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Asian Food in Transition

Priority Research for Food Security and Sustainable Futures
in Australia, China and the Asia-Pacific Region

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The transition in food demand and agricultural production in China is accelerating with significant implications for the rest of the world, but especially for Asia.

Important drivers of this transition are the industrialisation of the economy and its implications for labour demand and demographic change, including the ageing of the population and the decline in the size of the rural workforce.

A further consequence of the Chinese transition is the continuing urbanisation of the economy.

These changes are occurring in the context of constraints in natural resources and climate change which affect the capacity for food production.

These changes have important implications for both food supply and demand in China, which given its size and significance in world markets, have important consequences for the rest of the world.

The way that world markets respond to China's participation in global food markets will also feed back into the evolution of the transition in China.

Transition of this sort is not unique to China. Other economies have experienced and will experience the same processes inherent in a shift from an agricultural to an industrial and services economy. It is the scale and rate of change in China that is unequalled in human history.

There is now great value in international comparative research on the issues related to this transition to inform decision-makers to anticipate the implications of dramatic change and understand the potential issues associated with them.

In addition, the implications of Asian economies transitioning in association could interact through their impacts on world markets.

Since in China's case the strongest and direct effects are likely to be felt by their near neighbours, it is proposed here that they be included in a series of projects linked together under the banner of Asian Food in Transition (AFIT).

While we examine the global impacts of changes in the economies of interest, we also make the case for detailed attention on impacts at local levels within economies. The distribution of the benefits of the transition and the explanation of why some farmers gain and others do not is a key issue in all economies. The focus on this question is another distinguishing feature of the research proposed here.

Work continues on the science of food production and the development of new technologies that contribute to food security. Our focus here is the application of the methods of the social sciences to the problem of food security and to policy design.

Building on the University of Adelaide's skills, experience and relationships, we propose to build a collaborative research platform with partners, particularly in China and the ASEAN countries, which will contribute to the evolution of good policy in support of food security.

I encourage you to review the details herein and to take the opportunity to work with us in ways that would assist your organisation as we build the AFIT research platform.



A handwritten signature in black ink, reading 'C Findlay'.

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China in Transition

Changes in economic and social conditions are not new in China, and are not unexpected, but the pace of change has accelerated dramatically. Following industrialisation and demographic change, China has reached the point at which the supply of surplus rural labour is declining and real wages are now rising in order to draw labour from agriculture into other sectors of the economy. Even with the recent slowdown of growth in China, labour markets are reported to be 'tight' in various industries and locations. Evidence of this is the declining number of job seekers relative to vacancies. At the same time and not surprisingly, the costs of labour in agricultural production are rising.

Currently 50% of the population live in urban areas but this share will rise to 60% over the next decade. At the same time, constraints in natural resources and climate change will affect the capacity for food production. These effects may vary across regions in China. These changes have important implications for both food supply and demand in China and given its size and significance in world markets they will have important implications for the rest of the world. World market responses then feed back into and affect the evolution of the transition in China.

The transition highlights new issues about current policy settings in China, including

those related to rural development and to food security. For example, if policies promote short-term food security goals without a full consideration of their wider implications for demographic and institutional change, they will affect the path of the transition, its speed and its stability.

Particular implications of interest include those related to the food security of the general Chinese population, and additionally the effects on rural development and farmer income, especially for smallholders. The goals for the nation and for particular sub-sectors of the Chinese society are not necessarily aligned. Food security refers to the availability of food, its utilisation, access to food by households and the degree of volatility of prices. The scope of the analysis of food security issues in China are changing as consumption patterns change. For example, in China the traditional concern has been to ensure access to grain for direct consumption. However, Chinese consumers now demand more animal-based and processed food products and they are increasingly concerned about the safety and quality of their food supply. Consequently, some adjustment to the traditional goals of food security research and policy is required. This needs to be done in the context also of energy security concerns, since the emergence of biofuels as a renewable

“ Chinese consumers now demand more animal-based and processed food products and they are increasingly concerned about the safety and quality of their food supply.”

substitute for fossil fuels is impacting on global food markets in non-trivial ways.

Other economies have experienced and will experience the same processes inherent in a shift from an agricultural to an industrial and services economy. It is the scale and rate of change in China that is unequalled in human history. In China's case, some of the strongest and direct effects are likely to be felt by their near neighbours.

The following sections lay out a series of research themes that help us understand the drivers of these changes and their consequences, particularly for food security, and present priority social science projects in each area.



Research Themes – *What we will do*

1 *Demographic Drivers*

To anticipate food security issues in China and associated implications for the region it is vital to anticipate transitions in the quantity and structure of supply of rural labour in China, and to construct an analytical framework to analyse policies on population, urbanisation, demographic and environmental factors and agricultural production.

Fundamental shifts in demography and population that are driving growing food security issues include the size and rate of growth of the population, its age-gender structure and the related ageing of the workforce, and the distribution, urbanisation, and movement between rural and urban areas. Understanding the direction of demographic transition effects on food security is a vital resource for other related research themes and comparative work across economies of interest.

By 2030, the average rate of urbanisation in China is expected to involve annual migration of approximately 12 million rural people to urban areas. Changes in the size and structure of rural populations (rural residents

and migrants with agricultural household status), have already had large impacts on the urban labour supply and on agriculture.

The Chinese Government has designated urbanisation as the “number one policy topic”, implying that policy is seen as a key determinant of the rate at which that process occurs. However, the pathways through which China’s “three rural issues” (san nong wenti – agriculture, rural areas and farmers) may benefit from ongoing urbanisation are not well defined. Some policies promote urbanisation, while others, such as hukou, social security provisions and land ownership rules, seem to interfere with the process.

There are also powerful internal systemic drivers of the urbanisation transition across China. The lack of clarity about how urbanisation will affect agricultural production is further exacerbated by policy uncertainty relating to climate and carbon. People will adapt to resource constraints and a changing climate in situ and by exploiting processes of mobility. Such adaption mechanisms will also work to reshape China’s food system and impact significantly on food security issues.

The outflows of rural labour and farmland from the agricultural sector, rising food prices, growing food imports, and increasing agricultural production over the last decade further imply that China has arrived at a new food market situation, and that the nature of Chinese economic growth is shifting. Drawing out international experiences and lessons about how to manage implications of this situation in China will be important to minimise negative effects of agricultural protection policies, to raise agricultural productivity, and to stabilise food consumption levels.



Priority Research

To understand how food security issues are being shaped in China by population and demographic drivers, and what the associated implications are for China, Australia and the region, research is needed to answer:

- > What are the determinants of urbanisation in China and what are their effects on China’s “three rural issues”?
- > How will migration behaviour, type (temporary, permanent, circular; voluntary, forced), and destination choice, evolve during the urbanisation process in the next two decades, and how will this intersect with agricultural labour supply, land and water use and management, and farming practices?
- > What are the implications of changing structure of the rural population and characteristics of rural labour supply for land-use change, especially in peri-urban and ecologically vulnerable areas, on pollution of soil and water, land concentration, farming practices and productivity?
- > How has rural-urban migration influenced non-neutral technological improvements in agriculture since the 1990s, and especially since 2003, and how has this impacted agricultural production and food price fluctuation?
- > How does the level and rate of change in urbanisation across different countries in the region compare historically, and is China particularly unusual with respect to urbanisation?
- > How will household behaviour and community responses be shaped by climatic stressors and resource constraints such as water and arable land availability?
- > How will interactions between climate, resource availability and mobility shape policies and institutions and thereby investments for building resilience and adaptation for food security?

2 Consumption

Although previous research has examined differences in consumption patterns of rural and urban households in China, more research is needed to understand the growing change in demand for food safety and quality attributes by urban residents.

The demand for increased quality has implications for the entire food value chain, particularly on third-party systems to develop standards that ensure quality and safety attributes are verifiable. This is particularly important considering the complexity of food production in China and the fact that often many small farmers are involved in the production. Consumer research using unique methods and specific questions related to perceptions and value regarding quality attributes in food products is needed to address this issue. This area is complemented and informed through the University's world leading agricultural research capabilities in crop, animal, wine, food and health and natural resource management located at the University's Waite and Roseworthy campuses.

Future food demand patterns and related nutritional and health implications of changing diets also need to be addressed. This is important as formerly self-sufficient farmers become urban consumers, the population ages, disposable household incomes rise and the food system evolves and industrialises.

Priority Research

To understand changes in consumption patterns and the substantial implications for food security in China, and for global food production and trade, research is needed to identify:

- > What is the rate at which rural households shift their consumption patterns to match those of longer-established urban residents? How do the consumption bundles of rural-to-urban migrant residents compare with consumption in their rural homes over different durations since migration?
- > A shift in consumption to more processed foods and more protein is well-known, but what are consumers' perceptions of, and values placed on, quality attributes in food products?
- > What are the key socio-economic drivers of the value consumers place in specific food quality attributes. How should specific quality attributes, particularly attributes associated with food safety, be signalled to consumers?
- > What systems (e.g. traceability and certification) are needed to verify these "credence" quality attributes and what is the role of government in providing information and assurances?
- > What are the longer run nutritional and health implications of consumers' changing dietary patterns and food choices?
- > How is industrialisation of food production and processing in China and the region impacting on quality, safety, and quantity of food consumption?
- > What is the relationship between the ageing population, the pattern of consumption in the volume and mix of food consumed, and food security?
- > How are food patterns evolving in different regions across China, and in particular between small vs large cities and coastal vs inland cities.



As labour shifts out of agriculture, it might be expected that farm sizes will increase. In the absence of markets for land, as in China and other regional economies, this effect could be achieved either through renting out the right to use land or through the provision of commonly-used services.

While the extent of land consolidation is much debated – with some estimates that 20% of land is now managed through such mechanisms in China, it is clear that there are impediments to land transitions arising from farmer concern about access to social security and access to subsidies. Consequences could include a greater

preponderance of part-time farmers, whose management methods have implications for the application of inputs such as water and fertiliser or for the adoption of new technology.

Also a significant number of producers, particularly smallholders, will be unable to leave agriculture because they lack either the financial or human capital needed to make the transition to new sectors and to urban locations. This group could be considered “at risk” in the transition, and without other options, could continue to experience incomes that diverge (lower) from the rest of the community, presenting significant social

and political concerns. These smallholders “at risk” may be concentrated in particular regions or locations.

In contrast to the general global trend in expenditures on agriculture research and development (R&D), since the turn of the century China’s expenditures on agriculture R&D have been rising. This spending will contribute to increases in agricultural productivity, albeit with some lags. However there are many questions about the management of agriculture R&D investments and outcomes that comparative international studies involving economies of various stages of development would support.

Priority Research

The scale and scope of impacts from China’s responses to production and smallholder welfare challenges will influence global management of food. An examination of the resilience and adaptability of Chinese food systems is valuable to better inform Chinese, Australian, regional and global food systems policy, incorporating:

- > What are the drivers of adjustment, and what is the extent of adjustment in the management of agricultural production in China, and what are the consequences? How much of this is due to “natural” drivers to consolidation, how much does this vary between regions, and to what extent is it resisted by other policy settings?
- > How does the operation of the land tenure system and forms of entitlement impact the reallocation of land use for production of food systems in transition? How much would farmers need to be paid to accept the loss of access to their land?
- > What is the role of local government in the management of land in both consolidated agricultural use, and use in other types of agricultural production?
- > What is the size of the smallholder population “at risk” from the transition – those smallholders who have little option but to remain in rural agricultural production. What characteristics (e.g. socio-economic) make them more vulnerable to changes in state support for agriculture or social or ecological changes in marginal rural areas?
- > Why might the consequences vary systematically between regions, with farmers in some regions benefiting from the transition while in other regions farmers are more likely to be left behind? What is the relative importance of natural factors such as location and resources, compared to access to infrastructure and the influence of local policy? Can methodologies be developed to study these questions at local levels and to make assessments of opportunities for specific areas and localities?
- > What opportunities for agricultural and general economic growth (including farmer income) are lost as a result of failure to consolidate farms? What other adjustment options are open to smallholders?
- > How might the impacts of environmental change be offset by changes in cultivars or farming practices, and what might drive the adoption of those new technologies?
- > As climate change impacts on water supply and urbanisation/industrialisation affects water demand, where and when might there be a role for institutional change for more efficient water use (including pricing)?
- > What are the current impacts of climate variability on agricultural industries, how do national and international climate change policies support responses, and what strategies will optimise future agricultural productivity and profitability in the context of natural resource constraints?
- > How do farmers in China and other Asian countries respond to changes in climate? What are their adaptation strategies, and which farmers have a greater capacity to apply adaptation strategies. What policy initiatives best reduce the cost of adjustments needed to deal with climate change?
- > Where, particularly in areas of marginal land, might rising labour costs contribute to land being abandoned rather than consolidated?
- > What are Chinese food security expectations and assumptions that drive modelling and policy?
- > How has the management of R&D in China affected food security, including areas targeted, the role of public versus private institutions, the forms of outputs from the R&D investment, the dissemination of results to and adoption by farmers?
- > How does the management of R&D compare across different countries in various stages of development and what are the implications of that for managing Asian food in transition?
- > What adjustments are required to farming and supply chain systems to achieve the desired levels of productivity, quality and sustainability?

4

International Trade and Investment

China imported about two-thirds of all soybeans traded internationally in 2012. Trends in China's domestic demand and supply determine global patterns of trade. Trade decisions that have a large impact on world markets consequently affect world prices, leading to adjustments in other countries' domestic prices and net trade positions. Other economies may well have the impression that the bulk of adjustments surrounding China achieving its food security might be borne by them.

Since accession to the WTO, China's food exports and imports have increased. China's food imports have grown faster than exports, and China is becoming a net food importer. Broadly, current expectations are that China will tend to export labour-intensive foods such as horticultural products, and import foods that are intensive in the use of land and water. That perception is framing discussion on the recent growth in Chinese exports of fruit and vegetables and imports of feed grains and beef. However there are also distortions at work influencing these patterns of trade, such as domestic floor price schemes where the floor price has been allowed to exceed the world price, such that both stocks held in China and imports have increased simultaneously.

Trade patterns are also shaped by China's exports being restricted by high quality and safety standards applied by importing countries. Other factors, including lack of consumer confidence in certain domestic value chains, may be accelerating rapid import growth of dairy products, for example. More attention is needed to understand patterns, destination and impact of inbound foreign investment in China. Current assessments are that foreign direct investment (FDI) in the processing sectors is extensive and a continuation of that trend in dairy products for example, would contribute to a change in trade patterns in that sector.

Priority Research

To understand the implications of China securing its food supplies on trade patterns, global agricultural markets, and associated food availability and access, research is needed to determine:

- > What is the nature and scale of changes to demand and supply in key commodities and what are the implications of these changes for world agricultural and food markets, trade patterns and other economies?
- > What are the levels of expectation for adjustment and actual adjustments to be made by other countries resulting from China's demand for food, and what will be the likely responses of those countries?
- > What is the scope for growth in Chinese two-way trade in agriculture and food, and what are the implications for strategy and policy for rural development and food security?
- > What is the outlook for China importing particular crops and products, considering the impact of greater relative scarcity of labour and rising wages on particular commodities?
- > In which labour intensive food areas might China be losing comparative advantage, and in which more capital-intensive crops might it be gaining?
- > What are the destinations, opportunities and impacts of intensive inbound investment in China in agricultural and food products, and where is this leading / will that lead to changes in trade patterns?
- > At which point might dairy consumption (or other foods) revert to domestic sources where the perception of quality and safety is restored?
- > How significant are sanitary and phytosanitary (SPS) standards in constraining China's food exports and imports?



The operation of the value chain between the farmer and consumer determines the safety, quality and range of final products available for consumption. As disposable incomes rise in China, consumers begin to place greater value on foods with increased safety and quality assurances. In particular, product safety has grown as a major concern for domestic consumers in China in the wake of headline issues linked to value chains and the sale of food products that were too dangerous to safely ingest. Export markets and multi-national food retailers may place higher demands on quality and safety. Importable products highlight issues that other economies, including developing countries, face when considering their strategies for exporting to the China market. The value chain for food products in China, similar to other parts of Asia, may be particularly complex due to the structure of the food system. Many food products (e.g. horticulture products) are produced by numerous smallholder farmers that are heterogeneous in terms of their human, social and physical capital. Previous research has shown that it can be difficult for smallholders to deal with the new requirements and potentially high transaction costs that result when food markets transition and modernise. On the other

hand, in some circumstances, smallholders may have a comparative advantage in producing some crops that require local knowledge and abundant, low-cost labour.

In order to meet consumer demands and maintain market share, food retailers may require that their suppliers are able to meet public or private standards, to provide consistent quality and to deliver a sufficient quantity at a certain time. As a result, to gain market access, at a minimum, producers must be able to verify that they adhered to the required production methods and standards. Often this requires some type of traceability and certification system. Implementation of these systems can impose substantial costs on smallholders in particular, and may result them being excluded from the modern market channels, especially export markets. Smallholders that are able to meet the stringent quality standards often face other issues related to accessing inputs, credit, transportation or storage.

Additionally, SPS standards imposed on exports by trading partners or multinational food retailers may also require specific production standards and certification by a third-party. The safety and product quality standards that are applied and the distribution of the value created



to participants in the chain, including smallholder producers as well as large processors and retail operators, is particularly important to understanding the full impact of food system transition on the economy. Given the very significant consequences arising from value chain operations, it's critical to deliver research on both exportable and importable products, and products marketed through traditional markets versus modern food retail chains, particularly multi-national supermarkets.

Priority Research

- > How do China's domestic standards for quality and safety compare to those required by world markets, and how might impediments to export markets be overcome?
- > What is the role of the government in ensuring the food system is able to meet new production and processing standards – regulation, certification, enforcement and facilitation?
- > Is there a role for public-private partnerships in food system governance? Considering that public resources are scarce, is there an opportunity for private or third-party investment to develop new enterprises responsible for monitoring and ensuring food safety and quality requirements?
- > What is the impact of Foreign Direct Investment (FDI) on value chain development and the food transition in China? Where is FDI occurring (e.g. retailing, processing, production, input markets) and what are the implications for domestic firms upstream and downstream and consumers?
- > On a commodity-by-commodity basis, where in the value chain would it be most beneficial to invest in development, to improve food quality and safety? What are the bottlenecks limiting efficient development of the value chain for a specific commodity (e.g. on-farm, information, transportation, processing, whole-of-chain)? How can these limiting factors be addressed to improve competitiveness and growth of the sector and what investment options are available?
- > How can we improve smallholders' participation in modern food value chains and how can smallholders be integrated into coordinated value chains in a way that is efficient and equitable but ensures the needs (safety, quality and quantity requirements) of downstream firms in the value chain are also met? How can adoption rates more efficient technology and management practices be improved?
- > How is transition in value chains affecting distribution of the value created to participants in the chain? Are there market power issues or other market failures that need to be addressed to improve the equity of chain participants?

Research Platform – *How we will do it*

The University of Adelaide proposes to establish an international collaborative research platform to connect and coordinate research with different partners (providers and funders) across a range of related topics, with an eye on the big picture of Asian Food in Transition (AFIT). The University of Adelaide will work with its partners particularly in China and ASEAN countries on research-related activities in support of regional economic cooperation in the coordination of policy responses to food security concerns, and helping avoid responses that can exacerbate issues for these countries and their trading partners. We welcome expressions of interest to join us in this exciting international cooperative initiative.

AFIT Objectives:

- > To provide evidence-based policy advice for food security and sustainable futures in Australia, China and the Asia-Pacific region.
- > To examine Asian Food in Transition focusing on issues and implications across: demographic and environmental drivers; consumption; organisation of production and smallholder welfare and the management of R&D investment; international trade and investment; and value chains, food quality and safety.
- > To increase regional research capacity and access to skills through partnerships and exchange.

There is a significant body of work which could be undertaken in the long term for Food Security and Sustainable Futures in Australia, China and the Asia-Pacific Region. Herein are proposed a number of priority research areas that form a portfolio of needs over the next 3-5 years that would include examination of income and cost distributions, resilience in production systems, productivity, product utilisation and loss, and market access issues. These can be illustrated as a suite of potential projects, collated in the diagram below by association with each area's more pressing drivers for change.

AFIT – A Research Agenda:

- overview – size, age and place
- scale and rate of urbanisation, above or below expectations?
- urbanisation and demand for food – mix, quality, and nutrition – and the transition from rural to urban patterns
- food consumption in an ageing population
- value chain studies – supplying the urban population and responding to changing consumption choices

► *Demographic change*

- trade patterns with rising wages and price distortions – the world market impact and response
- impact of inbound FDI
- SPS and export performance
- land tenure arrangements and land use planning
- changes in use of marginal land
- re-organisation of food production and smallholder adjustment options
- management of R&D investment

► *Growth, industrialisation and structural change*

- adaptation of farming systems to deliver desired productivity, quality and sustainability targets, farmer adaptation to climate change
- climate change and output mix
- technological responses to climate change and their adoption by farmers
- water management systems

► *Climate change and the availability of resources*

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