 - 16:45 Prof. Jiehong ZHOU, China Academy for Rural Development, Zhejiang University

16:45 - 17:15 Dr. Jianjun GUO, Department of Rural Economics, Development Research Center of The State Council

17:15 - 18:00 Concluding remarks

1.4 List of speakers



Dr ZHANG Xiaoyong is a senior researcher at LEI, the Agricultural Economics Research Institute, part of Wageningen University and Research Centre in the Netherlands. She is a research fellow at Mansholt Graduate School of Wageningen UR. Her research focuses on food consumption behaviour and supply chain management. She has published a series of articles in leading academic journals related to food consumption patterns, health lifestyles, overweight and obesity, chain governance, etc. Her work has been rewarded as the best paper in the IAMA conference of 2009.



Professor HUANG Jikun is the founder and director of the Center for Chinese Agricultural Policy (CCAP) of the Chinese Academy of Sciences (CAS) and is professor at the Institute of Geographical Sciences and Natural Resources Research. He is vice-president of Chinese Association of Agricultural Economics and Chinese Association of Agro-Technology Economics, Member of International Policy Council, and Member of Global Agenda Council on Food Security (World Economic Forum). His research covers a wide range of issues on China's agricultural and rural development, agricultural R&D policy, water resource economics, price and marketing, food consumption, poverty and trade policy. He received the Outstanding Scientific Progress award from the Ministry of Agriculture four times, Award for China's top ten outstanding youth scientists in 2002, Outstanding Achievement Award for Overseas Returning Chinese in 2003, and Outstanding Contribution Award on Management Science. He has published more than 120 papers in refereed international journals, including two papers in Sciences and one in Nature, and about 160 papers in Chinese journals. He is co-author of 15 books.



Professor ZHONG Funing, Professor at the College of Economics & Trade, Nanjing Agricultural University, is currently the Chairman of the Agricultural and Forestry Economics and Management Disciplinary Appraisal Committee of the State Council Academic Commission, a Vice Chairman of the Advisory Committee of Higher Education in Agricultural and Forestry Economics & Management of the Ministry of Education, and a Vice President of the Chinese Society of Agricultural Economics. He has served as a consultant to the FAO, the World Bank, and IFPRI. He is also on the Editorial Advisory Committee of Agricultural Economics and the Editorial Advisory Committee of the Canadian Journal of Agricultural Economics



Professor TIAN Weiming of the College of Economics and Management, China Agricultural University in Beijing, has extensive experience in agricultural economic research and has been involved in a number of research projects commissioned by the Chinese government and international organizations. His recent research focuses on China's agriculture and rural development after accession to the WTO. He is co-editor of the journal China Agricultural Economic Review.



Dr Myrtille DANSE is head of the research group on Sustainable Chains and Markets at the Agricultural Economics Research Institute, part of Wageningen University and Research Centre in the Netherlands. Her research interests relate to innovative coordination mechanisms, such as voluntary standards and code of conducts that stimulate private sector involvement in sustainable chain development strategies. Besides projects in the Netherlands, she has extensive project expertise in a number of African, South East-Asian and Latin America countries.



Professor ZHANG Xiaoshan is the director of the Rural Development Institute of the Chinese Academy of Social Sciences. He is a delegate to the 11th National Peoples' Congress (NPC) of China and member of the Agricultural and Rural Committee under NPC. He obtained his Master in Economics from Renmin University of China in 1982 and his Ph.D. in Economic Management from The College of Graduate Students, Chinese Academy of Social Sciences in 1999. His academic interest is on issues related to rural institutional change, organizational innovation and rural cooperative economy. He was and is now the coordinator for several important national and international projects, such as the promotion of Chinese farmers' cooperatives, the ownership structure of rural economy, the property rights reform on TVE, the strategic adjustment for rural sector structure, and the rural social security reform. He published, as author or co-author, more than ten books and quite a number of papers. Some of his papers were published in English. In 1997, Prof. Dr Zhang was honoured as a National Scholar with Outstanding Contribution authorized by the Ministry of Personnel, China. In August 2006, he was elected a Member of the Chinese Academy of Social Sciences. He is Chairman of the Association of Chinese Forestry, Animal Husbandry and Fishery Economy, Advisor to the International Committee for the Promotion of Chinese Industrial Cooperatives (ICCIC), Vice-Chairman of the Association of Chinese Rural Cooperative Economy and Advisor in Agricultural Economy to Beijing Municipal Government, China.



Professor WEN Tiejun is the President of the College of Agriculture and Rural Development of Renmin University of China, Director of Rural Construction Center, Executive President of the Research Academy of Sustainable Development Higher Education and Director of the China Rural Economics and Financial Research Center. In 2007, he became the Deputy President of the China Society of Agricultural Economics. In 2008, he was appointed as Member of the Agricultural and Forestry Economic Management Group, the 6th Discipline Evaluation Group by the State Council Academic Degree Committee. His major research interest at international level is comparative development research of developing countries. At national level his research topics include country situation and growth, institutional evolution, rural control and rural construction, rural financial and banking taxation system reform, etc.



Professor HU Dinghuan is a senior researcher at the Institute of Agricultural Economics and Development of the Chinese Academy of Agriculture Sciences (IAED-CAAS). He received his PhD at the Department of Agriculture, Gifu University in Japan in 1996. He was working as senior researcher in the Center for Chinese Agricultural Policy (CCAP) during the period from 1998 to 2000. In 2003, he was working as visiting Professor in Kyoto University in Japan. During that period he studied the food supply chain in Japan. Since 1996, he was involved in about 70 research projects supported by both domestic and foreign foundations. He has published more than 100 papers. His major research interests are in Township Enterprises in China, Modern Retail Market and Supply Chain of Farm Produce, Natural Resources and Environment, Livestock Economics and Design of Marketing Strategies for Agri-products. Currently his research work focuses on the Effect of Chinese Food Supply Chain, the Dairy

Industry in China and Agri-food Safety in China. He gives technical support to farmer cooperatives to sell their products directly to supermarkets and low-carbon agriculture. His is teaching “Marketing and Management Courses” in the Graduate School of the Chinese Academy of Agriculture Sciences.



Professor Kevin Z. CHEN earned his PhD degree in agricultural and food marketing at the University of Guelph in Canada. His doctoral dissertation won the Best Dissertation Award of Canadian Agricultural Economics Society. Dr Chen currently is China Program Leader and Senior Research Fellow at the International Food Policy Research Institute (IFPRI) and is based in Beijing, China. He is also an Executive Director of the International Center for Agricultural and Rural Development (ICARD), a joint institute of the Chinese Academy of Agricultural Science (CAAS) and IFPRI. Before joining IFPRI in April 2009, Dr Chen was Field Director of China Canada Agriculture Development Program funded by the Canadian International Development Agency (CIDA) from 2005-2009. He was an associate Professor of food marketing and trade at the Department of Rural Economy, University of Alberta and was co-editor of the Canadian Journal of Agricultural Economics. Currently, he is the co-editor of China Agricultural Economic Review. Dr Chen has been involved in many policy research projects on agricultural trade, agricultural policy reform, industrial organization theory and supply chain management, food consumption and consumer behaviour, and climate change and sustainable development. He has published more than 50 academic papers and books, as well as more than 30 research reports.



Professor YU Xiaodong works at the State Ministry of Education, State Development and Reform Commission (former State Planning Commission). Since 1984, he has been the Deputy Director of the Editorial Department of the Institute of Economics, the Division Chief of the Division of Research Administration, the State Planning Commission. In 1993, he was the Deputy Director of the Institute of Economics, the State Planning Commission, Since 2001, he was the Director of the Public Nutrition and Development Center, Macro Academy, State Development and Reform Commission and Director of the State Public Nutrition Improvement Project. For years, he has been engaged in the research on macroeconomics, population and social development and economic and social development strategy. He has been involved in major scientific research projects of the World Bank, UN Population Foundation, UN Children Foundation, Asian Development Bank and other international organizations. His work includes the Public Nutrition and Social and Economic Development Report China Nutrition Industry Report, etc.



Professor ZHOU Jiehong is working at the Center of Agricultural and Rural Development of Zhejiang University in Hangzhou, China. Her research focus is on food safety, supply chain management and industrialization of agriculture. The last five years, Dr Zhou has been engaged in a National Nature Science Foundation Project, a key Humanity and Social Science Foundation Project and four key projects of Zhejiang province. Based on her continuing research on food safety and food supply chain, she has published ten papers, among which one was published by “China Social Science Digest” and two were cited by SCI. Prof. Zhou published three monographs, namely “Study on Quality Safety Management of Fresh Vegetables” which was honoured the 14th of philosophy and social

sciences outstanding achievement awards of the Zhejiang Government Award for Research in 2007; “Information Management of Food Safety: Theory and Practice” and “Study on Applying System of Agriculture Standardization”.



Professor GUO Jianjun is Director of the Comprehensive Division, Department of Rural Economic Research, the State Council Development Research Center. He is graduated at the Tokyo Agriculture and Industry University. He has won the first grade prize in research on China Development of the State Council Development and Research Center. He has participated in studies on Chinese Agricultural Development Policy, Cereal Market and Macro Management.

2 ADDRESS BY DIRECTORS OF LEI AND IAED

2.1 Prof. Dr Ruud HUIRNE, Director General of LEI-Wageningen UR

After having welcomed the speakers and the audience, Ben Kamphuis provided a brief introduction to the China-SPAR project and read a message of Professor Ruud Huirne, Director General of the Agricultural Economics Research Institute, LEI, part of Wageningen University and Research Centre.

Dear colleagues,

As the managing director of LEI, the Agricultural Economics Research Institute, I am pleased to deliver an address at this interesting symposium that is organized jointly by our institute, the Institute for Agricultural Economics and Development and IFPRI.

This symposium is an important event, as you will be discussing the future of our work: the topics that should be addressed by food economy researchers in the coming decades. The rapidly changing global food economy is affecting everyone's lives: rich and poor people alike. The world population is growing rapidly and is expected to pass the nine billion mark by 2050. We expect that the incomes of billions of people will increase, in particular in south-east Asia, including China. This will lead to changes in the diet of these people; they will not only demand more and better quality food, but also eat more animal products. As a result we expect a rapid growth in the demand for feed and fodder. In addition, there is a continually growing demand for energy, which will partly be met by bio-energy.

So, the world needs food, feed and fuel, but the availability of natural resources is limited. At the same time we expect consumers' demands to change with respect to food safety, environment, labour conditions, and social justice. Societies will change and we will experience impressive technological innovations. All these factors are influencing the food economy and policy makers in governments and companies need to take them into account. It is the task of science, of us, to provide them with knowledge and advice for taking the right decisions. We need to be ahead of them, to set our research agenda on the policy issues of tomorrow. The organizers of this symposium have chosen the theme of this symposium rightly.

Unfortunately, I am not able to attend the symposium due to other obligations, but I trust you, well-known researchers from China and the Netherlands, to jointly explore the impact of the afore-mentioned developments in the food economy and to generate new topics for agro food economy research for the future. Moreover, I sincerely hope that this symposium will be a starting point for expanding and strengthening the working relations between our institute and yours, between your universities and ours. I hope that we will soon be able to collaborate in joint projects on the new food economy.

I wish you an interesting and fruitful symposium

Thank you for your attention

2.2 Dr MA Fei, Deputy Director of IAED-CAAS

Ladies and gentlemen

The Academic Workshop on “The priority research topics in the food economic domain in 20 years to come” is now opening. On behalf of the Agricultural Economics Research Institute of Wageningen University and Research Centre (LEI-WUR), the Chinese Institute for Agricultural Economics and Development of the Chinese Academy of Agricultural Sciences (IAED-CAAS) and the International Food Policy Research Institute (IFPRI) Beijing, I would like to express my warm welcome and heartfelt thanks to all the participants.

The global food economy is facing enormous challenges. The latest data issued by FAO show that in 2009, there were about 1.02 billion people suffering from malnutrition, and newly increased 150 million people suffered from hunger. This means that one sixth of the world population is in a state of starvation. It is estimated that the world population in 2050 will reach nine billion. Because available farmland and water resources are limited, the population increase will cause enormous pressure on food supply, and cause enormous challenges to environment. China is one of the countries that have a huge population, and shows great concern of the future food economy trend and how to feed the nine billion people.

The Chinese Institute for Agricultural Economics and Development of the Chinese Academy of Agricultural Sciences (IAED-CAAS) was established in 1958, to carry out research on rural development policy, food safety, resources environment and sustainable development, foreign agricultural economy, agro-food international trade, poverty issues, agricultural technology economics, regional development and agricultural modernization, high- and new-technology industrialization and agriculture enterprise investment and operation management and other domains. The Institute provides policy suggestions and decision-making advice to government at all levels. It trains senior talents for agricultural policy research, administrative management and enterprise operation. The Institute is involved in international cooperation and academic exchanges. It has brought forward many excellent agricultural economists. It combines nature science and social science, technical science and

economic science, at macro and micro level, and has the advantage of collaboration between many different disciplines.

The “New Food Economy” is a topic of great significance and profound intension. I hope that the participants will speak out freely and learn from each other. “New Food Economy” is a topic that is oriented to the future, and this workshop is only a starting point of the bright future. It is essential to let each participant to continuously explore, dare to innovate, and accumulate experiences in joint effort to provide a safe, nutritious and high quality food environment for the world people and the Chinese people.

I wish the workshop a success!

Thanks!

3 SUMMARY OF LECTURES

3.1 Dr ZHANG Xiaoyong: New dimensions of food economy research

Agricultural Economics Research Institute of Wageningen University and Research Centre

3.1.1 Brief introduction of the speaker

Dr ZHANG Xiaoyong is a senior researcher at LEI, the Agricultural Economics Research Institute, part of Wageningen University and Research Centre in the Netherlands. She is a research fellow at Mansholt Graduate School of Wageningen UR. Her research focuses on food consumption behaviour and supply chain management. She has published a series of articles in leading academic journals related to food consumption patterns, health lifestyles, overweight and obesity, chain governance, etc. Her work has been rewarded as the best paper in the IAMA conference of 2009.

3.1.2 Central topic of lecture

Dr Zhang Xiaoyong pointed out that the traditional new classical economic framework and the linear scientific model are too simple to explain the current food economic problems. The new food economy has broken the simple supply chain from production to consumption. It is now centred around the consumers, guided by market demand and changed into a complicated chain of functions. In the new food economy the markets are not completely public, but based on relations and talent. Instead of *tame problems* an increasing number of *wicked problems* are arising in the food economy. These problems ask for new scientific models, not linear but cyclic, alternative theories and other research methods. Are we ready for new food economics?

3.1.3 Summary of lecture

The lecture of Ms Zhang can be broken down into three parts :

- a) The New Food Economy
- b) Emerging issues, wicked problems
- c) The challenges to sciences

Part One: what is the new food economy?

The reconsideration of economic theory during the current economic crisis has also caused a reconsideration of agricultural economics. Starting from the traditional food economics it is essential now to define the new food economics. The traditional food economics starts from the concept of a product chain from production, storage, processing, to marketing and consumption. The traditional food economics is mainly based on economic theories, such as price theory in which the equilibrium price at the cross point of supply and demand curves, the theoretic decision-making and competition theory and the assumption of rational consumers seeking to maximize utility. The new food economics starts from a consumers centred web in which many aspects of food consumption are interconnected. Establishing relations and developing processes come before production can start. In the new food economics, price discovery is not easy, because it is not based on supply and demand only; market access is often limited and is based on invitation to take part in the network.

Theories applied in the new food economics include supply chain management theories (chains and networks), institutional economics, organizational theories, consumer behaviour theories, etc. The new food economics is still analysing *'tame'* problems, but here and there are arising many *'wicked'* problems that need to be addressed. Tame problems in food economics are, for example, identification problems of sources of food contamination, cost and benefit problems of irrigation projects. The concept of tame problems is fairly clear, and we know how to solve the problem. In general, they can be clearly defined and the process to solving these problems is rather transparent. The results are correct or not correct and give leads to success or failure. These problems do not change much over time. The cause of the problems can be determined by experts on the basis of scientific approaches and data. The uncertainty around tame problems is small; we have a common understanding of the problem and a common expectation of possible solutions. When we have solved the problem, we have done our task and can continue to the following problem. When the problems are solved, the tasks are completed. However, the problems we are facing now, are not that straight forward, they are "wicked problems".

Part Two: Emerging issues, wicked problems

Examples of wicked problems are: animal welfare, GMO food, bio-fuel production, climate change and sustainable development of food. Wicked problems have the nature of social complexity, many interdependencies, multi-causal, and they are seldom the responsibility of a single organisation; there are many stakeholders involved who need to cooperate to solve the problems. Wicked problems are not consistent in time. The problems are changing when trying to solve the problems. The many stakeholders have different ideas on what the “true” problem is and the “real” cause of the problem. The solution of the problem is based on the judgment by the stakeholders. Hence, whether a problem has been solved or not, depends on the opinion of the stakeholders, the political forces and resources availability. There is no clear final solution; a solution is not clearly correct or wrong; the result is “better”, “worse”, or “good enough”.

Part three: Challenges to sciences

The new wicked problems are challenging the traditional research theories and methodologies. The traditional scientific linear model holds the view that the societal progress is based on scientific progress. It consists of different phases starting from basic research, leading to the establishment of a knowledge reservoir and databases, which are used for applied research leading to societal development and progress. Its assumptions: scientific progress causes societal progress, clear and correct science is the precondition of scientific solutions for political disputes. In contrast, scientific cyclic model holds the view that science and society are interconnected. The public participates in science, democratized science. Science and technology is not a black box, public should participate both in the phase of determining the research objectives and in the research orientation.

The traditional science approach is not suitable for research on wicked problems. Because of differences in valuating expected outcomes, different kinds of actions for different kind of stakeholders are required; hence, stakeholders need to participate in the whole process of decision-making. In that process, science plays another role, not simple leading but interlinked with the society; the functions of scientific decision making have become very complicated. An example of such a wicked problem is the decision on what should have the priority in the agricultural policies by the EU: farmer’s welfare,

environment protection, international competitiveness, animal welfare, sustainability etc.? Different groups do have different opinions about the priority issues. There are differences between the old and the new EU member countries, between rural and urban areas, between different education levels, different political ideology, and different value orientations.

Another example is the different values that consumers attach to food, such as health, taste, animal welfare, environmental friendliness, justice in payment, convenience, feeling good, etc.

The research of this type of wicked problems requires the application of scientific cyclic models and alternative theories and research methods, such as behavioural economics, stakeholder's analysis, effective participation, collective decision-making, etc. Wicked problems ask for trans- and interdisciplinary research, not only economics, but also psychology, political and public administration sciences, sociology and anthropology.

This change in research approach has also implications for research funding mechanism. Research funding agencies in the EU and the U.S. are increasingly not satisfied with curiosity driven, disciplinary based science, stressing more and more the impact of science on society and paying more attention to linking progress in science and society. Research committees do not consist of scientists and research workers only, but also of representatives of private enterprises, non-governmental organizations, practitioners and other stakeholders from various parts of the society.

In conclusion of her presentation, Ms Zhang states that it is time to think about the position of agricultural economics in solving wicked problems. If agricultural economics ignores these problems and the implications for research, what is then the future of agricultural economics?

For more details of this lecture and additional information, please, contact Dr Xiaoyong ZHANG.

E-mail: xiaoyong.zhang@wur.nl

(See also: www.lei.wur.nl/UK/newsagenda/Dossiers/The_New_Food_Economy.htm)

3.2 Prof. HUANG Jikun: Food economy in the coming decades: the emerging policy issues for research

Center for Chinese Agricultural Policy, Chinese Academy of Sciences

3.2.1 Brief introduction of the speaker

Mr Jikun HUANG is the Founder and Director of the Center for Chinese Agricultural Policy (CCAP) of the Chinese Academy of Sciences (CAS), Professor of Institute of Geographical Sciences and Natural Resources Research. He is also vice-president of Chinese Association of Agricultural Economics and Chinese Association of Agro-Technology Economics, Member of International Policy Council, and Member of Global Agenda Council on Food Security (World Economic Forum). His research covers a wide range of issues on China's agricultural and rural development, including work on agricultural R&D policy, water resource economics, price and marketing, food consumption, poverty and trade policy. He received the Outstanding Scientific Progress awards from the Ministry of Agriculture four times, Award for China's top ten outstanding youth scientists in 2002, Outstanding Achievement Award for Overseas Returning Chinese in 2003, and Outstanding Contribution Award on Management Science. He has published more than 120 papers in refereed international journals, including two research reports in Sciences and one paper in Nature, and about 160 papers in Chinese journals. He is co-author of 15 books.

3.2.2 Central topic of lecture

Prof. Huang Jikun holds the view that the world food economy and the Chinese food economy are facing challenges and opportunities. In the coming decades, the research domain should concentrated on the following four aspects: agricultural science and technology policy, agricultural resources and environment policy, agricultural production factors market and policy, agricultural products market and policy, as well as bio-energy and climate change problems that run through the above four aspects. Through the economic analysis of BT cotton and GM rice, Prof. Huang has concluded that biotechnology will provide an important contribution to the development of Chinese agriculture and should get full attention.

3.2.3 Summary of lecture

The lecture of Prof. Huang can be broken down into 3 parts:

- Prospects of the global food economy;
- Prospects of China's food economy; and
- The emerging policy issues for research

Part One: Prospects of the global food economy

According to projections of the United Nations the global population will increase from 6.4 billion in 2005 to 9 billion in 2050, of which, 2.3 billion (90%) increases will come from the developing countries. So, in the future, we need more food to feed the growing population. In addition, we need more animal feed, because the meat consumption will increase, as, compared with the developed countries, the meat consumption in developing countries is low. In addition, there is a growing new non-traditional demand, such as for bio-fuel, and multi-functional agriculture. The development of bio-fuels is very rapid: during the period from 2000 to 2005, the world bio-ethanol production has doubled. And the growth of bio-diesel production was even more significant.

During the period from January 2005 to May 2008, the international price of rice, wheat, corn and soybean increased significantly, resulting in a price crisis, which actually was caused by the combination of changes in oil price, bio-fuel, market speculation, export bans and some other factors. Mid-2008, the global economic crisis broke out and the phenomenon of food price crisis disappeared, but the price of the majority of farm products stayed at the high price level of 2007. Research shows that the production of bio-fuel will increase drastically in the 20 years to come. Based on these research results, the whole world is seriously facing a new food price crisis and food security problems in the future. Bio-fuel is a fundamentally different technology, as it affects the demand side. It is possible that we are in the middle of a fundamental watershed, perhaps the greatest since the "invention" of genetics. However, while genetics allowed for the rapid rise in food supply in the past with falling prices, this new technology affects the demand side and since food becomes tied to energy, food prices will rise if energy prices rise.

In the future, the food economy has both opportunities and challenges. The opportunities are in market expansion from originally food and fibre to bio-fuels and sector expansion from agriculture to industry and service sectors. Instead of falling prices as in the past, the agri-food prices have a trend to increase in the future. In addition, globalization can make it possible to benefit more from comparative advantages. There are also challenges. The world is facing the need for food, feed and fibre for nine billion people in the future, there will be a growing demand for bio-fuel, there will be problems caused by water scarcity and land and forest deterioration as well as climate change and, in addition, the agricultural productivity shows a decreasing growth rate.

Part Two: Prospects of China's food economy

From own research on the development of the food consumption per capita in the period 2004 and 2050, it appears that the consumption of rice and wheat will decrease, the consumption of edible oil slightly increase, while the demand for vegetables, fruits, meat, dairy products and aquatic products will increase drastically. Prof. Huang mentioned a number of opportunities for the future Chinese food economy development: (a) the expanding agri-food market, (b) the shift towards more competitive sectors and (c) the increasing support from the government by an increase of subsidies for agriculture and improved agricultural technologies.

During the period from 2004 to 2008, China has gradually increased its agricultural subsidies. In 2008, the subsidy reached 3.1% of the national GDP. With respect to agricultural research, the fiscal expenditures reached 10 billion RMB in 2005, and the total investments in agricultural research and development expenditure was 0.6% of the national agricultural GDP. China invested 1.65 billion RMB (US\$ 200 million) in agricultural biotechnology in 2003. In 2007, 7.1 million farmers cultivated Bt cotton, accounting for about 70% of the total cotton cultivation. The results of a study among farmers in the period of 1999-2001 show that the use of Bt cotton reduced pesticide use per hectare with 34 kg while the yield increased with 9.6%. The investments in seed increased with 570 RMB, but the use of Bt cotton reduced the input of labour with 41 days. In conclusion, the use of Bt cotton increased the net income of the farmers with 1238-1957 RMB per hectare, equivalent to US\$155-255.

On the basis of a research among farmers who respectively cultivated and not cultivated GM rice during the period of 2002-2003, we can conclude that by adopting GM rice, pesticide use per hectare can be reduced with 80%, the yield per hectare can increase with 6% and 5.5% labour can be saved, resulting in a net income rise of US\$90. By adopting BT cotton and GM rice, China can gain an income of about US\$5.2 billion in 2010.

There are opportunities, but the Chinese food economy is also facing a series of challenges such as (a) food security and food safety, (b) farmland related problems, (c) water shortage, (d) agricultural modernization, (e) environment pollution and (f) climate change. With respect to the water scarcity problems, the developments are promising, taking into account that in the course of time the total volume of water for agricultural purposes has been reduced gradually, while the total production volume has increased. It is clear that the Chinese small-scale rural households are facing a series of challenges with respect to labour productivity, modernization and food safety. To solve these problems, they need to increase the scale of production. There are signs that this is happening. Although the amount of farmland per capita is continuously decreasing, yet, the emerging of a land rent market provides opportunities for production scale expansion. In Zhejiang province, already more than 30% of the land is rented. With respect to the scale of distribution and marketing, it should be noted that the number of farmer's special cooperatives is continuously increasing. At the beginning of 2009, there were in total number 133,000 villages with farmer's special cooperatives, which is 21% of the total villages; 23.8 million farmers participated in farmer's cooperatives, accounting for 9.5% of the national total number of farmers. At the end of 2009, the total number of farmer's special cooperatives was 246,000. However, although the farmer's special cooperatives have had a fairly great development, yet, they need a long way to go both in quantity and in quality.

At hand of maps Prof. Huang showed the effect of climatic change on Chinese agriculture:

- The effect of temperature change on irrigated agriculture: a temperature increase is (surprisingly) favourable for agriculture production in south-east and southwest China; for the central part of China it has no benefit, while the farmers in Northern China region will be influenced negatively by global warming.

- The effect of changes in precipitation on irrigated agriculture: farmers in almost all regions in China will gain benefits, although small, from an increase in precipitation.
- The effect of temperature change on rain-fed agriculture: in the frigid and temperate zones, climate warming will benefit rain-fed agricultural output, but it will likely hurt rainfed farmers in most parts of China, particularly in the southern regions.

Part Three: The emerging policy issues for research

According to Prof. Huang there are four important policy areas that should be addressed by future research: (a) agricultural science and technology policy, (b) agricultural resources and environmental policy, (c) policy with respect to the market of agricultural production factors and (d) agri-food market policy.

With respect to agricultural science and technology policy, we could explore the effect of

- agricultural science & technology innovation system and reform
- agricultural biotechnology and related policies
- bio-fuel technology and policy,
- biodiversity and policy,
- climate change and agricultural technology.

With respect to agricultural resources and environment policy, the priority topics for research are:

- Sustainable use of water resources and policy
- Sustainable use of land resource and policy
- Impact of biofuel on land and water use and environment
- Effect of climate change on land use, irrigation and water security
- Agricultural (non-point) pollution and policy.

With respect to agricultural production factors market and policy, we should focus our attention to:

- Land: land rent, land ownership and property rights
- Labour: aging and increasing share of women in farming population
- Capital: rural credit market,
- Farmers' associations: how to effectively combine all agri production factors

With respect to the agri-food market and policy, we should study it from multiple angles, such as:

1. global, national and regional food safety,
2. trade liberalization (Doha and Post-Doha),
3. globalization and agri-food supply chains
4. Crop and livestock risk management,
5. global public goods and services (food security, food safety, bio safety)
6. the impact of bio-fuel on global and national food security and poverty,
7. the effect of climate change in multiple domains (impacts, mitigation, adaptation, carbon trade, tax and tariff...).

After this overview of future topics for economic research, Prof. Huang listed a number of methods to be used in future research such as:

- Social and economic experiments
- Policy analysis/simulation models (CGE or PE)
- Spatial economic models
- Econometrics: panel data
- IT, GIS and GPS in economic analysis

He concluded his lecture with the remark that in the future multi-disciplinary research will be necessary in order to find solutions for the challenges we face in the current and future food economy

For more details of this lecture and additional information, please, contact Prof. HUANG Jikun.

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3.3 Prof. ZHONG Funing: How to understand and interpret the food price crisis?

College of Economics & Management, Nanjing Agricultural University

3.3.1 Brief introduction of the speaker

Dr Zhong Funing, Professor at the College of Economics & Trade, Nanjing Agricultural University, is currently the Chairman of the Agricultural and Forestry Economics and Management Disciplinary Appraisal Committee of the State Council Academic Commission, a Vice Chairman of the Advisory Committee of Higher Education in Agricultural and Forestry Economics & Management of the Ministry of Education, and a Vice President of the Chinese Society of Agricultural Economics. He has served as a consultant to the FAO, the World Bank, and IFPRI. He is also on the Editorial Advisory Committee of Agricultural Economics and the Editorial Advisory Committee of the Canadian Journal of Agricultural Economics.

3.3.2 Central topic of lecture

Prof. Zhong Funing pointed out that a true agri-food market should include multiple dimensions in which many stakeholders participate. He holds the view that the slow-down of agricultural productivity growth can cause supply and demand imbalance. The actions of the decision-makers during the period of price fluctuation, the reaction of the producers and consumers on price changes are critical factors that have caused the recent food price crisis, and they should put forward countermeasures to prevent such crisis in the future.

3.3.3 Summary of lecture

During the period from 2007 to 2008, the international food prices suddenly went up, resulting in the price crisis of 2008. The outbreak of this food price crisis caused some major problems. The sharp rise of food prices was not determined by basic market forces. So, what was behind it? What was the reaction by the producers and consumers? What is the relationship between the international price,

border price and domestic wholesale and retail price? These are the questions that Prof. Zhong addressed in his lecture.

Part One: Analysis of the cause of the food price crisis

According to Prof. Zhong, the outbreak of the food price crisis was mainly driven by speculation and intervention. There were not great changes in basic demand and supply, before the oil price went down, the food prices declined sharply. In other basic commodity markets, the situation was very similar. So it seems reasonable to assume that the dramatic changes in the food prices were caused by speculation of hot money shifted from financial market. Based on a comparison of the nature of different markets Prof. Zhong comes to the conclusion that it is not likely that speculations will last long in grain market. The financial market has no final customers, there is no direct supply respond to price fluctuations and the holding costs are low or zero. In the other commodity markets, the final demand is greatly influenced by the economic situation, there is a relatively rapid supply response on price fluctuations and the holding costs are relatively low. In the agri-food market, however, the final demand is rather in-elastic; the supply response on price fluctuations is slow and lagging, while the holding costs are high and the competition fierce.

Part Two: Economic thoughts occurring by the food price crisis

(a) Imbalanced supply and demand in the food market

Since the year 1999/2000, the production of the major grain crops did not meet the demand, resulting in a steady decline of the world stocks. Because of the use of stocks, the shortage was not reflected in market prices and the correct price signal reached producers, researchers and policy makers only after a certain time lag. Only after a drastic decline of the stocks, the lagged signal might have triggered the price crisis in 2005/2006. Why the stocks had been accumulated? And why the annual production growth was slowed down? During the period 1963 - 2003, the productivity growth rate of major crops such as corn, rice, and wheat showed a trend of decline. The decline in productivity is likely to be determined by product price development. The decline of real price is the result of long-term growth, which is caused by various factors, such as the green revolution, subsidies in developed countries, growth in South American countries and the reform of former centrally planned economies. These

developments were not adequately reflected in the market price. Prof. Zhong came, therefore, to the conclusion that it is inappropriate to analyse price crisis with simple supply/demand models. Other aspects need to be taken into account, such as the role of intermediate sectors, the role of stocks, including government, commercial and on-farm stocks and price stabilization policies in many countries. The objective is to seek for price stability and quantity security on both short and long-term.

(b) Relation between prices

Due to government interventions, Chinese producers and consumers did not respond to the world grain price fluctuation, but how about other countries? Prof. Zhong showed that in some east African countries the food price fluctuations were rather severe, in contrast to some Asian countries, such as the Philippines, Thailand, India and Pakistan, where rice price stability is one of the major national policy goals. Then, what price is relevant and for whom? Is it the spot price at the time of shipment, the ex-ante future delivery price, the f.o.b. or the c.i.f. price? What is the expected price for the next harvest perceived by producers and the expected future price by the consumers, particularly the intermediates? Which one of these prices is worth to explore and to monitor by the decision makers? The conclusion of Prof. Zhong is that it is not appropriate to only use market price, in particular not for long-term decision making. Different prices are relevant for different decision makers at different times under different conditions. It is, therefore, essential to find out what price is relevant for what decision maker at what moment.

(c) Reaction of the consumers to price change based on micro data

Purchase (not necessarily consumption) is related to short-term price changes, but the overall consumption in one year or in one month (or one week) is rather stable. Consumption is during a period, but purchase is a time point, so when the purchase is larger than the consumption it can lead to household food stock. The consumption of food from stock in different time points may change marginal utility assumption. Hence, the conclusion is that simple assumptions related to demand are not appropriate.

(d) Reaction of the producers to price change based on micro data

In general, we estimate expected prices on the basis of past prices, but what to do when past prices during a special period do not provide reasonable estimations for the near future or do not provide clear patterns over a number of years. What prices should then be used for forecasting prices and responses?

The conclusion is that simple assumptions related to supply are inadequate.

Part Three: Conclusion

Based on this analysis, Prof. Zhong comes to the conclusion that the basic model of traditional analysis needs improvement. The simple economic model assumes two parties, production and consumption (demand and supply), instant transaction and a completely competitive market. However, the real market is multi-party, with long chains of intermediates and an imperfect market with various dimensions (time, space, etc.). Therefore, one of the important future research topics for economists is to improve the price analysis, to precisely define the markets concerned, the actual players in these markets and the price expectations they perceive at the actual time of decision making.

For more details of this lecture and additional information, please, contact Prof. ZHONG Funing.

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3.4 Prof. TIAN Weiming: Integrating smallholders into the global agro-food market: a real challenge of development

College of economics & management, China Agricultural University

3.4.1 Brief introduction of the speaker

Professor TIAN Weiming of the College of Economics and Management, China Agricultural University in Beijing, has extensive experience in agricultural economic research and has been involved in a number of research projects commissioned by the Chinese government and international organizations. His recent research focuses on China's agriculture and rural development after accession to the WTO. He is co-editor of the journal China Agricultural Economic Review.

3.4.2 Central topic of lecture

Prof. Tian Weiming showed that the small-scale rural households in developing countries are facing huge problems, caused by the development of modern global agro-food systems. In a certain extent, the expansion of these systems means a gradual extinction of the small-scale rural household operation model. On short term, however, the developing countries need to find ways to get small-scale rural households adapted to the competition patterns of the current global food market. In the long run, both developed and developing countries should explore what food production systems suit best to the human development objectives.

3.4.3 Summary of lecture

The lecture of Prof. Tian is broken down into three parts: The first part is about the background of the global food economy, the status of small-scale rural households and the necessary conditions to integrate agricultural producers, in particular small-scale rural households, into the global market and supply chain. In the second part the problems in the current global food market are discussed, while in the third part, Prof. Tian brings forwards new thoughts on agricultural development.

Part One: Research background

In recent years, the global food supply chains have rapidly developed. They have been expanded from urban areas to rural areas and from developed countries to developing countries. Integration into the supply chains is a necessary condition for agricultural producers throughout the world to get access to the benefits of the global agro-food market.

(I) Why focusing on small-scale rural households as research object?

In developing countries, agricultural production is mainly undertaken by small-scale rural households. However these smallholders are in a disadvantageous position in global competition. Past experiences show that the expansion of the scale of rural households largely depends on the urbanization process. However, the urbanization in developing countries is restricted by a number of factors. Rural households are, in general, short of the needed material and manpower capital; there are institutional restrictions and there is insufficient demand for low technology products and therefore restricted opportunities for rural-urban migrants to shift to other industries. Many developing countries have a huge rural population; even if the urbanization process should be accelerated, it is unlikely that the farm business scale will rise to an appropriate level in a relatively short period of time. Therefore, the model of small-holders will remain the dominant mode of agricultural production in developing countries.

The situation in China. During the period from 1996 to 2006, the urbanization rate of China increased from 30.5% to 43.9%. However, according to the agricultural census in 1996 and 2006 the number of rural permanent households did not decrease, on the contrary, there was an increase of 450,000. Yet, the rural population declined by 128 million and rural employment with 83 million. These changes are mainly caused by changes in definitions. The rural population involved in agriculture was about 340 million in 2006, 86 million less than in 1996. However, the average area of farmland per rural households did not change that much and is still around 0.6 ha per household. In conclusion, small-scale rural households are still the main form of agriculture in China as in other developing countries.

(II) Why small-size rural household should be integrated into global food market?

Against the background of globalization, small-size rural household's possibilities for self-development are rather unfavourable. Due to the fact that small-scale rural households lack economy of scale in the production and distribution process, lack price setting capacity in the transaction process and do not have much influence in the political process, they are in an unfavourable competitive position in the global agri-food market. It is difficult for the small-scale rural households to achieve sustainable development; they rely on government support. The practice of the developing countries show, that trade protection and government support are not effective mechanisms to realize sustainable development. WTO rules form restrictions on relevant policies and trade protection can only benefit a part of rural households, namely those who are involved foreign trade. As for direct support policy for small-size rural households, in theory it is feasible, yet in the implementation, there are problems: or the implementation costs are too high, the efficiency low or rent seeking behaviour causes benefit losses. Even it in the developed countries, policies for supporting small-scale rural households are facing many problems, with regard to the policy objectives, the target groups and the costs.

Small-scale rural households in developing countries have the option to integrate into the global market or not. Remaining isolated from the global market, they can only undertake subsistence farming, they can survive, but they cannot realize development. Therefore, small-scale rural household should be integrated into the global market, so that they can expand their development space, their development opportunities, although without the guarantee that they will really benefit from it. Under these circumstances, the way in which small-scale rural households can be effectively integrated into global food market is an important problem that needs an answer. The development of small-scale rural households in developing countries is related to the basic rules of social fairness, justice and harmony in human development. How to integrate them into the global food market is a relevant development problem.

Part Two: Problems in the global food market

On the one hand, the current global food market is dominated by the developed countries. The characteristics of the global food market reflect mainly the preferences of the consumers in the developed countries and the integration of the small-scale rural households in the developing countries into the global agri-food market will face many barriers. The consumers are increasingly concerned about quality, convenience, diversity and low price. The modern food production systems have responded this demand by economy of scale, mainly through large-scale processing industry and by demanding from the producers quality-consistent raw materials in large quantities and for a low price. They meet the new demand of the consumers through technical improvement and product innovation. Modern food system can not only meet the demand of the consumers, but also induce the demand and promote the consumption. On the other hand, the agro-food supply chains are controlled by large-scale food processing and marketing enterprises, some of them trans-national companies. These enterprises can make use of their strong price control capacity and inside information on ways to gain maximum profits at the costs of the interests of producers and consumers. In countries with immature political systems and democracy, governments may even get into alliances with large companies. These enterprises can purchase government officials' interest and ignore negative externalities, and even influence policy formulation. An example in China is the phenomenon of farmers losing their land for project development.

Because of these direct relations with business development, the government in many developing countries lack the capacity and willingness to regulate the activities of large-scale food processing and marketing enterprises. In addition, the international speculation capital is increasingly penetrating into the global food market, which makes the situation even more complicated. Furthermore, it is likely that the global supply chains are magnifying the price fluctuations. For example, during the global financial crisis, the agri-food prices at international markets showed a large rise and decline. This kind of situations caused additional risks for small-scale rural households in the developing countries, but the governments of the majority of the developing countries lack the capacity to counter such risks. In such an unfavourable environment, the majority of the small-scale rural households have been marginalized, only a minority of them has sufficient resources and the capacity to integrate in the global market. The

shift towards intensive and large-scale agricultural production does indeed improve productivity, but it also causes excessive use of resources and degradation of the environment.

To counter the increasing market competition and to guarantee their product to be sold, small-scale rural households have to lower their price. However, in order to reduce production costs, small-scale rural households often use production techniques, that ignore external cost, causing environment degradation and food safety risks. On the long run, many small-scale rural households in the developing countries will quit agriculture due to the fact that they cannot adapt to the pressure of the increasing market competition. The remaining rural households will expand their production scale, which will lead to a change in the agricultural production structure. Into a certain extent, the expansion of modern food production system means the extinction of the small-scale rural household model.

Part Three: New thoughts on agricultural development

In the majority of developing countries, the government is primarily concerned about getting enough food and raw materials from the rural areas to the urban areas. This model is obviously not suitable for realizing the development of rural areas themselves. Only when agricultural production is seen as part of the overall rural development objectives, agriculture can be viable at long-term. In short term, the developing countries need to explore feasible ways for getting the small-scale rural households adapted to the current global food market. For example, on how to make small-scale rural households participating in a better way in the supply chains, through organizational changes, risk management, code of conduct, public services and other measures. In the long run, each country should explore what kind of food production system fits best to the human development objectives. In the future, we should explore the nature of the food industrial system and the position of the small-scale rural households in it.

According to Prof. Tian, improving the development capacity of small-holders is, undoubtedly, critical important, but it will also be necessary to strengthen the social responsibility of the agro-enterprises.

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3.5 Prof. ZHANG Xiaoshan: Globalization and China's rural development

Rural Development Institute, Chinese Academy of Social Sciences

3.5.1 Brief introduction of the speaker

Prof. Dr Zhang Xiaoshan currently is the director of the Rural Development Institute of the Chinese Academy of Social Sciences. He is a delegate to the 11th National Peoples' Congress (NPC) of China and member of the Agricultural and Rural Committee under NPC. He obtained his Master in Economics from Renmin University of China in 1982 and his Ph.D. in Economic Management from The College of Graduate Students, Chinese Academy of Social Sciences in 1999. His academic interest is on issues related to rural institutional change, organizational innovation and rural cooperative economy. He was and is now the coordinator for several important national and international projects, such as the promotion of Chinese farmers' cooperatives, the ownership structure of rural economy, the property rights reform on TVE, the strategic adjustment for rural sector structure, and the rural social security reform. He published, as author or co-author, more than ten books and quite a number of papers. Some of his papers were published in English. In 1997, Prof. Dr Zhang was honoured as a National Scholar with Outstanding Contribution authorized by the Ministry of Personnel, China. In August 2006, he was elected a Member of the Chinese Academy of Social Sciences. He is Chairman of the Association of Chinese Forestry, Animal Husbandry and Fishery Economy, Advisor to the International Committee for the Promotion of Chinese Industrial Cooperatives (ICCIC), Vice-Chairman of the Association of Chinese Rural Cooperative Economy and Advisor in Agricultural Economy to Beijing Municipal Government, China.

3.5.2 Central topic of lecture

Prof. Zhang Xiaoshan pointed out that globalization has had an enormous effect on Chinese agriculture. On the one hand, the Chinese agri-food trade has become imbalanced; food security should not be ignored under the current pattern of import and export. On the other hand, farmers have been linked up in the agricultural production system with companies, however, always in a passive and relatively weak

position. Therefore, Prof. Zhang Xiaoshan holds the view that we should combat the negative effects of globalization on agriculture via deepening the reform.

3.5.3 Summary of lecture

The speech by Prof. Zhang was about the effect of globalization on the Chinese rural development and was broken down into three major parts: (a) the effect of globalization on Chinese agriculture, (b) the effect of globalization on Chinese farmers, and (c) ways to overcome the negative effects of globalization by deepening government functions reform.

Part One: The effect of globalization on Chinese agriculture and agri-food trade

Since China's accession to the WTO, the Chinese agriculture has been transformed from traditional agriculture towards modern agriculture through improved market orientation, commercialization, regionalization and specialization. The process of vertical integration and agricultural industrialization has been speeded up.

(I) The application of comparative advantage theory in China.

China should export labour-intensive products, and import land and water resource intensive products. Since having joined WTO, the agri-food trade deficit has increased from US\$4.64 billion in 2004 to US\$18.16 billion in 2008. China has overcome the problem of tariff barriers, but not yet non-tariff barriers and technical barriers, such as ISO9000 and HACCP. The Chinese agri-food trade needs to conform to the national trade policy and to development principles. In the trade games between China and the foreign countries, the Chinese agriculture and farmers have made sacrifices for national trade development.

(II) The influence of the Chinese agri-food import and export pattern on the Chinese food security.

China is the biggest country in the world with respect to soybean and edible oil import, of which, soybean import volume accounts for about 50% of the total world soybean trade, while the import volume of soybean oil, palm oil, and rapeseed oil accounts for about 18% of the world edible oil trade.

What kind of effect could such agri-food import and export pattern have on Chinese food security? On the basis of an analysis of the agri-food trade, we can conclude that to meet demand of the urban and rural consumers, the agri-food supply in China is now relying into a relatively large extent on foreign farmland and water resources. This means that China has transformed from a net agri-food exporting country into a country with an agri-food demand gap. It is essential to compute the agri-food demand and supply balance point from the viewpoint of land resources. We come to the conclusion that under the current food consumption pattern, at least 2.1 billion mu of arable land is necessary to meet the domestic demand for agri-food, of which about 13% is farmland resources from foreign countries. We need conscientiously consider ways to increase the domestic agri-food productivity and competitiveness through technical and system innovation, so as to protect the interests of the domestic producers. In addition to agri-food import and export, foreign capital has also entered Chinese agriculture, through investments in the up- and downstream parts of the agri-food chains and is controlling some industries, such as oil processing enterprises and the seed industry. The entering of foreign capital can result in a catfish effect and activate local enterprises in China. However, can it also inhibit or even strangle national industries, hence endangering the food security of China?

On the issue of foreign capital entering the oil processing sector, the guiding thought for future development should be that foreign capital in oil processing enterprises should support the development of competitive parts of the industry and force the domestic oil processing enterprises to innovation. They should encourage competition and not protect the backward companies. However, in order to maintain the state food security and an effective food supply, we should be aware of the increasing gap between foreign capital enterprises and domestic private enterprises. We should be on guard against a further expansion of foreign capital in the oil processing industry and we should inhibit it. We are not against foreign capital, but yet against a monopoly. We should put our efforts in improving market competitiveness and increasing the market share of the domestic oil processing enterprises.

Part Two: The effect of globalization on Chinese farmers

At present, a 'farmer' is only an identity or a household membership relation with respect to the resident population. In reality, however, farmers form a highly heterogeneous group. Part of the farmers is engaged in agricultural production, while another part is involved in non-agricultural labour, including the workers migrated to urban areas. Here, we will mainly explore the effect of globalization on the Chinese agricultural labourers.

Agricultural labourers, no matter in what agricultural production activities they are engaged in, have to participate in a kind of agricultural management system. In order to encounter the global challenge, the policy currently adopted is mainly agricultural vertical integration, mainly in the form of a company plus rural households. Such vertical integrated 'enterprises', guided by a company, can rapidly combine capital, technology, information, management, marketing channel with labour and farmland and can realize large steps towards agricultural modernization. It is essential to recognize that the leading companies, even the multi-national companies, in these agricultural industrial enterprises can play an active role in linking farmers and markets. However, we must look at the problems related to the contracts between the companies and the rural households. In practice, the companies have a strong position in these relations, while the individual rural households have always a weak position. The bargaining positions are always seriously non-equivalent. In many cases the interests and benefits of the two parties are not in balance. The two parties have an unequal mutual relation. In the relationship between labour and capital, capital dominates labour. This form of agricultural organization dominated by a company reduces the space for the development of economic organizations by the farmer themselves and slows down the progress of farmers' organizations.

In the agricultural modernization process, one of the focal problems is how to treat industry and commercial capital, or even foreign capital entering agriculture. When developing a diversified and suitable scale of operation, how to organize farmer's sub-contracting, renting or transferring land and cooperation? Does "Agriculture using farmland" mean "Farmers using farmland"? Do various kinds of non-agricultural owners, including industrial and commercial capital or even foreign capital, have the right to subcontract and rent rural households' farmland?

Part Three: Deepening the reform to overcome the negative effects of agricultural globalization

It is essential to consider the relationship between capital, labour, political power and land in agriculture. In the domain of agriculture and non-agriculture, in general, labour force is always in a passive position while, capital in a dominant and control position. Sometimes, capital forms alliance with political power to gain additional profit without taking responsibility for related social costs or only in a very limited way. During the process of reform and opening to the outside world, it is essential to implement reform and system innovation; otherwise, we cannot overcome the negative effects brought by globalization. The reform of political and economic systems should be deepened in order to better cope with the challenges of globalization, as it is demonstrated in the following two aspects.

Firstly, empowerment of labour is required, to enhance their organizational, social and human capacity, to strengthen their countervailing power against capital. It is necessary to enable broad masses of farmers to participate in the process of globalization in order to realize social justice. We should develop rural social organizations, community organizations, farmer's cooperatives (or associations) of various kinds on a large scale, and increase the social and organizational capacity of rural vulnerable groups. The development of diversified social organizations is a significant symbol of a harmonious society. We should speed up building the system for village autonomy and safeguarding rural peoples' political and democratic rights. Like Premier Wen Jiabao pointed out: "without village autonomy we cannot build a new socialist countryside; without grass-root democracy there is no socialist democratic politics." We should make attempts to build effective democratic checks and balance mechanism for government discussion and administration at township and village level. We should encourage and support farmers specializing in specific crops or animals to establish professional production and marketing cooperatives. When conditions are ripe, these cooperatives should be upgraded into higher level united cooperatives or associations. In this way such cooperative organizations and agri-food sector associations can reach large scale in agri-food production and marketing. They can occupy larger market share and it makes it much easier to understand and forecast market information. Through such organizational innovation, we can construct a platform for farmer's special cooperatives and sector associations to negotiate and communicate information with the relevant government departments and agri-food processing enterprises about the agri-food supply and demand, allocation

management, prices, and other relevant topics. In so doing, the government can find ways for macro control and optimizing resources. The equal partnership relation among farmers' cooperatives engaged in agri-food production and marketing, agri-food enterprises and associations and the government, will guarantee Chinese food security and system arrangement of the basic supply of the major agri-food products. Farmer can build up their organizations via economic alliances, which will benefit them in defending their interests during the process of economic globalization and trade liberalization. This is in fact proved by the agricultural practice in European and American countries, Japan and other developed countries. The cooperative and economic organizations of the farmers are a powerful instrument for the governments of these countries in agri-food trade negotiations. Of course, the final formation of a national farmers' cooperative system will need long-term and hard efforts.

The second example of needed reforms concerns the government administrative management systems, leading to changing and redefining the functions of the governments. During the process of economic globalization and Chinese modernization, the position of the government and market has always been a key issue in economic development. The government should give up some part of the power in the allocation of resources and the government should distance itself from direct intervention or direct management of economic activities. The government should comprehensively understand and master the four new functions of the government, including economic regulation, market supervision, public management and social service. One of the important functions of the government is to ensure social equality and justice. Before the reform and opening up, the Chinese government was an omnipotent government. Since the reform and opening up, it tried to act as an economic government. The Party Central Committee put forward the construction of a harmonious socialist society, and to combine social equality with socialist nature, showing a recurrence of the position of the Chinese government. The government should transform its functions and establish a scientific view on the developments and a correct attitude to the performance of the government. It should transform from an alliance with capital towards just arbitration and moderation of conflicts between capital and labour, guarantee the legal right of the labourers and coordinate a beneficial relation between all parties. If there is an alliance between power and capital, the government is unable to protect justice and

repositioning of government functions will be frustrated. Whether the government's functions can transform depends on whether its functions can be effectively restricted.

- a. Establishing a correct attitude towards government performance should deepen the political system reform. Through system innovation, we can establish new cadre examination and promotion mechanism. We need to change the situation of governments at various levels being accountable to upper levels, rather than being accountable to lower levels. In doing so, in practice, the government can truly demonstrate the unity of being accountable to the people and to the Party leading organizations.
- b. The functions, responsibilities and financial budget of government departments at all levels should be matched with each other. In doing so, the government officials can just assume their own responsibilities; rather than seeking the interests of their own department.
- c. The behaviour of the government's departments and civil servants must be effectively supervised, assessed and reviewed by the People's Congress, CPPCC, mass organizations, media and common public as well.

For more details of this lecture and additional information, please, contact Prof. ZHANG Xiaoshan.

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3.6 Dr Myrtille DANSE: Trends in global agri-food chains

Agricultural Economics Research Institute, Wageningen University and Research Centre

3.6.1 Brief introduction of the speaker

Dr Myrtille DANSE is head of the research group on Sustainable Chains and Markets at the Agricultural Economics Research Institute, part of Wageningen University and Research Centre in the Netherlands. Her research interests relate to innovative coordination mechanisms, such as voluntary standards and code of conducts that stimulate private sector involvement in sustainable chain development strategies. Besides projects in the Netherlands, she has extensive project expertise in a number of African, South East-Asian and Latin America countries.

3.6.2 Central topic of lecture

Dr Myrtille Danse points out that the agri-food chains are changing radically from supply oriented product chains towards demand oriented value chains. These changes require both technological and institutional innovations. In relation to that innovation systems research is needed to integrate and balance the knowledge and actions of the stakeholders involved and to achieve a sustainable and equitable development.

3.6.3 Summary of lecture

The speech of Dr Myrtille Danse can be broken down into two parts: (1) the major trends in value chain research and (2) the future research agenda. In the first part she focuses on three topics: globalisation and concentration, high value agricultural commodities, and pro-poor sourcing.

Part One: Major trends in value chain research

(1) Globalization and concentration

At hand of some figures, Dr Danse showed population and income growth is the major decisive factor in the food market development. The fast urbanisation all over the world is supporting the development

of internationally operating retailers. In 1980 the five largest retailers, Tesco, Wal-Mart, Metro, Ahold and Carrefour were active in 18 countries, in 2003 in 100 countries. At the same time, the retail sector took a larger share of the fresh food market: in the UK it is 82%, in Germany 80% and in the Netherlands 74%.

(II) High value agricultural commodities

High value agricultural commodities are commodities that generate high returns per unit of labour, land, or capital, such as fruits, vegetables, milk and milk product, eggs, meat and fish. These products have some characteristics in common:

- Perishability (and related risk)
- High income elasticity (in relation to growing demand)
- Price is very sensitive to quality
- Food safety is particularly important

The driving forces of a shift towards high-value agri-food consumption are very strong and include income growth, urbanization, trade liberalization, foreign direct investment, etc. Rising income does consumers diversify away from grains & starchy root crops. In addition to income growth, the availability of high value agri-food has increased the consumption of these commodities by urban consumers. Trade liberalization (including market exchange rates) has supported the introduction of high value agri-food and the export of high value products to high income markets. Foreign direct investments link farmers and high income consumers in other countries, making the products much easier to market.

The key characteristics of the trade in high value agricultural commodities are: value chain, trust, quality assurance, reliability and continuity in supply. This is achieved by 'collaborative' business models', traceability systems (especially in support of supermarkets' private brands), private standards, scale of production by narrowing the supply base, national and cross-border systems to coordinate procurement and distribution and distribution centres. The retailers form a 'narrow' funnel between a large number of producers and a large number of consumers.

Then Dr Danse explained the difference between the concept of a product chain and a value chain. A product chain is based on competition between independent enterprises with the objective of increasing prices and reducing costs, with the supply as the guiding factor, without information flow. A value chain is quite different from the product chain. In a value chain not the individual enterprises but the entire chain is the competitive unit. The enterprises in the chain are inter-dependent actors that cooperate with the major objective of improving both value and quality of the chain, with demand as the guiding factor and sharing information among the enterprises along the chain.

(III) Pro-poor sourcing

The driving factors described above cause changes in the market, changes in the supply chains, which lead to inclusion or exclusion of small farmers. Some farmers can participate in the supply chains; others cannot, because of lack of technology or capital and other factors in the new dynamic markets. The development of value chains provides suppliers different strategies to meet the higher standards of the market, such as

- Process upgrading
Improving efficiency, innovation, labour & environment conditions
- Product upgrading
Moving into more value-added products
- Functional upgrading
Acquiring higher value-added activities in the chain
- Inter chain upgrading
Moving into or starting another value chain

Alliances between small farmers and supermarkets are an effective way to solve potential contradictions in the supply chains. Dr Danse presented a number of projects that were aimed at supporting small holders linking to large-scale retailers, such as the China-SPAR project. She advocates the necessity to continue with this type of cooperative projects to support small-scale farmers.

Part Two: The future value chain research agenda

The new value chain system has expanded the research scope, involving all stakeholders, besides entrepreneurs and practitioners, citizens, activists, community leaders, researchers, educators, media, politicians and policy makers. Through interactive knowledge processes, including learning alliances, policy dialog, action research, social learning, knowledge networks and multi-stakeholder engagement, we can establish collective actions on the basis of good communication and shared understanding of the expected improvements. Traditional research is a linear process of technology transfer, starting from setting the agenda, research, development, communication and extension leading to the expected improvement. The new research contributes to the continuous learning and innovation processes in which business, government, citizens, civil society and media are involved. Knowledge institutions, i.e. research and education, are supporting these processes not just by researching innovation systems but actually supporting them to be effective. Innovation systems research links process and content.

The innovation content includes agriculture for development, pro poor market development, climate change adaptation, ecological system management, food quality and safety, and calamity management. The related processes include system transformation, institutional innovation, governance, multi-stakeholder learning processes, private sector engagement, navigating complexity and new planning and evaluation frameworks. Innovation systems research is aimed at balancing these two aspects in action in order to achieve a sustainable and equitable development.

Conclusions

Ms Danse ended her lecture with the conclusion that the agri-food chains are changing radically and that these changes require both technological and institutional innovations. In relation to that, the research agenda also needs to evolve and to be focussed on process and system innovation, institutional arrangements and new business models on private sector driven coordination mechanisms.

For more details of this lecture and additional information, please, contact Dr Myrtille Danse.

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3.7 Prof. WEN Tiejun: Eco-civilization and the food safety problem

School of Agricultural Economics and Rural Development, Renmin University of China

3.7.1 Brief introduction of the speaker

Since 2004 Prof. Wen Tiejun is the President of the College of Agriculture and Rural Development of Renmin University of China, Director of Rural Construction Center, Executive President of the Research Academy of Sustainable Development Higher Education and Director of the China Rural Economics and Financial Research Center. In 2007, he became the Deputy President of the China Society of Agricultural Economics. In 2008, he was appointed as Member of the Agricultural and Forestry Economic Management Group, the 6th Discipline Evaluation Group by the State Council Academic Degree Committee. His major research interest at international level is comparative development research of developing countries. At national level his research topics include country situation and growth, institutional evolution, rural control and rural construction, rural financial and banking taxation system reform, etc.

3.7.2 Central topic of lecture

Prof. Wen Tiejun holds the view that the food safety crisis in China shows the major problems in the three agricultural issues (sannong wenti): farm production, farm family and rural development. In order to solve the food safety crisis, China can not completely rely on the western theory and systems, but should find a way out of the problem guided by eco-civilization. In his lecture, Prof. Wen presented Community Supported Agriculture (CSA) farm models as solution. The Rural Construction Center of the Renmin University of China participated in the construction of more than 10 county-level rural construction experiment zones, involving nearly 50 villages that are following the CSA model.

3.7.3 Summary of lecture

Part One: background

Why has pollution from agricultural sources exceeded industrial and households' pollution, becoming the largest pollution source? Globally, three major capital surpluses have caused the eco-environment crisis:

- d. The financial capital surplus has entered the agri-food and commodity market, causing a surplus in that market and shifting the costs of the crisis to agricultural producers and consumers.
- e. The industrial capital surplus has enlarged the food industrial chain in absorbing the surplus production capacity resulting in global food output and calories surpluses, which leads to a gradual reduction of the share of producers' benefits in the total food expenditure.
- f. The commercial capital surplus has caused a vicious competition in distribution and allocation links, leading to the contradicting situation of an overall food surplus and systematic regional shortages.

Prof. Wen is of the opinion that the current problems of agricultural pollution and food safety problems are caused by both market failures and government failures in market supervision. He presented a number of problems related to these failures such as the growing carbon emission, the desertification in China, with an annual growth of 3500 square kilometres, the gradual decreasing grain productivity and the unjust situation that on the one hand people die because of too much food and on the other hand because of food shortage.

Part Two: The development problems guided by development-ism

(I) The ruling position of western monistic historical view and the recovery of ecological pluralism

According to Prof. Wen the problem is that since the world entered the stage of capitalist civilization, its development is ruled by the western modernized ideology of centralism, from colonization to globalization. Characteristics of the "Western centralism" culture are the following: the early western individual culture takes the specific Mediterranean resource environment as the overall starting point, based on food collection and hunting, forming a social culture based on individuals, and in its later period, directly accepting the control of a superstructure. Russia, Europe and America as well are part

of this culture, which is needed by industrial capital, and has still the internal characteristics of its original culture. During the period that China has strictly enforced the westernized culture in nearly 100 years, it has introduced the monism culture, washing out hundreds of philosophical schools. Now, there are in China two opposite ideological trends of both the oriental and western ideology, which might together provide a way out of the problem. Different cultures are not good or bad. The so-called human historical progress is not a single process; a diversified development of culture ecology is the normal situation of human beings. Only through mutual understanding and containment a harmonious development can be achieved. The resources and geographical conditions for the formation of human civilizations are different. The polytheistic religion and plural society of the non-Mediterranean culture, including America, Africa and Asia have a different historical development path than the western culture. In this oriental culture, the Chinese polytheistic religions and plural society occupy a dominant position. This society is formed by the thousands years old, irrigation based, agricultural production pattern, causing a community oriented culture.

(II) Eco-civilization: a new phase of human history

The price of development-ism under the hard restriction of resources is paid by agriculture, the countryside and farmers and results in a series of problems.

The Chinese development had to deal with hard restrictions. The resources and environment in China can be compared with those in the Western Asia and North Africa and not with those in America and Europe. China has less than 10 % of the total global water, soil and light heat resources, mainly concentrated in the coastal zone. The industrial and agricultural economy and cities are also concentrated in the coastal plains, causing increasing regional differences and land prices rising inevitably. The desert area in China is more that 18% of its total territory and is increasing by 3,500 square kilometres each year.

Taking the agricultural region in North plain as an example, we see that there is a shortage of land resources, thousands of households are living in densely distributed large-scale villages amidst large plastic covered horticulture areas with an excessive application of chemical fertilizers and herbicides.

The excessive use of agro-chemicals in crop production has a devastating impact on people. Agricultural chemicals have three methods to enter the human body: one is occasional contact of large quantities of agricultural chemicals, such as eating by mistake; the second is long-term contact, such as the users of agricultural chemical have; the third is in-daily-life contact, i.e. agricultural chemical entering the human body via the food chain or in another way that harms the health of people. In China, there are about 30 million people suffering from food poisoning through micro-organism, pesticides or toxic animals or plants. Every year, about 500 farmers die due to excess use of pesticides and 54,000 farmers need medical care. The suicide rate of Chinese women is very high and the majority of them commit suicide by swallowing pesticides.

In addition to that, the excessive use of chemical fertilizers causes also many negative effects on the environment. Nitrate from chemical fertilizers in rivers and streams is an important factor inducing cancer. The WHO suggests that the maximum allowed concentration of nitrate in drinking water should not exceed 45mg/litre. In Beijing region, nearly 30% of the underground water exceeds this standard. The Yangtze River accounts for 54% of the total available water resources in China, while 90% of untreated industrial waste water, agricultural chemicals, chemical fertilizer and sewage waste water is directly discharged in the rivers, implying a waste water discharge volume of 3 tonnes per second; 90% of the water production bodies along the Yangtze River suffer from different degrees of pollution, influencing the drinking water quality of about 500 cities along the river. The river ecosystem is expected to die in only 10 years' time. In order to disinfect river water for drinking water containing chemical fertilizers, bleaching powder is added, which react with alkane in water, producing organic chloride that might induce cancer (in animal laboratory it mainly happens in the liver).

The excessive use of chemical fertilizer leads also to soil compaction and a reduction of soil productivity. Soil experts of the Chinese Academy of Sciences have already warned that the "chemical time bomb" has already come into effect: soils have lost their natural adhesion force and can be blown away easily, causing water and soil erosion. Consequently, the land cannot be used for agricultural anymore, causing a gradual decline of the farmland area year by year.

Besides the negative aspects of intensive crop production, Prof. Wen also asked attention for the negative impact of intensive animal husbandry. During the period from 1980 to 2005, the share of China in the total meat output of Asia has increased from 52% to 71%. The shift from a small-scale rural household based cyclical economy towards a few large-scale enterprises has brought problems: the use of antibiotics and hormones, inhuman and unsanitary production processes and environment pollution. Each year, China produces 2.7 billion tonnes of animal waste, which is 3.4 times the total industrial waste.

In addition to the impact on the environment, the excessive use of chemical fertilizer and feed additives eventually causes unsafe food. Food pollution mainly comes from nitrite from chemical fertilizers, toxic heavy metals and pesticide residues in feed.

According to Prof. Wen, it is not an option under the economic conditions of predominant small-scale rural households in China, to copy the experience of foreign countries. It will be necessary for China to develop its own approach, for instance by establishing 'standards' and introducing label bar code systems to solve the problems.

At present, the conditions in Chinese agriculture and U.S. agriculture are very different: China has no large farms and the U.S. does not have small-scale farmers. Consequently, if China wants to solve its agricultural problems it cannot uncritically imitate the U.S. system and theory.

(III) The three major agricultural problems and system changes.

The three major agricultural problems (sannong wenti) are: farm production issues, farm family issues and rural development. These three problems are universal and are caused by three essential elements under any system conditions. The developing countries guided by development-ism suffer from these three agriculture problems in general. In China the system crises have shifted towards agriculture. The benefits and costs of system change are not equally shared. The groups that have gained from the system change have shifted the costs to agriculture and the rural population. "New China" has relied on internal accumulation to complete industrialisation, forming a corresponding infrastructure and economic base. Industries and cities have extracted a total amount of 17 thousand

billion RMB from agriculture in the past 60 years (Kong Xiangzhi). In the past, economic crises had agriculture and rural households as a soft landing place, causing an unfavourable position for solving the three major agricultural issues and leading to system inertia. As the vulnerable group, farmers have taken the price, but they could not bear the burden, and shifted it to the land and the environment. The food safety crisis is, therefore, one of the external demonstrations of the three major agricultural problems. The source of the crisis does not lie in the restriction of resources, but in the shift of crises from advantageous groups to disadvantageous groups during the process of system change.

Part Three: food safety crisis elimination guided by eco-civilization

(I) National policy guide change

Prof. Wen mentioned the following actions in the history of development strategy transformation

- 1999: the Party put forward the development view of giving up purely seeking for GDP growth.
- 2003: The Third Plenary Session of the Sixteenth Central Committee put forward “to build up a people oriented, comprehensive coordinated and sustainable development view”
- 2005: The Fifth Plenary Session of the Fifteenth Central Committee put forward “to construct a resource-saving and environment-friendly society”
- 2007: The 17th CPC National Congress put forward that “China should build eco-civilization and stressed the versatility of agriculture”.
- 2008: The Third Plenary Session of the Seventeenth Central Committee put forward “the objective task of constructing a resource-saving and environment-friendly agricultural production system”, which is one of the intentions of “constructing eco-civilization”
- 2010: The Central Number One Document has affirmed and stressed that improving farmers’ organizations will be beneficial to the formation of eco-agriculture development and realize the village and farmer’s cooperative’s rational mechanism at low costs.

(II) Theoretic research and actual experience

In the scope of the world, the mainstream agricultural production model is based on the Ford industrial production model and the agricultural economic theory is based on the theoretic logic of industrial economics. In the real world, however, there are three major agricultural production models:

- (a) large-scale farm agriculture represented by the U.S.,
- (b) medium-size agriculture with citizen participation represented by Western Europe, and
- (c) small-scale rural household agriculture represented by China, Korea and Japan.

Based on the East Asia rural development experience, China puts forward the theoretic hypothesis of “rural economic rationality under East Asia small-scale rural system conditions”, which is different from the rational economic hypothesis of the western individualized rationality, and also different from the collective rationality hypothesis and cooperative model hypothesis based on individual rationality.

The rational small farmer hypothesis poses that under the East Asia small-scale rural system conditions, where the people-land ratio is high, the rationality of small scale rural community is different from the characteristics of large-scale agricultural economic units under the western and western colony conditions. The rural household/family resources are limited and cannot be individualized. The family members have common land and other properties and in that way they have a mechanism to internally deal with external problems. By using land that is common property, the family have a risk-free property and by limited resources diversification and being engaged in two or more agricultural activities, the family can diminish the external risks. In order to get extra family income, the family members can undertake other activities.

Part four: Experiments in rural construction of Renmin University

After this theoretic explanation, Prof. Wen presented the experiments of the Rural Construction Center of the Renmin University of China. The early experiments were focused on the three grass-root agriculture problems as presented above. Currently the experiments are focussed on citizen agriculture. In order to address the food safety crisis, in many countries different so-called Community Supported Agriculture (CSA) farm models have been developed to guarantee food safety. Following this approach, the Rural Construction Center of the Renmin University of China has participated in the construction of more than 10 county-level rural construction experiment zones, involving nearly 50 villages. The citizen farms combine agriculture with tertiary industry. The farmers can get higher income, while the citizens can get vegetables directly from the fields and enjoy being at the farm. The farmers are responsible for cultivation, harvesting, washing, packing and transportation. The citizens can visit on the farm, make use of pension and nursery, enjoy weekend leisure, culture experience, and self-labour and experience

other agriculture functions. The citizens participate in the supervision of the CSA farms, sharing risks but the supervising costs are low and the model is based on mutual trust.

Prof. Wen holds the view that the future research agenda should include community supported agriculture as solution for food safety and other issues in agriculture and rural development.

For more details of this lecture and additional information, please, contact Prof. WEN Tiejun.

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3.8 Prof. HU Dinghuan: Food waste along the supply chain

Institute of Agricultural Economics and Development, China Academy of Agricultural Sciences

3.8.1 Brief introduction of the speaker

Professor Hu is a senior researcher at the Institute of Agricultural Economics and Development of the Chinese Academy of Agriculture Sciences (IAED-CAAS). He received his PhD at the Department of Agriculture, Gifu University in Japan in 1996. He was working as senior researcher in the Center for Chinese Agricultural Policy (CCAP) during the period from 1998 to 2000. In 2003, he was working as visiting Professor in Kyoto University in Japan. During that period, he studied the food supply chain in Japan. Since 1996, he was involved in about 70 research projects supported by both domestic and foreign foundations. He has published more than 100 papers. His major research interests are in township enterprises in China, modern retail market and supply chain of farm produce, natural resources and environment, livestock economics and design of marketing strategies for agri-products. Currently his research work focuses on the effect of Chinese food supply chain, the dairy industry in China and agri-food safety in China. He gives technical support to farmers' cooperatives to sell their products directly to supermarkets and to low-carbon agriculture. He is teaching "Marketing and Management Courses" in the Graduate School of the Chinese Academy of Agriculture Sciences.

3.8.2 Central topic of lecture

Prof. Hu Dinghuan pointed out that China needs to introduce a brand-new agri-food supply model to secure its food supply, i.e. the reduction of waste. In China the agriculture productivity is very high, the farmland resources are difficult to increase and there is a serious shortage of water resources. To further increase agri-food output, a substantial increase of the input of fertilizers and pesticides is necessary. Such an approach, however, faces diminishing returns and can have a negative impact on the eco-environment and food safety. Instead of this approach, China needs to start reducing waste in the supply chains. Through policy guidance, technical innovation and a changing attitude the agri-food waste could be reduced in every stage of the supply chain, from field to table, resulting in a larger

Chinese agri-food supply volume and less pressure on the eco-environment. Prof. Hu Dinghuan has carried out some surveys and found that the waste rate of Chinese fruit is 37.3% and that of vegetables 45.7%. The wastage of these two types of products is equivalent to wasting about 12 million ha of farmland.

3.8.3 Summary of lecture

With view on the global food crisis and related challenges, Prof. Hu asked for a shift from the traditional concept of production and consumption towards innovation in production, processing and logistics to reduce food waste, so as to counter the increasingly serious challenges in the food supply. His speech can be broken down into three parts.

Part One: Introduction into the challenges faced by global food economy

In the coming 20 years, the global food economy will face an enormous pressure in demand. Firstly, the population will strongly increase, resulting in a world population in 2050 of around nine billion. Secondly, the available resources are limited: farmland and water resources are difficult to increase and the pressure on climate and environment is becoming fiercer. Thirdly, there is a change in food consumption patterns: along with the income growth, food consumption shifts from cereal type to protein type; as a result the demand for fodder crops has multiplied.

Part Two: Models for increasing food supply: increasing supply and reducing waste.

Increasing the food supply may start from increasing the production input. However, increasing the use of chemical fertilizers can cause an increasing negative impact on the environment effect while the return of input is continuously diminishing. On the other hand, it is possible to introduce technological innovations in production, processing and logistics, changing from the traditional production and consumption concept towards the concept of waste reduction in each link of the food supply chain.

In the future, China's food supply will be faced by enormous pressure. However, a huge amount of food in the Chinese food supply chain is wasted and, therefore, increasing food supply by reducing waste has a great potential. Although both the developed and developing countries have surprisingly high

wastage levels, the waste structure is different; waste in the developed countries is concentrated in the food consumption stage, while the waste in the developing countries is mainly concentrated in the production and processing stage of the supply chain, especially in logistics.

Part Three: Research on waste in each link of the Chinese supply chain

Prof. Hu and Dr Zhang Yaxin from Renmin University carried out a number of surveys on this issue:

- A survey on rural households in Hunan, Hubei and Shandong, to analyse the waste in the agri-food production phase;
- A survey on enterprises in Hunan, Anhui, and Shanghai, to analyse the waste in the agri-food processing phase;
- A survey on wholesale markets, wet markets and supermarkets in Beijing to analyse the waste in the wholesale and retail links.

Some concrete results:

During the *production phase*, the waste of pears, apples and vegetables is 20%, 15% and 15%, respectively. The main factor causing the waste is the low quality, hence low commercial value of the products. The major reasons are lack of good quality seed, cultivation technology and harvest machinery. During the *storage phase*, due to lack of cool storage facilities, a large amount of fresh and raw agri-food products was wasted; the loss of pears, apples and potatoes is 7%, 6% and 15% respectively. During the *transportation phase* an enormous amount of products is wasted, caused by the traditional transportation vehicles, along with the increasing volume of agri-food transported over long distances. During the transportation, the waste of pears, apples, common vegetables, Chinese cabbage and lettuce is 5%, 3%, 7%, 10%, and 15% respectively. During the *wholesale phase* the loss of apples, pears, papaya, potatoes and leafy vegetables is 3%, 5%, 3%, 2% and 5% respectively. The agri-food wholesale markets function almost the same as the traditional wet market, meaning that a large amount of vegetables and fruits need to be moved from one trader to another and from one wholesale market to the other, resulting in waste of products. During the *retail phase* the waste is also large. According to the survey, only 85% - 90% of the vegetables and fruits on the wet markets can be sold to the consumers. The major reason is the bad quality (poor external shape or rotten products) and

because it is very difficult to estimate the market demand. However, the waste is also high in supermarkets, because of a too high storage temperature, selection of the best products by consumers and the imbalance between supply and demand. The waste of vegetables and fruits in supermarkets is 10% and 6%, respectively.

Based on these figures, it is estimated that the total waste of fruit before reaching the table is 37.3%, in total a volume of 67.6 million tonnes, equivalent to a waste of 4.0 million ha of farmland. The waste percentage for vegetable is 45.7%, in total a volume of 269.6 million tonnes, equivalent to a waste of 8.2 million ha of farmland. During the *consumption phase*, there are different developments in food consumption patterns and related food waste. The fast growing and often excessive food consumption in China has led to hyper-alimentation, resulting in obesity, hypertension and a growing number of diabetes patients. Along with the improvement of living standards, the number of consumers going out to restaurants for dinner has increased fast, while about 40% of the food in restaurants is wasted.

Concluding his lecture, Prof. Hu asked for more attention for research on food waste, because in that way we can find new paths to feed nine billion people in 2050 and maintain our living environment.

For more details of this lecture and additional information, please, contact Prof. HU Dinghuan.

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3.9 Prof. Kevin Z. CHEN: Climate change, adaptation and agriculture in China: knowledge gaps and research needs

International Food Policy Research Institute, Beijing

3.9.1 Brief introduction of the speaker

Professor Kevin Z. Chen earned his PhD degree in agricultural and food marketing at the University of Guelph in Canada. His doctoral dissertation won the Best Dissertation Award of Canadian Agricultural Economics Society. Dr Chen currently is China Program Leader and Senior Research Fellow at the International Food Policy Research Institute (IFPRI) and is based in Beijing, China. He is also an Executive Director of the International Center for Agricultural and Rural Development (ICARD), a joint institute of the Chinese Academy of Agricultural Science (CAAS) and IFPRI. Before joining IFPRI in April 2009, Dr Chen was Field Director of China Canada Agriculture Development Program funded by the Canadian International Development Agency (CIDA) from 2005-2009. He was an associate Professor of food marketing and trade at the Department of Rural Economy, University of Alberta and was co-editor of the Canadian Journal of Agricultural Economics. Currently, he is the co-editor of China Agricultural Economic Review. Dr Chen has been involved in many policy research projects on agricultural trade, agricultural policy reform, industrial organization theory and supply chain management, food consumption and consumer behaviour, and climate change and sustainable development. He has published more than 50 academic papers and books, as well as more than 30 research reports.

3.9.2 Central topic of lecture

Prof. Chen pointed out that climate change is one of the major challenges for the world and, hence, the Chinese agricultural development as well. Climate change can cause temperature rise, serious water shortage, as well as frequent extreme climate conditions and other related problems. It is, therefore, important to strengthen measures to counter climate change in order to reduce the negative effects of climate change on agriculture and food safety. Prof. Chen emphasized the need for multidisciplinary research, in particular to address the challenges of food security. In his view, it is necessary to break

through the current research framework and work together with other disciplines to provide evidence-based, quantitative information on the social and economic impact of climate change and related adaptation measures in China.

3.9.3 Summary of lecture

The lecture of Prof. Chen consisted of three parts: (a) global trends effecting agriculture, (b) the effects of climate change on agriculture and (c) future research orientation.

Part One: Global trends effecting agriculture

The major global trends affecting agriculture are urbanization, technical innovation, industrialization, bio-energy and climatic change, of which the former four aspects have aroused great public concern and gained fruitful research achievements. The topic of climatic change becomes very protruding since the Copenhagen Conference on Climate Change in December 2009. Prof. Chen brought forward three basic premises in analysing the relation between climatic change and agriculture. Firstly, climatic change affects China and China affects climatic change. Secondly, the major challenge we face is to analyse the scale and extent of the impact of climate change. What shall we do? Thirdly, it is essential to do social-economic and applied research on climatic change.

Part Two: The effects of climate change on agriculture

The major effects mentioned in the IPCC report are the following. Firstly, the climate variability will likely increase, harming grain crops, livestock, soil, etc. Secondly, the effects of climate change will show significant regional and local differences. Thirdly, these changes will lead to reduced food security and increased vulnerability of the poor rural households. Up to 2050, the world needs more than two folds of grain to feed the increasing world population. Therefore, FAO holds the view that climate change is to be considered as the key challenge for future agriculture and FAO calls to significantly increase investments in agriculture to address this challenge as to reduce food security risks. In this context, the policy challenge of research are as follows. It is essential to provide evidence to guide policy formulation. Engagement with the policy world is necessary to guarantee the policies are formulated

according to these evidences. And the research world should provide rapid and effective response in crisis situations.

At the Chinese People's Congress it is said that climate change is a reality:

- "Every one of us can feel it, the Chinese climate is warming."
- "Climate change is having an impact on China in terms of the instability of agricultural output"
- "There's now more flooding in the south of China and increasing shortages of water in the north. Forests and grasslands are being eroded and there are more typhoons and storm surges along our coast."
- "If one looks ahead to the long term, climate change may have a huge impact on China's food security and the life and property of our people."

There are some experts who believe that current statistics on climate change are not reliable enough. However, climate change has already had important effects on Chinese agriculture. The desert area has been enlarged; flood and drought calamities have become very frequent in some regions, making agriculture output becoming rather unstable. There are quite a few agricultural agronomic studies on the impact of climate change on agriculture in China. It is estimated that the output of the major grain crops will decline with about 14%.

Part Three: Future research orientation

There are still clouds of unknown aspects of climate change, such as weather scenarios, carbon dioxide (CO²) fertilization effects, the frequency extreme climate events, the amount of precipitation during intense climate events and, last but not least, the economic impacts of these events. There are only a few studies in China on the social and economic effects of climate on agriculture and there is little knowledge on how to adapt to climate change. There are many knowledge gaps:

- Lack of social and economic assessment of adaptation at both national and regional levels;
- Lack of cost-benefit analysis of adaptation measures at both macro and micro-levels;
- Lack of understanding on autonomous and planned adaptations;
- Lack of understanding on region-specific and community-specific adaptation;

- Lack of understanding on governance issues related to climate change adaptation internationally, nationally and locally.

Concluding his lecture, Prof. Chen presented a series of IFPRI projects on climate change and agriculture and summarized the needs of China in terms of social and economic research in the future as follows:

- Much of the interest so far in relation to climate change and agriculture has been on mitigation of impacts but the focus needs to shift towards adaptation;
- It is necessary to mobilize scientists from various disciplines to start an extensive multi-disciplinary study on the interactions between climate change adaptation, agriculture and food security in China;
- Specifically, evidence-based quantitative information is needed on the social and economic impact of climate change and related adaptation measures.

For more details of this lecture and additional information, please, contact Prof. Kevin CHEN.

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3.10 Prof. YU Xiaodong: Adaption to market change: actively developing healthy “New Food”

Public Nutrition and Development Center, Macro Academy, State Development and Reform Commission

3.10.1 Brief introduction of the speaker

Professor Yu Xiaodong works at the State Ministry of Education, State Development and Reform Commission (former State Planning Commission). Since 1984, he has been the Deputy Director of the Editorial Department of the Institute of Economics, the Division Chief of the Division of Research Administration, the State Planning Commission. In 1993, he was the Deputy Director of the Institute of Economics, the State Planning Commission, Since 2001, he was the Director of the Public Nutrition and Development Center, Macro Academy, State Development and Reform Commission and Director of the State Public Nutrition Improvement Project. For years, he has been engaged in the research on macroeconomics, population and social development and economic and social development strategy. He has been involved in major scientific research projects of the World Bank, UN Population Foundation, UN Children Foundation, Asian Development Bank and other international organizations. His work includes the Public Nutrition and Social and Economic Development Report China Nutrition Industry Report, etc.

3.10.2 Central topic of lecture

Dr. Yu Xiaodong holds the view that it is very necessary in the current situation in China, to develop policies for health promotion and improvement of living quality and to develop a ‘new food’ industry. Because of the growing economy, an increasing number of Chinese people suffers of chronic nutrition related diseases. Traditional medicine treatment cannot solve these problems and it is, therefore, necessary to develop ‘new’ healthy food. The growing medicine expenditure also asked for more attention for a more prevention oriented approach. China possesses the knowledge of the relation between food and drugs and has a rich and practical experience in the traditional Chinese medicine.

China has also a wide range of plant, animal and mineral resources for new food. For these reasons, China should spent more attention to the development of a new food industry.

3.10.3 Summary of lecture

The speech of Dr Yu Xiaodong can be broken down into four parts: (a) description of food functions, (b) concept of new food, (c) necessity of developing new food, (d) the basic conditions for China in developing new food and (e) the advantages of developing “New Food” in China.

Part One: Description of food functions

There are 3 kinds of food functions:

- The first function of food is to meet people’s basic physiological requirements to stay alive, as the requirement for warmth/clothing.
- The second function is to meet the nutrition requirements at the micro level. China is joining the global action to solve the shortage of certain minerals by adding essential nutrition elements to the staple food. Enriched staple food has a history of over 80 years in the world. Now, over 80 countries are compulsory implementing staple food enrichment.
- The third kind function of food is to improve people’s health and living quality. For example, to enhance children’s’ development and to strengthen specific functions, such as the psychological status of athletes during the game or students during entrance or final examinations.

The relations between these three kinds of food are as follows: to meet the requirements of having adequate food and clothing is a basic requirement, mainly of macro nutrition, including a certain amount of micro nutrition. The second and third function is a higher level function of food. However, people’s cognition of the second and third function and understanding of the actual functions depend on economic and science and technological conditions. Since ancient times, China had the cognition of the three food functions, yet due to many restricting factors, the second and third functions could not be realized to certain extent. At present, however, the food supply in China has entered a new period. The income situation has improved and as a result the importance of the three functions has changed. The proportion of the second and third function food in total consumption is increasing. This provides the

opportunity for an overall improvement of the food industry, following the global trend of developing new food with the objective to support people to have a healthy and beautiful life.

Part Two: The concept of new food

Viewing the food functions of new food, there are new foods to supplement various kinds of nutrition shortage, such as meeting the requirements for improving people's health and life quality. In China this kind of healthy food is called 'health food', yet internationally it is called 'functional food'. Viewing it from the scope of product, functional food includes: enriched food or food with added nutrients for instance special food with additives that have a supplementary treatment effect on various kinds of diseases. There are special food products for various kinds of people. At present, we are at the beginning to develop such kind of special food products and the market demand is very large. In addition, there are special leisure food products. New resources for special food, so called nutrition raw materials, are in development, including specific animal and plant extracts. Although these new resource food products have both the second and third function, yet, it looks like normal food and is part of the regular nutrition intake, hence promoting and maintaining health in daily life.

Part Three: Necessity of developing new food

There are many reasons to develop new food.

1. Viewing from the angle of market change. Since China has entered a 'well-off' society in economic development, the food consumption is not for getting enough food only, but broad masses of people seek for health, beauty and longevity. They pay greater attention to the nutrition supplements of food for healthy development, disease prevention and supplement treatment and other internal quality.
2. The impact on the environment, such as water, air and soil pollution, requires us to develop new food.
3. The life rhythm has speeded up and working pressure has increased.
4. Excessive food processing has caused nutrition loss, for instance 70% of the nutritional value of wheat, rice and other crops is in the germ, so excessive processing can cause large quantities of

nutrition loss. Over-nutrition refers to an excessive intake of macro nutrition, such a fat and calories. However, research shows that Chinese residents are in general short of micro elements.

5. The overuse of antibiotics. According to the international standards, the proportion of antibiotics use must not exceed 25%-30% of the total drug use, but in Chinese hospitals the use of antibiotics has exceeded 90% of the total use of drugs.
6. The bad way of living and non-scientific eating habits.

The above mentioned factors require us to correct or supplement our food by new food and healthy products. At present, the nutrition and health status of the Chinese residents is not ideal. According to the survey on national residents' nutrition and health status, published in 2004, the micro nutrition intake by the Chinese residents is lower than 10 years ago. According to vegetable nutrition survey, the nutrition value of wheat has greatly reduced in the period 1963-2000 as a result of excessive processing, for some vegetables the reduction in vitamin C contents was more than 50%. This development has caused the outbreak of chronic diseases in China. In 2004, the number of adult people suffering from hypertension, diabetes, abnormal blood lipid and obesity has exceeded 400 million (some patients suffer from several diseases). This figure does not include people with cancer, anaemia, etc., or the several hundred millions people with overweight, fasting blood glucose damage or other "sub-health" conditions. Traditional medicine treatment cannot solve the current health problems and it is, therefore, very necessary to develop new food. The spectrum of diseases has changed. At present, the major health problems are chronic non-infectious diseases; the major cause of chronic diseases is the living style and food structure. Not only China, but the whole world has found that traditional medicine cannot solve the problems caused by chronic diseases related to food and nutrition. Food is an important cause of modern health problems. We must, therefore, rely on 'health' food to solve health problems.

The seventh reason for developing new food that Prof. YU Xiaodong mentioned, are economic and financial factors; the expenditures for medicine are too high. The total medical costs in China increased from 143.2 million RMB in 1980 to 10.966 billion RMB in 2007, which is about 844 RMB per capita. It is an enormous expenditure for the government and the residents as well. It is necessary to address that problem. Prevention can help in decreasing the amount of medical care as the situation in Japan shows.

In the period 1997-2003, the expenditures of Japanese residents for nutrition products gradually increased, while the expenditures for medicines and insurances gradually declined. It is for these reasons necessary to put forward suggestions to the State Council to stimulate consumption of new food.

Part Four: Basic conditions of China in developing new food

Prof. YU Xiaodong mentioned a number of basic conditions for new food development.

1. International background conditions. The global economic and industrial development is very rapid. In the U.S, the nutrition and health industry and the new energy industry are very important industries. The nutrition and health industry accounts for 17% of the GDP. The European food industry accounts for 20% of the GDP, in France it is 30% of the GDP. In China, the food industry accounts for 10% of the GDP. The improvement of the food industry in China mainly relies on the improvement of food nutrition value, health science and technology, etc. The expenditures for knowledge distribution, promotion and education of the Chinese nutrition industry is increasing while the material costs have been relatively reduced, accounting for about 20%-30% of the total costs. The majority has shifted to knowledge cost.
2. Because of the economic growth, there is already a market demand for new food in China.
3. China has adequate new food processing capacity, including the availability of resource material.
4. Biotechnology in China is in a certain stage of development. It is generally recognized that further economic development will be based on breakthroughs in biotechnology, causing a rapid development of nutrition and health food.

Part Five. The advantages of China in developing 'new food'.

Chinese traditional medicine has always focused on the prevention of nutrition diseases as well as "regimen method" and "recuperation/aftercare". Only since the end-20th Century and early-21st Century, the western medicine is moving from treatment to prevention and health medicine. When the western medicine recognized health medicine, the Chinese traditional medicine started to approach it and since then, the western countries started to gradually accept some theories of the Chinese traditional medicine, because the traditional western medicine treatment methods cannot completely solve the

current health problems. China possesses the precise understanding of the relation between food and drugs, based on a rich practical experience. China is also a large country with complicated topography and geomorphology with diverse soil and climate conditions and is , therefore, rich in plant, animal and mineral resources, which is an advantage for developing new food.

Conclusions

At present, people seek for beauty and longevity on one hand and on the other hand they suffer from environment pollution and misuse of antibiotics. The “pure” medicine has no good recipe to effectively treat “nutrition-related diseases”. Because of the increasing medical care burden, prevention of diseases gets more attention. By integrating nutrition science, biology, prevention medicine and other domains, the development of a modern “New Food” industry is a practical and feasible way to address this problem.

For more details of this lecture and additional information, please, contact Prof. YU Xiaodong.

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3.11 Prof. ZHOU Jiehong: Rural food safety problems that need attention in research

Center of Agricultural and Rural Development, Zhejiang University

3.11.1 Brief introduction of the speaker

Prof. Zhou is now working at the Center of Agricultural and Rural Development of Zhejiang University in Hangzhou, China. Her research focus is on food safety, supply chain management and industrialization of agriculture. The last five years, Dr Zhou has been engaged in a National Nature Science Foundation Project, a key Humanity and Social Science Foundation Project and four key projects of Zhejiang province. Based on her continuing research on food safety and food supply chain, she has published ten papers, among which one was published by “China Social Science Digest” and two were cited by SCI. Prof. Zhou published three monographs, namely “Study on Quality Safety Management of Fresh Vegetables” which was honoured the 14th of philosophy and social sciences outstanding achievement awards of the Zhejiang Government Award for Research in 2007; “Information Management of Food Safety: Theory and Practice” and “Study on Applying System of Agriculture Standardization”.

3.11.2 Central topic of lecture

Prof. Zhou Jieihong holds the view that the rural food quality safety is a domain that needs further exploration. She pointed out that there are three major orientations for future research: (a) the establishment of modern rural food distribution system, (b) government supervision systems on food safety including improvement of the reputation of safe food, and (c) the improvement of the food safety awareness of rural residents.

3.11.3 Summary of lecture

The lecture of Prof. Zhou consisted of three parts: (a) research background, (b) progress in Chinese food safety management and (c) Chinese rural food safety, a problem worth for future research.

Part one: research background

The three major policy objectives of in the food economic domain are:

- Food security aiming at sufficient quantity;
- Price stability, aiming at a stable price
- Food safety, aiming at good quality

In her lecture, Prof. Zhou focuses on food safety.

(I) Status of food safety in China

Through the economic development in China, the quality of agricultural and food products has been significantly improved. Also the import and export food quality has been improved up to a fairly high level. The development of certified products has witnessed a fairly rapid development, taking 'green food' as an example. However, the food quality problem in general is still very protruding, which is manifested in the fluctuation of food quality, the deteriorating rural food quality and safety and the rapidly aggravating nature of food safety problems. In addition, the food safety standards of the developed countries are increasingly becoming important for the Chinese agri-food demand.

(II) Causes of rural food safety problems in China

There are a number of reasons for the rural food safety problems in China;

1. China is missing modern distribution systems, which is demonstrated in the absence of modern rural market infrastructures. The statistics of the Ministry of Commerce show that nearly 40% of the food is purchased from small shops and small peddlers and that 61.7% of the rural wet market consists of food products without label and bulk food.
2. Because the rural residents are scattered over the rural area, it is difficult for the government to effectively supervise food safety developments, to establish mechanism to safeguard food safety, and to construct new type of distribution centres.
3. Both the food producers and the consumers have in general a low education level, which makes it difficult to raise awareness of food safety.
4. The availability of budget and other resources for food safety management differs significantly between rural areas and urban areas.

Part Two: Progress in Chinese food safety management

In this part of her lecture, Prof. Zhou summarizes a number of research topics with respect to food safety, including relevant authors in the respective topics.

(I) Research on food quality and safety monitoring and supervision systems.

Prof. Zhou holds the view that in the situation that different departments have a responsibility in food safety management, the State Council should clarify that the Ministry of Agriculture has a leading position in agri-food safety management, and that the recently established State Food Safety Commission should gradually implement a vertical administrative structure in food safety management. In solving the linking problems among the various food safety management departments, we cannot simply rely on mediation by the Food Safety Commission. More important is to describe the flow chart links, the supervision standards and other aspects in order to come to a clear division of work and responsibilities.

In the long run, China should shift the food safety management from segmented supervision towards unified supervision, resulting in one or only a few departments responsible for the food safety supervision. In order to establish a high-efficient food safety management system, arrangements need to be considered with respect to mutual assistance by relevant stakeholders, including government regulators, consumers and producers

(II) Research on consumer's food consumption options and safe food demand

Consumer research in China is mainly focussed on (a) the Chinese consumers' awareness of food safety risks, (b) the identification of information that can effectively reduce consumer risks and (c) the differences in information demand of different consumer groups. At present, the research on the above problems is mainly descriptive; analyses are mainly based on factor analysis: the used food safety risk awareness research methods are rather simple and they lack of guidance by economic theory. Research on rural consumers is missing. Another research topic is consumers' demand for safe food and their willingness to pay. Also in this research, the methods for analysis and organization of surveys needs to be further improved.

(III) Research on food producers' behaviour and food safety control measures

Researchers on the willingness in enterprises and rural household to produce safe food are applying various methods, such as factor analysis, binary or plural logit probability models and structural equation models, in order to clearly determine factors influencing the production of safe food by leading enterprises and rural households as well as the effect of influencing factors on the producers' attitude to future safe food production, including tracing willingness. There are a number of research projects with respect to the options that producers have for food safety control measures, including research on the initiative, influencing factors and cost efficiency of safe food standards for enterprises and farmer's cooperatives, qualitative and quantitative research as well. Current shortcomings are: research with respect to the lack of safety management regulations, the effect of standards on enterprise costs and research on the reaction of enterprises to regulations and standards. Prof. Zhou told that, although we have done certain attempts, yet, they are based on the subjective judgment of the decision makers.

(IV) Research on safety management from supply chain perspective.

Due to the fact that the majority of food safety problems occurred in the different links of the supply chain, more and more scholars hold the view that it is essential to control food safety through the supply chain. Some scholars suggest taking supermarkets as an important link into the food safety control system. Others hold the view that the wholesale markets are the key link in the main channel of raw and fresh agri-food distribution system, and should, therefore, be included in the food safety control system. Systems should be set up for tracking and tracing from the wholesale link to production and consumption links, supplemented by market access, certification and invoice systems and other quality control measures.

(V) Research on the rural food safety problems

At present, research on the rural food safety problems is still in its primary stage, with only a few studies in total. These studies have the following characteristics: with respect to in the used research methods, most of them are qualitative and macro oriented; with respect to the research contents, at present, the researchers have treated rural food safety problems as general food safety problems. There is no research on food consumption behaviour and consumption habits of the rural consumers.

Part Three: Chinese rural food safety is a problem worth for future research

Prof. Zhou holds the opinion that more research is needed with respect to rural food safety. She mentioned three major research orientations:

Orientation I: The establishment of modern food distribution system in rural areas;

Orientation II: The establishment of a government supervision system on food safety in rural areas and measures to improve the reputation of safe food;

Orientation III: Improvement of food safety awareness of rural residents

For more details of this lecture and additional information, please, contact Prof. ZHOU Jiehong.

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3.12 Dr GUO Jianjun: Reform and development of agriculture and rural areas in China

Department of Rural Economics, Development Research Center of the State Council

3.12.1 Brief introduction of the speaker

Prof. Guo Jianjun is Director of the Comprehensive Division, Department of Rural Economic Research, the State Council Development Research Center. He is graduated at the Tokyo Agriculture and Industry University. He has won the first grade prize in research on China Development of the State Council Development and Research Center. He has participated in studies on Chinese Agricultural Development Policy, Cereal Market and Macro Management.

3.12.2 Central topic of lecture

Prof. Guo Jianjun holds the view that the changing trends in agri-food prices and its effect on China's food security and rural development are the key topics for future agricultural economic research, in particular to develop a strategy with specific Chinese characteristics against the background of rapid urbanization, industrialization and globalization.

3.12.3 Summary of lecture

Dr Guo Jianjun introduced in his lecture the development of Chinese agriculture and rural development from a macro angle and the related research topics; the lecture can be broken down into three parts: (a) basic situation of Chinese agricultural development, (b) major problems faced by China in the course of agricultural development and (c) research domain of food economics in coming 20 years.

Part One: Basic situation of Chinese agricultural development

As starting point for policy formulation, Prof. Guo provided some basic information on the current situation in China under a number of headings.

I. Population and income

- In 2007, China had a total population of 1.32 billion, of which 0.59 billion in urban areas and 0.73 billion in rural areas.
- The total farmland area of China is 121.78 million ha, which is 1.38 mu farmland per capita (1mu=1/15 ha)
- The total agri-food export amounts to US\$37.01 billion, the total import is US\$41.09 billion, resulting in an agri-food trade deficit of US\$4.08 billion.
- The average net farmer's income is 4140 RMB per capita, equivalent to only one third of that of urban residents. Farmer's income has increased continuously in the last years, but the gap between the income of rural and urban residents has increased further.
- According to the national rural poverty supervision report, the Chinese poor population has declined from 250 million in 1978 to 28.2 million in 2007. However, due to a weak economic basis, it is easy to fall back in poverty.

II. Chinese rural reform and development policy

Since 1978, when China started its reform and opening policy, China has implemented a system reform based on farmer's Household Responsibility System, The new countryside construction that started in 2006 is aimed at the following major reform objectives: increasing farmer's income, improving agricultural comprehensive production capacity, constructing a socialist new countryside, and a unified development of the urban and rural economy and society.

III. The practice of China in developing agriculture and rural areas

- The state has paid great attention to grain production and grain farmer's income. In 2003, China had a large decline in grain output, which led to a transformation of agriculture policies and increased

financial support to agriculture, countryside and farmers, including direct subsidy to grain producers and subsidies for agricultural machinery, seed and other means of production.

- Measures to strengthen the rural infrastructure and to improve eco-environment
- The state also accelerated the development rural social undertakings. China has realized 9 year compulsory education in rural areas, constructed a new type of rural cooperative medical system and implemented a rural minimal life insurance and pension insurance system. The new type rural cooperative medical system started in 2004, while currently over 90% of the area in China and the majority of farmers participate in the system.

Part Two: Major problems faced by China in the course of agricultural development

After the presentation of the basic situation, Prof. Guo described the major problems that China is facing with respect to agriculture.

1. China has a fairly weak agricultural basis and rural production and living conditions are rather backward, particularly in the central and west zone, where the water supply, transportation, power supply and other components of the infrastructure are rather weak. In 2009, there were 250 million rural people who had no access to safe drinking water; 100 townships had no access to high way and about 2 million rural people have no power supply.
2. The rural economic development is lagging behind and the income gap between urban and rural residents shows a widening trend. The Third Plenary Session of the Seventeenth Central Committee of the Communist Party of China put forward that an annual growth rate of farmer's income by more than 6% is required. The scale of Chinese farms, however, is very small, the productivity has declined and the farmers' commercial orientation is fairly low. Hence, the increase of farmer's income is a very hard task, with the result that it is difficult to prevent a further widening of the income gap between urban and rural residents. At present, the ratio between urban and rural income is about 3:1. If the government does not take effective actions, this situation may cause a series of social problems.

3. There is an imbalance in the provision of public services between the urban and rural areas in China. The development of social service is lagging in rural areas resulting in a fairly low coverage rate compared with the guaranteed level.
4. Farmer's democratic rights and property rights have not been well protected, and there are frequently reported cases of violating farmer's rights. During the process of agricultural development, the Chinese government has insisted on taking the agriculture, countryside and farm household problem as the focus of the work of the whole Party, insisted on the position of agriculture as the basis for development, insisted on a reform orientation towards a socialist market economy, insisted on an agricultural modernization path with Chinese characteristics, and insisted on guaranteeing farmer's material interests and their democratic rights. All these policies are based on precious experience gained in the practice of Chinese agricultural development.

Part Three: Research domain of food economics in coming 20 years

1. The effect of international agri-food price changes on Chinese agricultural development

Since China having joined the WTO, the international prices have become an important factor influencing Chinese agriculture. China is importing nearly 40 million tonnes of soybean, meaning that two thirds of the total needed volume of soybean depends on the international market. There are a number of related research topics:

1. The effect of the growing demand and hence production on natural environment change
2. The effect of changes in supply and demand. The newly developed countries have brought new development forces into the international food economy. The grain consumption policies of the United States, European and the South-American countries have caused changes in the grain demand structure.
3. China does not only feel the impact of food prices but has also quite some influence on international prices.
4. During the period from 2002 to 2008, the international grain price increased significantly. Since the financial crisis in 2008, the grain price has a trend to decline, but now the price is back at the high price level of 2007. When the international grain price was rising, China implemented some policy

measures to restrict export; as a result, the Chinese farmers did not gain the benefits of the agri-food price rise.

In conclusion, Prof. GUO is of the opinion that the development of the future agri-food market and its relation with the development of Chinese agriculture is a problem worth for future research.

II. Chinese grain security and rural development against the background of urbanization, industrialization and globalization.

With respect to the food supply to the rural population, there are still many hidden problems in the grain production. Although China has achieved bumper harvests in the past six years, yet, this does not meet the changes in demand, because China is facing an up-grade in consumption. On the long run grain supply and demand will be in a precarious balance, and basically only in total volume. With respect to different types of grain, wheat is basically in balance, while rice has a small surplus. Because of the development of animal husbandry, the balance for corn might lead to a short supply. Soybean basically relies on import. With respect to regional production capacity, in 2007, only Anhui, Jiangxi, Jilin, Heilongjiang and Henan and other two provinces could realize a grain export, while, before 2007, there were 13 provinces that were exporting grain. The situation has changed from “South China transporting grain to North China” towards “North China transporting grain to South China”.

Viewing the problem from the angle of resources, the resources of farmland and water are continuously declining. In addition, the comparative advantage of agriculture has declined; farmers and local governments are not in the position to change that. Generally speaking, farmers are willing to work in urban areas, rather than being engaged in agricultural production. There is no way, that local governments can develop the local economy by encouraging grain production.

III. The problem of agriculture modernization

Generally speaking, agricultural development is in a process from chemical agriculture, to organic agriculture and finally to sustainable agriculture. How does China follow this path of modernization? In the rapid process of globalization, industrialization and urbanization, how can China avoid a declining development of the rural area, bankruptcy of farmers and a decline of agricultural development? How can a rapid rural development be achieved and an unified development of both urban and rural areas?

These questions need to be addressed in future research. In the process of research, we must take into account China's own characteristics and demonstrate Chinese characteristics. We need to understand agricultural modernization: development economics, the binary economic structure of Lowi and the agriculture surplus theory. In his works entitled "Reform Traditional Agriculture", Yujiro Hayami has put forward his view on system change and described in detail the shift from traditional agriculture to modern agriculture: hundred years ago there was manual agriculture; then came the human-livestock phase and since the industrial revolution, agriculture jumped into the mechanization phase. In the 1970s and 1980s agriculture shifted from mechanization phase into the IT application and computerized phase.

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