



CORNELL WORKSHOP  
ON  
AGRICULTURAL AND RURAL DEVELOPMENT  
IN THE PEOPLE'S REPUBLIC OF CHINA

Randolph Barker and Radha Sinha, Eds.

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CORNELL WORKSHOP

on

AGRICULTURAL AND RURAL DEVELOPMENT  
IN THE PEOPLE'S REPUBLIC OF CHINA

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Malott Hall

Sponsored by:

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In cooperation with:

Department of Agricultural Economics,  
Program in International Agriculture,  
and Center for International Studies'  
Rural Development Committee

Cornell University  
Ithaca, New York

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## INTRODUCTION

It is no surprise that the normalization of the relationship between the U.S. and the People's Republic of China and as a result her growing accessibility has generated a spate of information, some hard, some soft and opinionated. While on one hand an American newspaper commentator recently suggested that China was bringing back capitalism, some leading Marxists in the West feel disillusioned and are suggesting that China has gone 'revisionist'. At least one of them found the recent changes in China so much to his dislike that he refused an official invitation to go to China and see for himself.

In such a controversy-charged atmosphere it is difficult for a non-specialist to assess the present changes in official attitudes and policy changes in China. It is much more difficult to present an objective view of the Chinese development to the students of international agricultural development or to judge the appropriate role of U.S. universities in technical assistance and cultural exchange.

It was decided, therefore, to invite some of the leading China experts to Cornell for a three-day workshop on May 17-19, 1979 under the sponsorship of the Center for the Analysis of World Food Issues in cooperation with the Department of Agricultural Economics, Program in International Agriculture and Center for International Studies' Rural Development Committee. The scene of the workshop was set with the opening speech of William Hinton, a leading China scholar, widely known for his versatility and objectivity. He covered a wide canvas and by and large felt that the recent changes were in the right direction. Much of the issues touched by him were later discussed intensively by the respective panels of China experts. The summary report of the proceedings prepared jointly by the chairman and the rapporteur of each session is included

in this publication. Included also in this publication is a copy of the program, a list of participants with their addresses and a list of papers prepared by participants.

In spite of the wide differences in views and in emphasis a broad consensus seemed to have emerged. It was felt that the recent change in direction is likely to affect investment priorities, science and technological policies, and attitudes toward trade and cooperation with foreign countries as well as the economic management of the economy. It was stressed that many of these modernization policies have been tried before but never with such vigor and enthusiasm. Their incentives and managerial systems are now being reoriented more towards growth of specialization and economic efficiency and less towards self-reliance and socially oriented equalitarian goals so much so that there was a risk of reemergence of greater inequality related social tensions than currently exists. Many of the changes, taken individually, do not appear dramatic or new; but when they are all put together they represent a major break with the past, particularly with the Cultural Revolution ideology.

On the question whether China, in coming years, will be able to feed its growing population adequately and ensure the basic level of living, the general feeling was one of cautious optimism. While the experts disagreed, sometimes vehemently, as to the current levels of food consumption and the prevalence or otherwise of 'hunger'-in absence of hard statistics such disagreements are inevitable-the general consensus particularly among the experts on agricultural technology was that China has the 'potential'. Whether such a potential can be translated into practice will largely depend on how quickly the country can regain lost time in creating scientific and technological manpower and whether adequate infrastructure, particularly transport and back-up facilities commensurate with the rather ambitious economic plans, could be provided.

It is in this context that foreign cooperation can be extremely useful and the willingness to learn from foreigners is clearly reflected in current policies of bilateral and multilateral exchange of experts in various fields. However, importing foreign technology: equipment and technical know-how is usually an expensive proposition. Besides, there may be the need for increasing imports of grains with increased income and particularly if the livestock sector is expanded. In the present state of economic development, all this may require resources which the country, at least until its petroleum industry is fully developed, cannot easily afford. More so if the fear of the Soviet Union's military might, encourages them to substantially increase already heavy military expenditures.

The leadership in China is clearly aware of these limitations and has, in the recent months, attempted to scale down some of the targets. Even with somewhat lower targets, achieving them may not be easy. The sheer magnitude of the basic problem (i.e. ensuring the basic minimum standards of life to a billion people) alone is daunting. The leadership in China has recently acknowledged that nearly 100 million people are not having the 'desired' level of food consumption and nearly 20 million people are unemployed. In any objective assessment of such statements one must keep in perspective the immensity of the task and the fact that so much has been achieved largely by 'self-reliance' within a couple of decades.

The above evidence suggests that the dust has yet to settle before one can judge clearly the implications of recent change not only for U.S. trade with China, but also for the host of other technical and cultural relationships. Despite the growing enthusiasm on both sides for technical and scientific cooperation, it is still too early to judge the dimensions and scope of this interchange or the effective role that can be played by China scholars who

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attended this conference in unraveling the many unknowns with respect to  
China's past and future.

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CORNELL WORKSHOP

on

AGRICULTURAL AND RURAL DEVELOPMENT  
IN THE PEOPLE'S REPUBLIC OF CHINA

Session I - Economic Strategy - General

Rapporteur - Douglas Gritzinger, Graduate Student, Cornell

Chairman - Milton J. Esman, Director, International Studies, Professor,  
Government, Cornell

Panel - Dwight Perkins, Professor, Economics, Harvard  
Martin Bernal, Associate Professor, Government, Cornell  
Sherman Cochran, Assistant Professor, Chinese History, Cornell  
Tsu-lin Mei, Director, China-Japan Program, Cornell  
Stephen Schmeisser, Food, Agriculture and Nutritional Service  
Group, Mathtech, Inc., Atlanta  
Radha Sinha, Visiting Professor, Agricultural Economics, Cornell

The workshop's first session provided a general overview of China's recent economic strategy. Discussion was limited to the post 1976, post "Gang of Four," era, and to the new policies which present leaders hope will bring China into the modern world by the year 2000. There have been several revisions since 1976 when the Great Leap Forward-like "Four Modernizations" were announced: but on the whole, continuity and consistency are evident in China's economic policies during this brief period. Individually, however, many of the new policies represent small shifts especially from the period of the Cultural Revolution.

The major issues in China's development strategies may be conveniently grouped into three categories:

1. Investment priorities: investment in producer good production versus consumer goods; in agriculture versus other sectors; and regionally, investment in richer areas where the return may be higher versus poorer, more backward areas.

2. Technology policy and choice of technique: indigenous versus foreign technology; large scale versus small scale or "appropriate" technologies; and

foreign or local training for scientists and engineers.

3. Organizational strategies: the legitimacy of material incentives, the autonomy of management, and the role of specialization and hierarchy in managerial strategies.

#### Investment Priorities

. The big question in investment priorities for China over the past 20 years has been how high a priority should be placed on agriculture. Although agriculture's share of GDP may now be as low as 25%, nearly 80% of the population still depends on agriculture for its livelihood; improving general well-being and living standards, as well as insuring food security for a population that is still growing rapidly, depends directly on agricultural performance. In a formal sense, agriculture has long had some priority; "agriculture as the foundation" has been espoused as official doctrine since the late 1950's. But as one participant pointed out, on an individual level this tends to be mostly rhetoric. The occupation most young people prefer was said to be the military, followed by industry, then perhaps culture; most would, as it was put, rather be dead than go into farming'.

Current plans call for 4-5% annual growth in agriculture with a goal of 400 million tons of grain per year by 1985, up from 270 million tons in 1977. Mechanization of much of agriculture by 1980 was also proposed in 1976/77. This would suggest a dramatic priority for agriculture; but actual events indicate more priority has been placed on the modern industrial, and especially the defense related sectors. Further, it is not entirely clear how this proposed growth in agricultural production is to be achieved. The leaders apparently felt that changes in the incentive system (to be discussed later) would play a substantial role. A bad harvest in 1977 and a mediocre one in 1978 seem

to have reinforced the attitude Chinese leaders have had that agricultural growth must be maintained. The policy revampings of late 1978 and 1979 seem to have included renewed recognition of agriculture's importance. Mechanization by 1980, however, has quietly been dropped. High technology agriculture may not be appropriate to China's economic endowment at the present stage of development.

The economic structure and demographics of China suggest the changing role agriculture will play. In one sense, the reduction in birthrate that China is apparently experiencing suggests that the pressure on agriculture will decline, or at least diminish. But the new importance being given to material incentives and higher wages, coupled with what is believed to be a high income elasticity of demand for food implies that demand for food could remain high. A recent Japanese social sciences delegation to the U.S. reported that the Chinese want to increase per capita grain consumption from 300 to 500 kg/yr. The time frame was not known; but the idea was to provide more meat, mainly pork, to the Chinese diet.

In industry, the Chinese first put stress on heavy machinery and steel as the core of industrial development. A goal for steel was announced in 1976/77 of 60 million tons by 1985, compared to 31 million tons in 1978. In 1978/79 this was revised downward to between 40 to 50 million tons. It is felt that this does not represent a big shift in policy; rather the pragmatic realization that such a heavy emphasis on steel would be too costly in foreign exchange, since these plants would come from abroad. In addition, more serious bottlenecks in other sectors, such as transport and electrical power, became obvious. More emphasis now is being put on light industry, infrastructure, and resource development at the expense of heavy industry.

### Technology Policy

It is in technology policy that China has made the most dramatic shifts. During the Cultural Revolution and into the early 1970's dependence on foreign technology was considered not only unnecessary, but positively bad. Self reliance was the dominant theme. Since then there has been a 180 degree shift. The Chinese are now carrying out technological exchange with the West on a broad front; they are contracting to obtain industrial technology from foreign firms through a variety of means, including joint ventures. To date, their principal (and most logical) partner has been Japan. The exuberance the Chinese are showing for this new attitude is reflected in a recent statement by Chairman Hua: "Not only do we have to learn from foreigners while we are catching up, but even after we have equalled them in technology, and even 10,000 years from now." During the Cultural Revolution a person would have been subjected to severe criticism, at the least, for such a statement.

This is not to say that China has not gone abroad regularly for technology in the past. In the 1950's, of course, they were heavily dependent on technical and economic assistance from the U.S.S.R.; in the early 1960's they obtained technology from Japan. China does not now intend to go abroad for all its technology, or even the bulk of it; the small scale, labor intensive industries program will not be abandoned (except, perhaps, for small scale fertilizer production). One should also not think that the anti-foreign attitude has been eliminated. It is simply that those who do not have a pronounced anti-foreign bias are now in power.

Foreign technology was rejected during the Cultural Revolution in part because of a rejection of specialization and highly subdivided forms of production, The subdivision of labor implies, and is used to justify, hierarchy, Mao thought; and hierarchy should be resisted because it is associated with inequality and

with capitalism. China's present leaders are certainly aware of this argument. Their willingness to go abroad for technology indicates they either reject the argument, accept the costs as inevitable aspects of modernization, or feel the costs can be minimized by adapting Western technology to Chinese modes of organization.

China is now facing the fact that importing technology is expensive, especially in terms of foreign exchange. Their exports are small (\$8.2 billion in 1978) and mostly agricultural. The prospects for expansion of agricultural exports are low; in fact, China may end up being a net food importer given its goal of producing more meat. China's future export potential is largely in oil and coal, much of which is yet to be discovered and developed. Agreements with foreign firms to produce consumer goods, which capitalize on China's abundant supply of low-cost labor, and the setting up of export zones should be seen as efforts to earn foreign exchange. Estimates now are that China's foreign debt will grow to \$20-35 billion by 1985. Ultimately, even though this debt will be principally to foreign reserve rich Japan, it may become a constraint to their modernization goals.

#### Organizational Strategies

The Chinese appear to be in a state of flux in the area of organizational strategies, work incentives, and managerial control. The present leadership believes the problems here have been severe over the last decade, and responsible for low productivity of all the factors of production, but they have not yet finalized appropriate corrective policies. Recently, they have shown interest in American business management techniques. Whether U.S. management methods would be appropriate in the Chinese context is questionable; this interest may in fact symbolize just how bad the leaders think things are.

There has been renewed stress in agriculture on the production team, and greater flexibility has been allowed in the use of private plots. Statements of the Chinese leaders in 1977/78 give the impression they believed these new material incentives would produce a large acceleration in agricultural output. The question is the degree to which China's agricultural problem is in fact mainly organizational and managerial, as the leaders apparently believe. The panel thought it more likely that the most significant constraint on China's agriculture is simply poor land endowment, and that efforts to solve the problem of low productivity primarily by managerial innovations and reforms are not likely to be effective.

#### Summary and Discussion

The new policies of the last 2-3 years indicate that, after assuring the security of the state, China's primary goal now is economic growth. Many of these modernization policies have been tried before, in part, or in one form or another; but never before with such vigor and enthusiasm. Their incentives and managerial systems are now oriented more towards growth, and less towards self reliance, cultural change, or egalitarian social goals—such as the movement towards socialism. They are now setting their priorities more nearly on straight economic criteria, but are experiencing the inevitable difficulties of choosing priorities in the face of enormous, competing needs and limited resources. Many of the changes, taken individually, do not appear dramatic or new; but when they are all put together they represent a major break with the past, especially with the period of the Cultural Revolution.

China is now in a period of rising expectations, both material and political. The experiment with free speech and Peking's Democracy Wall in 1978/79 quickly led to bitter attacks on Communist Party rule. The young especially have shown

their frustration with authoritarianism. Demonstrations and riots in Hangchow and Shanghai in February, 1979 protested the Cultural Revolution policy of resettling city youth in the countryside. The Party must contend with the rising material expectations and demands for greater freedom of new generations who do not remember prerevolutionary China. Material expectations began to rise in 1977 after the Gang of Four's fall, and the government responded with substantial wage increases, the first in nearly two decades. At issue is whether the government can count on the spirit of self-sacrifice, so important in the past, to contribute to the modernization goals; on the other hand, material aspiration and reward (economism) is the root of capitalism's success. China's present leaders must consider resistance from elements opposed to their pragmatism and de-deification of Mao. The leftist-rightist debate is far from resolved.

Another question is the relationship of the goal of economic growth to the security needs of the state. China has spent heavily on defense (6-10% of GNP) since the early 1960's and its break with Russia. Since 1970 the share has declined somewhat, but has remained high. Defense spending in the past has cut heavily into consumption and slowed growth. The present leadership does not appear to have lowered resource commitments to defense since 1976, despite the new emphasis on growth. China's leaders are known to believe that a major war between the superpowers is inevitable. An interesting question then is whether China feels it must grow, and join the club of technologically advanced modern nations to be able to meet its long term security needs. That is, do the leaders feel China must become a technologically modern nation, and by implication a potential equal of the superpowers militarily, to assure the survival of the present regime and enable them to be a major factor in international affairs; or is improvement of the population's material well-being more fundamentally the goal of their modernization?

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AGRICULTURAL AND RURAL DEVELOPMENT  
IN THE PEOPLE'S REPUBLIC OF CHINA

Session II - Economic Strategy - Agricultural

Rapporteur - James Coyle, Graduate Student, Cornell

Chairman - Erik Thorbecke, H. E. Babcock Professor of Economics and Food  
Economics, Cornell.

Panel - Robert Dernberger, Professor, Economics, University of Michigan  
Miriam London, China Scholar  
Nicholas Lardy, Assistant Professor, Economics, Yale University  
Ivan London, Professor, Brooklyn College  
Bruce Stone, Researcher, International Food Policy Research Institute  
Peter Timmer, Professor, Economics, Harvard School of Public Health  
Lee Travers, The Ford Foundation

The second session was concerned with the successes and failures of economic policies relating to agricultural development strategies and their implications for allocation of resources, output and likely future trends. The session started with the opening statement by Robert Dernberger. He acknowledged the inadequacies of available statistics but felt that these limitations did not inhibit broad analysis of trends. He reported that gross value of output between 1952 and 1975 grew at an average annual rate of 2.9 percent, while net value of output grew at a lower rate of 1.9 percent which implies an increase in marginal costs.

Explaining the causes responsible for rising costs during the 1960's and early 1970's, he felt that the most important factor has been the Chinese strategy to solve solely the technical problems of agriculture in contrast with organizational and managerial problems. This strategy has led the PRC to invest great effort in farmland reconstruction, new seeds and cropping patterns, increased irrigation, the more intensive use of chemical fertilizer, expanded



mechanization and rural small-scale industry. In 1952 current inputs accounted for only 8 percent of gross value, but by 1975 their share had risen to 38 percent. Dernberger indicated that this strategy has been successful in increasing agricultural output, but the strategy to modernize agriculture has led to investment in many inefficient programs which have caused labor and land to be misused.

In looking toward future developments in the Chinese agricultural strategy, Dernberger felt that the Chinese will continue with their strategy of heavy investment in the technical aspects of agricultural production, but this will be coupled with an institutional reorganization which will allow greater response to market forces. This new reorganization will allow production teams, and entire areas of the country to specialize in maximum value crops rather than being forced to be self-sufficient. It should also include tax reductions and price increases which will enable past marketing problems to be overcome. In closing, Dernberger raised several questions concerning the new program. The most important is whether it will succeed to increase output. Also, what effects will the new program have on income distribution, resource flows and price structures, and what will be the social and political consequences of these effects?

Lardy, while agreeing that the rate of growth of agricultural production in China has been rather slow (approximately 2.2 percent), asked whether diminishing returns to additional factor inputs was due to the slow pace of underlying technological change or to mismanagement of agriculture by the state. He suggested that the true marginal cost curve has been shifted upwards by upgrading the limiting factor as well as by the successful development of high yielding varieties of grains, specifically in the area of rice strains, where new semi-dwarf varieties similar to the International Rice Research Institute's

IR-8 seed and hybrid rice have been developed and similar changes, though on a limited scale, of new corn and wheat technologies.

Lardy stressed that misguided agricultural development policies and perhaps the slow diffusion of new technologies and modern inputs rather than an inadequate pace of technological change were mainly to blame for the slow growth of agricultural output. To support this hypothesis he presented new evidence on differential rates of growth of grain production within agricultural regions dominated by the same crop. In the predominantly rice growing region, for example, both Kiangsu and Hunan have grown very rapidly (4 to 5 percent per annum) since the mid-1960s with the rate of growth actually somewhat more rapid in the latter half of the period. On the other hand, in Szechuan growth from 1964 to 1976 was just over one percent per year. He presented similar data showing diverse performance within predominantly wheat-growing regions. He suggested that this pattern of development was not consistent with the hypothesis of technologically determined diminishing returns but reflected the effect of government planning in agriculture, particularly the policies directed towards the achievement of forced self-sufficiency in grain for all areas of the country. This was accomplished through forced deliveries and planting requirements. The policy led to marginal land being brought into production at greatly increased cost and lowered yields. Sinkiang and Inner Mongolia suffered severe ecological damage as a result, and grain production actually fell. These policies, in other areas, led to land being triple-cropped where it had been double-cropped in the past. In Szechuan farmers were forced to shift from the traditional wheat-rice pattern and plant rice-rice-wheat or rice-rice-rape seed each year. Because inputs

were in short supply, the third crop barely replaced yields lost on the first two crops, and the costs were greatly increased. At the same time, withdrawal of land from the production of cash crops reduced considerably the output of cotton, sugar beets, sesame and livestock, and also depressed the incomes of many peasants and thereby their incentive to work. He felt, however, that the recent changes in government policies would lead to increasing availability of modern inputs and extension of transport networks will lead to an increase not only in the rate of growth of grain output, but also that of commercial crops and livestock.

Although they agreed with Lardy's optimistic outlook for the future of Chinese agriculture. Stone and Timmer were less critical of China's past performance. They feel that Lardy's opinion that an annual rate of growth of 2.2 percent shows poor performance was wrong in the context of an underdeveloped economy. In comparison with other poor areas in the world, a sustained rate of growth of 2.2 percent was quite respectable. But neither Stone nor Timmer feel that growth should be the major indicator of China's performance in agriculture. The much more pressing issue was consumption of food, and in this area, the Chinese have been quite successful. Stone felt that even though per capita consumption of food grains was no higher in 1977 than it was in 1957, it was among the highest in the world, being 190 kilograms per person per year. Stone and Timmer felt that in the past the major cause of famine in China was not necessarily inadequate total production of food grains, often the maldistribution of grains was at the root of the problem. In the 1930's, even with high levels of grain output, widespread hunger existed because of a very skewed distribution. Since such skewness has been considerably reduced by the payment of wages largely through the work point system and the egalitarian policies, China does not suffer from 'hunger', at least with the same intensity as prevails in India or Indonesia.

However, Stone conceded that an average Chinese diet lacked diversity; per capita meat consumption is nearly twice that of the 1950's but it still is only two pounds per month and only a few types of vegetables are available in the markets. Timmer felt, however, that grain is the best way to feed people, and if large scale attempts are made to diversify production fewer total nutrients will be available for consumption even though gross value of output will be greater. If meat production is desired it can only be done on a large scale by using grains as feed. Presently, according to Timmer, these grains were not available in adequate quantities, and large scale grain imports may not be a realistic solution.

In terms of future developments both Stone and Timmer felt that the outlook was good. The heavy investment in agriculture of the 1960's is expected to continue and probably increase. Stone stated that he expects to see an increase in the rate of growth of agricultural production along with the expanded use of inputs and new technology. It is possible, however, that there may be a worsening in the distribution of income among regions of the countries resulting from the recent stress on regional specialization and efficient resource use within a region, rather than among regions. Because recent policies have been stressing the more efficient use of inputs within regions rather than among regions, adverse distributional effects may result.

Other panelists, Miriam and Ivan London, were not only more pessimistic about the future outlook but also questioned the reliability of the Chinese agricultural statistics and the inferences drawn on the basis of such data of debatable value. Based on the information collected by them in personal interviews of the refugees together with the newspaper reports emanating from China and Hongkong, they suggested that famine and hunger were still common in many parts of the countryside particularly in the years of crop failure. In their view the frequency and the intensity of such failures may have increased

in post 1949 period because of improper land management. According to them the years of crop failures have experienced dramatic increases in the number of beggars. This statement was challenged by William Hinton, who however, conceded that workers in areas affected by serious drought often moved to other areas to work as contract laborers.

The instability of production arising out of the vagaries of nature as well as official policies have led to peasants dissatisfaction with the commune system. This was reflected in actual or threatened disintegration of production teams in at least nine provinces in April of this year alone. If all these indirect evidences were taken into consideration, the London's felt that the Chinese agricultural policies have not achieved their objective of ensuring basic minimum food for everybody.

Much of the open discussion during the session centered around, not so much the method of analysis, but the nature of the available statistics. The general consensus was that the available information was neither sufficiently reliable nor adequately representative of the country as a whole, to draw more than very rough inferences.

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AGRICULTURAL AND RURAL DEVELOPMENT  
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Session III - Rural Organization

Rapporteur - Steven Jones, Graduate Student, Cornell

Chairman - E. Walter Coward, Jr., Chairman, Rural Sociology, Cornell

Panel - Benedict Stavis, Assistant Professor, Michigan State University  
Milton Barnett, Professor, Rural Sociology and Asian Studies,  
Cornell  
Donald DeGlopper, Assistant Professor, Anthropology, Cornell  
Mark Selden, Associate Professor, History, Washington University  
Christine Pui-wah Wong, Assistant Professor, Economics, Mt. Holyoke

In a brief presentation designed to provide a framework for the panel discussion on rural social organization in China, Benedict Stavis opened the session with comments on recent policies that apparently signal a shift in national development strategies. Until recently, the official policy line on agricultural development in China stressed that production units at all levels from the production team upward should strive to achieve an increasing degree of self-sufficiency. By June of 1978, however, the Chinese national government had apparently re-examined its insistence on self-sufficiency. A call for the development of various forms of specialized production was issued by several officials.

Past attempts at establishing self-sufficiency focused on several levels, and the current movement toward specialization is relevant to many levels as well. Regional specialization has recently been proposed as a means of achieving a more rational distribution of production. Past patterns of grain production under self-sufficiency guidelines have been blamed for disruptive effects on agricultural production, especially on lands marginally suited for

grain farming, where problems with soil erosion have appeared. The current direction of policy calls for the establishment of Grain Bases in areas already producing good yields in the various grains. Greater emphasis will be placed on growing grains in these high-yield areas by the communes and brigades. In other areas, brigades will be encouraged to produce commodities specially suited for growing in their region. Such grain and commodity specialization is also credited with the potential for raising levels of efficiency in the purchase and use of machinery.

Specialization in production, as viewed by the participants, might be expected to engender certain difficulties in nations having a great land area and generally low levels of infrastructural development. In particular, with their heavy reliance on grains for public consumption, the establishment of dispersed Grain Bases could lead to problems in achieving a reliable system of distribution of grains to non-producing areas. The lack of a dependable and widespread rail system could be one bottleneck encountered in the specialization of agriculture. Unless the transportation system is expanded concurrently with the movement toward grain and other commodity specialization in China, considerable difficulty with the supply and administration of food supplies might be expected. In terms of the aggregate grain supply in China, it was felt that changes in cropping patterns and regional specialization would have only minor effects on aggregate production levels.

Regional specialization in livestock production might create difficulties also. One problem would be the increased demand for feed grains in the livestock-producing regions coinciding with decreased grain production in those regions as land is converted to pasture. Transportation difficulties in the movement of feed grains could also be expected. Deficits in the animal food supply might, however, be reduced by relying upon grazing and locally produced fodder

and silage, as well as by increasing feed grain imports.

The development of specialized service companies in agriculture was also mentioned. For example, the China National Seed Company has already been established. Competition between xian (county) branches of the company may be allowed in order to develop efficient seed production and distribution. The seed company has been cited as a model to be followed in other areas of the economy, such as food processing, machine maintenance, and veterinary services.

Specialization is also expected to lead to problems in maintaining social integration. Within the Peoples' Communes, the lower level production units have recently been reassured of their rights in property ownership, decision-making and election of political leaders.

The main economic mechanism of integration is to be a system of negotiated contracts between production units. Contractual relations will require a new body of contract law, and the expansion of the legal system into resolution of contract dispute.

The relative economic role of the production team in the commune system is expected to decline in importance as specialization increases, while the relative role of production brigades will be reinforced as the major production institution in non-grain commodities. As for the communes themselves, they are expected to have increasing economic importance due to their position in the marketing network.

As an incentive toward specialization in the communes, the national government has announced a plan to increase the prices paid for state purchases of grain and other commodities.

The potential for popular opposition to the current program of specialization was also acknowledged. Opposition from the bureaucracy toward increased



reliance on prices and contracts for planning production is possible. Opposition might also be expected on philosophical grounds stemming from preferences for the self-sufficiency of past years.

Another topic discussed by the panel was the extent of the success of the Chinese government in making basic improvements in the quality of life and standards of consumption of the rural population. There is evidence of substantial improvement in the availability and equality of rural housing. The public education system has been expanded to include children in most rural areas of the country. Cooperative arrangements between local villages and the state have permitted the widespread development of a primary health care system. Food supplies at subsistence levels and above have been guaranteed for all residents, regardless of age or employment status. In some cases, food is supplied on a credit basis, or for minimal labor requirements for dependent persons and the aged.

Tensions within the Chinese social system were also discussed, especially social inequality. The greatest reductions in inequality have occurred within production units, although some differences remain between age groups. Inequality between rural and urban areas continues to exist, although the government has ameliorated these disparities by maintaining constant price levels for agricultural products. The degree of rural-urban inequality appears fairly stable and seems related to government restrictions on migration from rural to urban areas. It was also noted that specialization in agricultural production and the establishment of Grain Bases may lead to increased levels of inequality between regions. State investments and subsidies may be manipulated by the government to counter such tendencies.

The current shift in emphasis from local self-reliance and self-sufficiency to regional specialization and division of labor is also being applied to the development of rural industries. One of the basic tenets of the Cultural Revolution development strategy was that all economic activities should be decentralized to the lowest feasible administrative level in order to fully utilize local resources and initiative. Rapid growth of rural industries through the late 1960s and early 1970s grew out of this strategy, when localities were encouraged to set up their own factories to produce chemical fertilizers, cement, farm machinery, etc., self-reliantly for their own use. This successive decentralization of production tasks to sub-provincial units is best illustrated in the farm machinery industry.

The farm machinery industry produces a diverse mix of products ranging from large, complex machines such as tractors and combines to hand-operated machines such as grain threshers to simple, small farm tools. These different products can be manufactured in workshops of different sizes employing production techniques and equipment of varying complexities. Thus the industry is well-suited for implementing a scheme of hierarchical division of labor such that a good many production tasks could be decentralized to lower administrative units in the countryside.

With minor regional variations, the post-Cultural Revolution development of the local farm machinery industry was aimed at producing small walking tractors and diesel engines at the prefecture level, small electric motors and some mechanized processing machines at the county level, and hand-operated machines and farm tools at the commune and brigade levels. While local production of farm tools and simple machines has been extremely successful in increasing output and helping many localities to achieve mechanization in

non-field tasks decentralization of production at the upper end of the technological spectrum has been far less successful in the farm machinery industry.

Production of walking tractors and diesel engines in many small, dispersed prefectural and county level plants turned out to be extremely uneconomical. At the 1978 National Conference on Farm Mechanization, Vice-Premier Yu Qiuli pointed out that problems of high costs and irregular production runs plague many of these local plants, and the problem of low product quality was particularly serious. The experience of many localities showed that these problems stemmed primarily from the existence of significant economies of scale in the production of these two products. Not only did small production runs result in high unit production costs, but that very significant economies of agglomeration were found to accrue to plants located in urban centers, near producers of component parts. These internal and external economies of scale constituted formidable barriers to the decentralization of production to small plants dispersed in the countryside. In view of this, Yu Qiuli called for a reorganization of the industry to allow walking tractors and diesel engines to be produced at the higher level of provincial units.

In the post-Mao "New Period", when Cultural Revolution policies are being reassessed, it is not surprising to see some backing off from the encouragement of local self-reliance and self-sufficiency where such a policy had proved to be costly.

Discussions within this session of the conference also examined the nature of the terminology used in analysis of Chinese policies. A tendency toward dichotomization was noted. With the debate on "self-sufficiency versus specialization," it seems that actual policies are related to a change in degree of emphasis on either alternative, rather than a total shift. The rural-urban dichotomy as used in Chinese policies may actually be a disguised reference

to regional inequalities, since the major cities are located in the most productive regions of the nation.

As for the effects of new policy lines, it was felt that specialization and the production of cash crops may elevate the level of popular awareness of regional inequalities in standards of living. Some intensification of local political debate on the allotment of quotas for the production of cash crops is also expected.

To consider the relevance of Chinese policies for the planning of agricultural development, the discussants also made a brief comparison of China with other underdeveloped countries, and examined the possibilities for transfer of the "Chinese Experience." Similarities in the social organization of pre-revolutionary China and the poor nations of Southeast Asia were noted, including the high rates of tenancy and sub-tenancy, oppressive relationships between landowners and the peasantry, an abundance of surplus labor, and the existence of extended family structures.

It was felt that many persons attempting to transfer the "Chinese Experience" tend to ignore important political factors, and assume that only a simple transfer of technology and policies is required, despite past difficulties encountered in attempts to transfer even very limited technical and institutional models. Still, some areas of experience seem to offer the potential for transfer and implementation in other national contexts. Irrigation systems and their control in China were felt to have important positive aspects that should be considered by development planners. The close system of coordination between farmers, extension services and the higher-level scientific research organizations related to agriculture was suggested as a policy for consideration by others.

Potentially transferable policies included those that aim to establish a relatively equitable system of land distribution, as well as those that organize the rural population for collective or cooperative activities. By mobilizing unemployed and underemployed labor in combination with the low and intermediate technologies available in local areas, the Chinese have been able to develop and improve the rural infrastructure to a considerable extent. The policy of diversifying productive activities in rural areas was also considered as offering the potential for stabilizing agriculture and raising rural incomes.

In general, a convergence was noted between the experiences of China and development programs defined as Integrated Rural Development or Community Self Reliance projects, especially those utilizing Group Farming programs.

CORNELL WORKSHOP

on

AGRICULTURAL AND RURAL DEVELOPMENT  
IN THE PEOPLE'S REPUBLIC OF CHINA

Session IV - Science and Technology

Rapporteur - Richard Cobb, Graduate Student, Cornell

Chairman - Walter Galenson, Professor, Industrial and Labor Relations, Cornell

Panel - Thomas Wiens, Senior Economist, Mathtech, Inc. Bethesda, Maryland  
Randolph Barker, Professor, Agricultural Economics, Cornell  
Haldore Hanson, Director Emeritus, CIMMYT  
Henry Munger, Professor, Plant Breeding and Biometry, Cornell  
Richard Suttmeier, Hamilton College

The panel's discussion focussed on three related topics--the current performance in food grain production, the policy framework affecting science and technology, and specific areas for technological improvement. Thomas Wiens started by pointing out that poor land endowment and vagaries of climate together with an already well-developed labor intensive agriculture, naturally sets a limit to rapid technological change in the foreseeable future. On the other hand there have been marked differences in performance over time of various crops, and the same crops in different regions. If the technological levels of the crops (and/or regions) that lagged behind could be raised to levels comparable to the more successful ones, a reasonably sustained high rate of growth could be achieved, at least for the foreseeable future.

Rice, for example, which makes up roughly 45% of food grain output, has had a long-term growth rate of 2%. Wheat has done better with a growth rate of 2.8% per year. In fact, over the period 1965 through 1977, a very respectable growth rate of 4.2% was achieved. Corn, with even more spectacular growth, has come from third ranking in terms of importance of crops to second ranking. Corn has shown

a growth rate of 4.1% per year over a twenty year period.

However, with regard to soybeans, tuber crops, potatoes, and to miscellaneous grains, such as sorghum, millet and the like, the picture is a lot less optimistic. Soybeans have shown no growth at all in twenty years. For the rest of the grains perhaps 1.5% per year has been recorded. The problem therefore is to improve production in the less-advanced regions while maintaining the momentum in the most rapidly progressing regions.

Wiens expressed the view that there is a considerable potential for improving some of the crops. Rice in particular has average national yields of about 3.5 tons per hectare. In contrast, 4.7 tons per hectare has been attained in double cropping systems on Taiwan and 5.3 tons per hectare with single-cropping in Japan. In Taiwan, Japan and south Korea, the growth rates for rice production of 3.5% to 4% have been sustained over very long periods of time. Thus, it is conceivable that comparable levels of yield for rice could be reached in China. According to Barker, if Taiwan experience is taken into account. China even with currently available technology can reach 4.5 tons per hectare within the next fifteen years. These levels will be obtained largely from an increased use of chemical fertilizer, and some improvements in the varieties themselves.

For wheat, the average yield is 1.5 tons per hectare. By world standards or by the standards of advanced technology in developing countries, these yields are not high. Today, 2.5 tons per hectare are possible. As an indication of potential wheat yield, Hansen reported seeing fields in China of a quarter mile in size with yields of 8 to 8 1/2 tons per hectare. Hansen indicated that this yield is comparable to the highest yield that can be obtained in Mexico (at CIMMYT) in an experiment station small plot. A yield of 8 1/2 tons represents a fivefold increase over average wheat yields in China.

Whether substantial increases in agricultural output can be attained will ultimately depend on the provision of inputs as well as appropriate policies with regard to science and technology. According to Suttmeier, at least in the recent past, mainly as a result of the Cultural Revolution ideology there has been serious neglect of the need to replenish and expand the number of highly skilled scientists and technologists. When the Chinese changed policy in 1977, they began talking about needing a cadre of something like 800,000 individuals engaged in research and development. It is not exactly clear what they mean by that 800,000 but if one looks at the best estimates of numbers in 1967, the numbers add up to only about 50,000 people. Given these figures, quite a large increase in technical manpower is still required.

In 1977 important changes in policy began to occur. The changes in policy can be summarized under six different headings. One is the change in status of professionals. This takes many forms, but included would be a re-definition of the role of the expert in ideological terms and the use of expert knowledge in policy advice as well as giving them leadership roles in research.

Second, some very significant organizational changes in the national research system have taken place. Notable among these is the establishment of a central Science and Technology Commission as a central focus for policy-making for the nation. The re-establishment of a professional society which had been disbanded during the Cultural Revolution is also significant.

The third policy change was the re-introduction of scientific planning with specified priorities for research. Over one hundred projects were identified and within these, eight particular areas were highlighted as high priority topics. These topics include the general purpose fields of agriculture, energy and materials, high technology and science-based technology fields (Lasers, Space and Computers) and two areas of basic research, such as hydrogen physics and



genetic engineering. The re-introduction of planning has given a form of guaranteed stability in the research environment.

Fourth, major changes in education were announced. These involved changes in the recruiting process, the new stress placed upon research in higher education, and the designation of certain institutions of higher education for priority investments in specific research activities.

Fifth, a major change was the broadening of international contacts. These take a number of forms which include relations at the "professional" level with international scientific organizations, and more importantly, the relations at a government to government level with the West.

Finally, there is an increasing emphasis being placed on consideration related to economic efficiency. This will lead to a more rational use of resources such as labor which has, in the past, often been used excessively to the collection, processing, transporting and application of organic manure without adequate attention to the opportunity cost of labor. Similarly, for political and ideological reasons, regional food self-sufficiency was stressed even if it meant growing of crops or using crop-mix which was not suited to a particular area. As a result of recent changes towards greater autonomy to the peasants it is reported that many areas' output has increased considerably. For instance in Szechuan there has been a rapid growth in output because the farmers have reduced the amount of multiple cropping which earlier had been arbitrarily imposed on them by high-level authorities. Changes are taking place in other cultural practices as well. As for example the practice of dense planting is giving way to less dense planting in order to take the advantage of high tillering rates.

Some detailed consideration was given to plant breeding, irrigation, chemicals and agriculture mechanization.

In the area of seed breeding, there have been some notable successes. Development of hybrid rice is the most important activity at the moment now that much of the potential of the dwarf lines has been exhausted. Hybrid rice has gone from experimentation in the early 1970's to the beginnings of seed production in 1974. Thirteen percent of the rice acreage in 1978 was under hybrid varieties, a remarkable development by any world standard. No other countries yet use hybrid rice. The Chinese have claimed that hybrid rice adds one ton per hectare on the average to existing yields, a 20-30% increase. If that is the case, there is no question that it is very important new technology.

However, it is not yet certain that hybrid rice is a good strategy. Hybrid rice is a fairly complex technology to apply in production. The peasants are being asked, in effect, to raise their own hybrid seeds. The yields for hybrid rice seed are about 1/10th the normal yields of other seed fields. The technology requires labor-intensive techniques and hand-pollination of plants to produce those seeds. Under normal circumstances, this would make hybrid rice uneconomic, because it means that ten times more land for seed fields has to be set aside. Also, the technology is troublesome and labor consuming.

Hansen reported that the Chinese are ahead of the rest of the world in developing early maturing wheat seeds. (This is also the case in rice.) This early maturity allows the production of up to three crops. In fact, the Chinese wheats mature some three weeks earlier than any of the wheat seeds available in CIMMYT's world collection. This technology could greatly enhance the productivity of multiple cropping systems.

Regarding potato seed production the issue is one of disease, primarily viral disease. A combination of the self-sufficiency policy, which did not permit the establishment of areas for production of virus-free seeds but rather required each locale to grow its own seeds and a Soviet view that environmental, not viral.

influences caused potato degeneration, have delayed for 10 to 15 years the development of a good base for producing viral-free seed potato stock. As of 1975 the Chinese first began to establish such bases. However, supplies are still too inadequate to furnish the seed potatoes required. It does not take long to build up seed stocks, and potato yields should show some increase where high-yielding seeds are used.

With regard to irrigation, the panel felt that the Chinese irrigation systems were already pretty well developed—nearly half of the acreage was irrigated, therefore very little improvement was conceivable, particularly in parts of South China. Some scope still remained for better utilization of available water.

While any real future improvements in surface irrigation would be very costly, there are some possible developments which could be used effectively. First is the introduction of sprinkler irrigation system, which is being encouraged in mountainous provinces in the Southwest where the growth rate of rice production is low. The use of central pivot sprinkler irrigation systems presumably would be applicable both in areas where the surface irrigation systems are impossible because of elevation or the shape of the terrain, and in areas where the water sources are too limited to develop economical surface irrigation systems. The procedure may have special applicability to the backward regions in China, both on the northern frontier and especially in the mountainous areas.

In the chemical area, the real breakthroughs in technology are going to come in pesticides and herbicides technology in which China is really behind. China can produce on an experimental or trial basis some of the more advanced products of the world, but not all of them. However, mostly old-fashioned 1950's vintage pesticides are now being used in the fields. Obviously a lot could be done in the way of improving the quality. Use of chemicals is usually a feasible alternative to mechanizing the process of inter-tillage and it is a

much cheaper option on the whole. Herbicides are being experimented with in the northeast. The Chinese seem to be leaning towards heavy use of herbicides as a more rational method of solving the weeding problem than by trying to invent machines which can weed.

Another major problem deals with the issue of using a systems approach to mechanization. In China, individual machines are produced to do individual operations. For example, in the northeast most of the area is tractor-plowed. But, at the same time there are major weaknesses in the processes of weeding, tillage, and harvesting. The result is that this practice does not release labor, except during plowing. Labor is still needed for tillage and harvesting. Ultimately for areas where labor shortage exists in the peak seasons (or is likely to develop in the future) there is a need to develop machinery and equipment that fits together in an integrated way designed around all the operations involved. This is an area where China may need foreign help.

CORNELL WORKSHOP

on

AGRICULTURAL AND RURAL DEVELOPMENT  
IN THE PEOPLE'S REPUBLIC OF CHINA

Session V - Agricultural Trade

Rapporteur - Eric Crawford, Graduate Student, Cornell

Chairman - Kenneth L. Robinson, Professor, Agricultural Economics, Cornell

Panel - Frederic Surls, CPCPA-FDCD-ESCS, USDA, Washington  
Robert Dernberger, Professor, Economics, University of Michigan  
Daniel Sisler, Professor, Agricultural Economics, Cornell

Frederic Surls opened the discussion with a review of recent developments relating to trade in agricultural commodities. He did not attempt to cover non-agricultural trade, nor imports of agricultural inputs, but did point out that such imports had been rising in recent years. The principal points covered in the review of agricultural trade were as follows:

1. China has remained a net exporter of agricultural commodities (in value terms) despite a rising volume of grain imports. The current estimate of the net value of agricultural exports over imports is around \$0.5 billion.

2. Grain accounts for over 50 percent of agricultural imports. Total grain imports over the period from 1972 to 1978 ranged from a low of around 2 million metric tons in 1976 to a high of over 9 million tons in 1978. Canada, Australia and Argentina have been the principal suppliers. The U.S. has been mainly a residual supplier, providing significant quantities of grain for China only in 1973/74 and again in 1978/79.

3. Grain imports have risen recently. In the first half of 1979 they were running at the annual rate of 14 million tons; they are expected to decline during the last half to an annual rate of around 12 million tons. The volume

of grain imports is likely to average somewhere between 11 and 13 million tons annually over the next 2 or 3 years (through 1981) of which the U.S. might supply as much as 5 to 6 million tons. China has long-term agreements with Canada, Australia and Argentina to supply 6 to 7 million tons per year.

4. In addition to grain, China has consistently imported cotton, sugar, and rubber. More recently, they have imported significant quantities of soybeans and soybean oil. Imports of vegetable oil now amount to around 100,000 tons per year, enough to provide a 2 kilogram ration for 40 to 50 million people.

After reviewing recent trends in the commodity trade of China, Mr. Surls turned to the question of why the volume of agricultural imports has risen so dramatically in the past two years. He attributed the change to the combined effects of: lagging production; a change in policy which reduced compulsory deliveries and hence the amount of grain available for distribution in urban areas; rising demand, especially in urban areas due to wage increases; a commitment to expand livestock production; relaxation of attitudes towards self-sufficiency; and an improved foreign exchange position. Surls pointed out that per capita agricultural production over the period 1975-77 averaged about 4 per cent below the level achieved in 1974. Stocks of grain have declined, and supplies have become tight, especially in the coastal region which contains about 20 per cent of the population or around 200 million people. Pig and poultry production units have been established to supply urban areas. This has led to an increase in demand for corn. Additional incentives offered in an attempt to increase cotton production have in some instances led to a reduction in the area planted to cereal crops.

Mr. Surls was reluctant to make specific predictions because of uncertainties regarding future policy developments, internal production, and foreign exchange earnings. Projected imports of both agricultural and industrial products,

he pointed out, have already been scaled down from earlier estimates. He thought it unlikely that the development of livestock feeding enterprises would lead to a large expansion of grain imports. Overall, he anticipated there would be only a modest increase in the volume of cotton and grain purchased from abroad. Chinese planners are placing major emphasis on increasing domestic production and hope to increase the volume of agricultural exports, holding agricultural imports at about the current level.

The second panelist, Professor Dernberger, began by calling attention to the difficulties of inferring very much about China's production and internal policy decisions from observed changes in foreign trade. Trade statistics must be pieced together from data supplied by China's trading partners since the government has not in the past published such information. Trade in agricultural commodities obviously is affected by production, but also by marketing decisions, changes in stocks (which are widely dispersed), and by internal policies. Because of these other factors, it is difficult to work out a precise or consistent relationship between changes in production and imports. Policy decisions are not discussed in the press and hence one can only speculate about the reasons for year to year changes in the volume of imports.

The current level of agricultural imports appears to be the result of adverse weather in the past few years and reflects humanitarian objectives as well. Shortfalls in production have been augmented by imports to avoid serious food shortages.

The third panelist, Professor Sisler, suggested that increased instability in agricultural production within China could lead to large year to year changes in grain imports. He drew an analogy between China and the Soviet Union. Expansion in agricultural production in the 1950's and 1960's in the Soviet Union occurred in areas subject to greater weather risks.

A similar situation could develop in China if they push production in northern areas which are drier and have a less reliable growing season.

Professor Sisler also pointed out that the decision to establish large-scale specialized livestock production units could make the Chinese more dependent on imports of grain. Such facilities would be extremely vulnerable to shortfalls in domestic production or bottlenecks in transportation. If they are to operate at or near capacity, additional imports may be required to meet deficiencies in internal supplies. Larger imports of soybean meal may be required as well in order to meet the protein needs of livestock.

In the general discussion which followed a question was raised as to why the Chinese had decided to establish large-scale pig and poultry production units since this could make China more dependent on grain imports and vulnerable to shortfalls in production. No one offered a direct answer to this question although one of the panelists did point out that there was as yet no evidence of any dramatic increase in imports of grain for this purpose. Later, Mr. Surls expressed the view that he would be pleasantly surprised if the expansion of livestock production lead to a large increase in U.S. exports. This view was not shared by other participants, one of whom commented on the report of a recent visitor in China who thought that the Chinese had underestimated the potential risks involved in expanding livestock production.

Other participants commented on linkages between grain production targets and plans for expanded livestock production. Reports of recent visitors indicate that the expansion in livestock output is designed mainly to provide additional protein to the 200 million urban inhabitants. Increased beef production in sparsely-populated areas is a long-run objective but Chinese planners apparently are not seeking a major expansion in livestock numbers in rural areas at this time. Whether or not grain imports increase obviously will depend on their success



or failure in achieving the targets established for domestic grain production. The announced target is 400 million tons of grain by 1985 which implies a growth rate of around 4 per cent per annum. This is to be achieved through a combination of increasing the cultivated area by 13 million hectares, adding to the area now irrigated, more multiple cropping, improved incentives, and mechanization.

A question also was raised about the potential effect of increased grain sales to China on world grain prices. Respondents answered by pointing out that the short-run price effects this year had been substantial, partly because they provided a psychological lift at a time when grain prices were depressed. Others pointed out that the longer-run effects are likely to be more modest since Chinese purchases probably will add no more than about 5 per cent to the existing total volume of world grain trade (about 170 million tons). If one assumes a short-run price elasticity of demand of 0.5, this could result in a 10 per cent increase in grain prices. Others pointed out that the long-run supply elasticity needs to be considered as well. It may be quite high in potential exporting nations. If Chinese import requirements are reasonably predictable and regular, production can be readily increased in the U.S. to accommodate this additional demand simply by diverting or setting aside smaller acreages. More serious problems will arise if import requirements prove to be unstable. One of the participants reinforced the point made earlier by Professor Sisler, namely that part of the planned increase in production is programmed to come from northern areas where average grain yields are relatively low and more variable.

The issue of financing imports of grain was brought up by several of the participants. One suggested that the capacity to pay for imports might be limited by trade restrictions placed on imports of textiles and other labor-intensive goods by high-income countries. It was reported that a recent

proposed agreement that would have permitted larger imports into the European Community had been vetoed by one of the EC members. Another participant pointed out that if the Chinese are able to increase oil production, this would provide a means of paying for imports.

Participants pointed out that, in the past, China has paid for wheat imports in part by selling rice which normally brings a higher price in world markets than wheat. One participant suggested that rice exports tend to be responsive to the relationship between the price of rice and the price of wheat, but a member of the panel countered by stating that in the work he had done, the rice/wheat price ratio was not a good predictor of year to year changes in rice exports. He thought that stocks of rice were an important factor underlying the decision to sell rice. The total amount which is typically sold (about 1 million tons) is small in relation to Chinese production, and consequently export sales have had only a small impact on the availability of food within China.

In response to a question from one of the participants, a member of the panel pointed out that China is continuing to export soybeans to Japan although they are now a net importer of soybeans and soybean products. Apparently they want to maintain their specialized market in Japan.

Another question raised by participants to which panel members were asked to respond was whether or not port handling facilities and internal transportation bottlenecks would limit the capacity of the Chinese to import more grain. The consensus of those who responded was that China did have sufficient port capacity to handle the 11 to 13 million tons of grain now projected as the most likely volume of imports, but that problems might arise if import requirements rose significantly above this level.

One of the participants suggested that it might be cheaper to import grain rather than to transport it from rural areas due to the high cost of inland

transportation. It was generally recognized that the movement of grain entails an opportunity cost, assuming transport facilities are fully utilized, but one of the participants stated that he did not think that their decision to import grain was based on cost-benefit calculations.

The session concluded with a discussion of several issues that had emerged from previous sessions, precipitated in part by comments made by Professor Dernberger. He pointed to the conflicting views that had been presented regarding China's performance in the recent past and prospects for achieving the goals that had been established for agricultural production in the next few years. The distinction between what is feasible or technically possible and what was likely to happen was not always made clear. He suggested a middle ground as a reasonable starting point for projections of future performance.

Among the recurring issues discussed was the question of the distribution of income and of food. There was general agreement that growth in agricultural production and in incomes had been uneven. In some areas such as Szechuan and the Northwestern region there has been an actual decline in per capita food production in recent years. The degree to which regional shortfalls in production have been made up by interregional transfers of food is not known. The general assumption is that relatively little food moves between interior provinces. The procurement policy combined with imports has made it possible to maintain adequate supplies in urban areas. Inefficiency in marketing and the shortage of storage and handling facilities including the lack of refrigeration for perishable products probably have led to substantial losses of food in some instances. Such losses have been the subject of articles in the People's Daily.

A question was raised as to whether current policies designed to encourage growth in agricultural output will lead to increasing inequality. Average family or per capita incomes probably vary more within provinces than between provinces.

Incomes tend to be evened out within communes, but may differ substantially between one commune and another because of differences in the quality of land resources and the man/land ratio. Previous policies, although egalitarian in principle, did not produce uniformly even growth among regions or communes. In the 1950's, the ratio of the highest to lowest income was estimated to be 5:1. The present leadership, at least in their public statements, appears to be less equity oriented than was Chairman Mao. If income differences widen as a result of the pursuit of policies emphasizing growth rather than equity, it was pointed out that this could lead to serious political problems for those now in command.

CORNELL WORKSHOP  
on  
AGRICULTURAL AND RURAL DEVELOPMENT  
IN THE PEOPLE'S REPUBLIC OF CHINA

Session VI - Technical Cooperation

Rapporteur - Claude Freeman, Graduate Student, Cornell

Chairman - Joseph F. Metz, Jr., Director, International Agriculture, Cornell

Panel - Quentin West, Secretary, Technical Cooperative, ERS, USDA  
Halsey Beemer, Professional Associate, Committee on Scholarly  
Communication with the People's Republic of China, NAS  
Philip Thomforde, FAO, Rome, Italy

Jaw Kai Wong, NASULGC, International Programs and Studies Office

The panel on Technical Cooperation with the People's Republic of China included representatives from the following national and international agencies which have ongoing exchange programs: 1) the Food and Agricultural Organizations of the United Nations, 2) the Office of International Cooperation and Development of the United States Department of Agriculture, 3) the Committee on Scholarly Communication with the People's Republic of China, and 4) the International Science and Education Council. Besides describing the activities of these agencies, the discussion also raised certain questions and issues pertaining to policy in this area. It is desirable to outline these issues because they will serve as parameters for policy responses at both the governmental and university levels of technical cooperation.

With regard to government to government cooperation it was brought out that it will be necessary for policy makers to develop some ideas as to what the Chinese actually want in terms of cooperation and based on this construct long-term policy. This appraisal will involve an understanding of the Chinese priorities and to gauge agriculture's place relative to other areas of scientific and technical exchange. A long-range American policy should also have a

relatively clear understanding of how much the Chinese will be willing or able to pay for costs of exchange programs and which institutions within China are likely to play dominant roles in determining those areas of science and technology that will be emphasized.

On the U.S. side of these exchanges, an important policy issue will be deciding what the U.S. or any other cooperator for that matter expects to gain from these interchanges, that is, whether cooperation is to be based primarily on political motives or whether it will also have strong commercial or humanitarian motivations. Related directly to this issue is the question of the extent to which the People's Republic of China's ability to pay will become a constraint on their participation. If the Chinese are not able to afford as much of this exchange as they had originally hoped, it will be necessary for policy makers to decide how much this will set limitations on the potential for cooperation that exists. A variant expression of this dilemma is the question of the extent to which the envisioned exchanges will be mutually beneficial and, subsequently, if strict reciprocity is demanded how will it be monitored.

A final issue at the governmental level is one concerning participating U.S. agencies. It will be necessary, having determined which institutions will be instrumental in a program of technical cooperation, to define the institutions' roles in terms of subject area responsibilities and the amount of cost they will bear.

Other important questions grew out of the discussion of the Universities' role in Technical Cooperation with the People's Republic of China. One of the most important questions concerned the Universities' involvement in developing study and research opportunities as well as the extent to which they will be responsible for financing visiting Chinese students or researchers. Viewed another way, this question relates to the degree of involvement U.S. government

agencies are likely to have in the funding of Chinese exchange personnel.

Other important problems were determining the general objectives of Chinese universities in sending their students and staff and the ambiguity as to Chinese participants' roles at American universities. The latter problem represents a dilemma in that it is hard to determine the capacity in which Chinese "visiting scholars" will participate at American universities and comes from a lack of clear equivalence of expertise between the two national education systems. A final concern discussed was that related to the degree of openness or access American scholars are likely to find in China. While all these issues might not pertain to any one of the agencies active in technical cooperation with the People's Republic of China, their importance becomes apparent as it is seen how they impact policy decision among the represented cooperators.

One of the earliest agencies to take advantage of the recent opening of China is the FAO. Since the People's Republic of China's return to the United Nations in 1973, there has developed a relatively extensive and growing program of exchange. This is due in some part to the eagerness of the Chinese who have been quite active in FAO matters. The Vice Chairman of the FAO Council is Chinese. While there were certain difficulties in the first few years arising from the fact the five million yuan allotted for technical cooperation by the Chinese could only be spent in China, better circumstances have developed recently such that the UNDP has been allotted 15 million dollars to be spent in China over the next two and a half years. The following list of areas of interest gives some idea as to Chinese priorities in technical cooperation.

Of seven major areas of interest only one was directly related to agriculture and was concerned with grassland development as it might increase livestock production. The other six areas include information processing systems,

educational methodologies (in particular audio-visual technique), foreign language studies, meteorological techniques, interpretation of satellite data transmission via telecommunication media. While agriculture does not have a prominent place on this list, it does figure importantly on the reserve list which consists of three agriculturally related areas of study: forestry, aquaculture, and land reclamation techniques suitable for rice production.

Some idea as to what FAO member governments have felt to be priorities in their analysis of Chinese agriculture may be derived from the FAO program in China which began as early as 1972. This part of the FAO program consists of three major types of approach: 1) technical missions, 2) study tours, workshops and training programs, and 3) fellowships to China.

FAO technical missions to China, which started in 1972, have been FAO-financed and staffed and have conducted studies in such diverse areas as the water buffaloes in China, freshwater fisheries and aquaculture, forestry, grain post-harvest technology, and the Chinese peoples' communes.

Study tours, workshops and training activities in China have been largely UNDP-financed and FAO-led and have included, as regards the study tours and workshops, participants from up to 14 FAO member countries in a given tour as well as two to three FAO technical personnel. Since 1977, a number of such tours have been conducted, at times emphasizing regional interests while others were oriented to common interregional problems. Among the topics explored were: organic recycling in agriculture, forestry support in agriculture soil and water conservation and management, freshwater fisheries and aquaculture, azolla and biogas, irrigation, drainage and water use, integrated wood processing industries, processing technology to serve agriculture, agricultural and rural training, multiple cropping and related crop production technology, sericulture



development, mass mobilization of rural communities for reforestation, forestry support for agriculture (French-speaking), and post-harvest grain technology (storage and design). The 1980 program will include 12 study tours, workshops and training courses financed by UNDP.

Single country delegations have thus far been dominated by groups from Nepal. These were organized by FAO and financed by UNDP or trust funds and had as their object of study the following areas: hill irrigation, soil and water conservation, multiple-use mountain forestry development, rural development (Philippines) and agriculture (Ethiopia).

The FAO fellowships program for training in China, which has been financed primarily by UNDP and organized by FAO, has been confined until 1979 to freshwater fisheries. Since its inception in 1975, it has provided training for more than 100 fisheries technicians from more than a dozen countries in Asia, although more recently it has been dominated by fellows from Sri Lanka and Bangladesh. In 1979, FAO will also conduct courses in China on strengthening remote sensing applications for soil survey and forestry.

Under the FAO Regular Program, a series of lecture tours will be held in China on animal husbandry and veterinary surgery and, additionally, on olive cultivation. Discussions are underway for major UNDP/FAO assistance for the development of new permanent training centers in China in freshwater fisheries and in sericulture for training technicians, especially from other Asian countries.

Chinese participation in FAO programs may be divided into three types: 1) participation in FAO's governing and other bodies; 2) Chinese technical missions to countries having technologies relevant to their interests, and 3) visits of Chinese experts to FAO Headquarters. In addition to active participation in the FAO Governing Bodies (Council and Conference), China

attends the bi-annual FAO Regional Conferences held in Asia. Also, China sends representatives to a number of FAO technical seminars and meetings. For instance, it has participated in the last two sessions of the World Forestry Congress organized by FAO, and plans to participate in the World Conference on Agrarian Reform and Rural Development in July 1979. It participated in a Seminar on Fertilizers and Organic Materials and also in a Seminar on Reproduction and Artificial Insemination of Buffaloes, both held in India in 1978. Additionally, China has prepared a number of technical papers for UN specialized agency meetings, including FAO.

In 1978, Chinese technical missions organized and financed by FAO were in olive production and processing (a group of six Chinese visited Italy, France and Spain) and seed processing (a group of eight visited Italy and France). In 1979, study tours were in the following areas: introduction of drying equipment for cereals; introduction of modern seed production technology; seed processing technology for maize, rice and wheat; and the introduction of industrialized fish rearing equipment.

FAO also provided considerable equipment and supplies to China on the basis of the recommendations of the Chinese missions and study tours.

As for visits by Chinese experts to FAO Headquarters, in 1978 five senior Chinese soil scientists spent a week with FAO senior technical staff and in this period also visited centers in Italy. In 1979, four Chinese specialists held discussions on food policy and nutrition.

A Chinese fisheries specialist is under recruitment for FAO's Headquarters staff and a Chinese plant protection specialist is shortly to join the FAO Regional Office staff in Bangkok--both to be permanent staff members. Already both WHO and UNIDO have on their permanent staff specialists from China.

Additionally, FAO has twenty Chinese as translators, revisers and typists in its Rome Headquarters staff.

Numerous FAO technical books, reports, studies and documents have been translated into Chinese and are being given circulation in China. FAO also produces training materials for use in China in the subject matter of the seminars, workshops and lecture tours organized by FAO. Reports on FAO technical missions and study tours are issued in the language of the activity and in some instances also in other official languages of the Organization, Several are being put into Thai and Arabic.

FAO maintains an extensive collection of reports from groups which recently visited China, as well as studies, seminar reports, documents, bibliographies, etc. A limited number of copies of a listing is available on request.

The U.S.-People's Republic of China program of technical cooperation in the field of agriculture involves the participation of two major U.S. organizations: 1) the Committee on Scholarly Communication with the People's Republic of China (CSCPRC) and 2) International Science and Education Council (ISEC). The CSCPRC includes representatives from the National Academy of Sciences (NAS), the Social Science Research Council (SSRC), and the American Council of Learned Societies (ACLC). ISEC includes representatives from the U.S. Department of Agriculture and the U.S. Land Grant Universities.

The CSCPRC is responsible for coordinating educational exchange with the People's Republic of China and is expected to take up those aspects of technical cooperation which are primarily theoretical in nature. In analyzing its past involvement some ideas may be drawn with regard to Chinese priorities in scientific exchange, in particular the priority of agricultural topics relative to other areas of exchange. It is also possible to obtain some notions as to those topics within agriculture which apparently are of most interest to Chinese academicians.

The history of the CSCPRC's involvement with China may be divided into two periods: that preceding normalization of relations and that which has developed since formal recognition. The early period which began shortly after the Shanghai Communique of 1972 was characterized by exchange of scientific delegations. Since 1973 the U.S. has received seven Chinese delegations concerned with agriculture, while the CSCPRC has sent five agriculturally oriented delegations to China. The five U.S. delegations to China explored the following topics: insect control, plant studies, wheat studies, rural small scale industry, and vegetable farming systems. The Chinese delegations covered the following areas: insect hormones, basic agricultural sciences, plant photosynthesis, agricultural mechanization, citrus production, the animal feed industry, and the fertilizer development centers. Also this year the Chinese are sending a delegation to study remote sensing.

As opposed to this past tendency to affect technical cooperation through exchange of delegations, the post normalization program of the CSCPRC is expected to be implemented through individuals. On the U.S. side a total of sixty Americans, half of whom are to be students and the other half researchers, are expected to go to China. The Chinese contingent in the U.S. is expected to number somewhere between 500-700 by September 1979, Out of the projected 500

or more Chinese only 12 will be involved in agriculture. In keeping with this order of priority, out of a 20-item list agriculture was 20th. However, this apparently low priority of agriculture may be a result less from a general policy than from the fact that the Ministry of Education and the Academy of Science developed proposals for exchanges earlier than the Ministry of Agriculture. It is expected that agriculture will receive more attention in the second or third rounds.

The disproportionate numbers in the CSCPRC exchange bring out the question of whether the cooperation is to be truly reciprocal. In this context it was noted that the symmetrical numbers of exchange personnel that occurred in the program of cooperation with the USSR did not lead to satisfactory results, rather the entire process based on formal reciprocity tended to lead to sterile dead ends. Instead of equal numbers of individuals being the measure of how much the U.S. is to benefit, it was felt that the "balancing factor" will be the trade-off in access to new information such as the Archives recently made available to an American researcher involved in political analysis. Recent experience in this connection has allowed some optimism. American scholars have found exceptional access even in areas which could be considered to be sensitive, such as the May 4th movement. One area which will be important in determining the degree of openness scholars are likely to have in a particular period will be that of the evolving role of the "companion" that is assigned to accompany American researchers during their stay in China.

The second component of the U.S. cooperation with the People's Republic of China is that administered by ISEC. ISEC is made up jointly of members from both the USDA and universities within the land-grant system that have international specialization. This committee has been chosen to implement technical cooperation as the January 31, 1978 negotiations did not provide

for direct government relations. The subjects to be taken up by ISEC are expected to differ from those which are the responsibility of CSCPRC in that they are to be applied rather than basic.

ISEC's involvement with the People's Republic of China is being planned and implemented through two committees: one responsible for training and another responsible for scientific and technological exchange. These committees rather than dealing with the Chinese Ministry of Agriculture will work directly with Chinese agricultural universities. The committee on training will apparently be primarily involved with upgrading Chinese university staff who are still recovering from the disruptive effects on higher education caused by the "cultural revolution." Efforts will also be made to train technical people at U.S. universities.

The committee on science and technology will handle exchanges in science and technology and also will be involved in the exchange of economic information. The inclusion of exchange of economic information is typical of U.S. strategy as it has evolved with regard to centrally planned economies. Similar exchanges exist with the U.S.S.R. and three eastern European countries. There are at present three specific areas of cooperation planned for 1979: 1) germ plasm resources, 2) animal health and production, and 3) biological pest control. Agreements for exchanges in the areas of soil science and forestry have also been made. The American teams in all of these exchanges will be co-led by individuals from both the USDA and land-grant universities. The Chinese have made other proposals, among the most important have been: 1) a suggestion that 12 Chinese deans visit the U.S. and develop familiarity with the U.S. educational process, and 2) that another team come to study technical equipment as utilized in scientific agriculture.

Among the important issues that have arisen as a result of the normal-

ization negotiations has been the question of who will pay for the envisioned exchanges. With regard to the program of cooperation as implemented through ISEC, costs have been based on strict reciprocity. It has been agreed that the receiving side will pay the costs in the host country of both travel and living expenses, while transportation to the country being visited will be covered by the visiting country. Another issue that has developed concerns the capacity in which visiting Chinese will come to U.S. universities. This has become a dilemma of interpretation as to academic status of a "visiting scholar." While in this connection the Chinese might think an assistant professor deserves financial support, funding generally will depend on the policy of the particular university involved. Some universities will be more willing than others to provide support such as fellowships. In regard to this problem the USDA will not be involved directly as it is expected that Chinese universities and interested staff will find their own support.

The USDA role will be to update Chinese knowledge regarding strengths within the U.S. university system so that Chinese scientists may contact U.S. universities directly according to the interest of the scientists and their institutions.

Program Announcement  
of  
Cornell University Workshop  
on  
Agricultural and Rural Development  
in the People's Republic of China

Purpose

The workshop is designed to bring together knowledgeable people from among the Cornell faculty, other universities, and public and private organizations to have an informed discussion on current developments in China with particular reference to Chinese agricultural and rural development. While the major portion of each session will be devoted to discussions among the panelists, the workshop sessions will be open to members of the Cornell community. In recognition of the fact that Cornell will likely have increasing numbers of Chinese on campus as students and visiting scholars, the sponsors encourage those who have an interest in agricultural and rural development in China to attend.

Workshop Organization

The workshop will be conducted informally to allow for a free exchange of views. In each session, one speaker will delineate the topic in about 15 minutes. This will be followed by comments from other members of the panel and workshop participants. At the conclusion of each session, a portion of time will be reserved for questions and comments from the audience.

Several of the workshop participants have submitted papers. It is anticipated that these will be edited for publication shortly following the workshop.



Thursday, May 17, 1979 Bache Auditorium

7:30 P.M. Public Lecture

Chairman: David L. Call, Cornell  
Welcome: W. Keith Kennedy, Cornell  
Speaker: William Hinton, China scholar  
Topic: Current Changes in Policies  
and Ideology in the People's  
Republic of China

9:00 P.M.\* Registration and Reception  
Collyer Room

Friday, May 18, 1979 Bache Auditorium

8:30 A.M. Economic Strategy - General

Chairman: Milton J. Esmen, Cornell  
Rapporteur: Douglas Gritzinger, Cornell  
Panel: Dwight Perkins, Harvard  
Martin Bernal, Cornell  
Sherman Cochran, Cornell  
Tsu-lin Mei, Cornell  
Stephen Schmeisser,  
Mathtech, Atlanta  
Radha Sinha, Cornell

10:30 A.M. Economic Strategy - Agricultural

Chairman: Erik Thorbecke, Cornell  
Rapporteur: James Coyle, Cornell  
Panel: Robert Dernberger, University  
of Michigan  
Miriam London, China scholar  
Nicholas Lardy, Yale  
Ivan London, Brooklyn  
College  
Bruce Stone, IFPRI  
Peter Timmer, Harvard  
Lee Travers, Ford  
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12:15 P.M.\* Lunch, Big Red Barn

2:00 P.M. Rural Organization

Chairman: E. Walter Coward, Jr., Cornell  
Rapporteur: Steven Jones, Cornell  
Panel: Benedict Stavis, Michigan State  
Milton Barnett, Cornell  
Donald DeGlopper, Cornell  
Lee Lee, Cornell  
Mark Selden, Washington  
University  
Christine Pui-wah Wong,  
Mt. Holyoke

Friday, May 18, 1979 (Continued)

3:45 P.M. Science and Technology

Chairman: Walter Galenson, Cornell  
Rapporteur: Richard Cobb, Cornell  
Panel: Thomas Wiens, Mathtech,  
Washington  
Randolph Barker, Cornell  
Haldore Hanson, CIMMI  
Henry Munger, Cornell  
Richard Suttmeier, Hamilton  
College

6:30 P.M.\* Social Hour, West Lounge,  
Statler

7:30 P.M.\* Dinner, West Lounge, Statler

Saturday, May 19, 1979 253 Malott Hall

8:30 A.M. Agricultural Trade

Chairman: Kenneth L. Robinson, Cornell  
Rapporteur: Eric Crawford, Cornell  
Panel: Frederick Surls, USDA  
Robert Dernberger, University  
of Michigan  
Daniel Sisler, Cornell

10:30 A.M. Technical Cooperation

Chairman: Joseph F. Metz, Jr., Cornell  
Rapporteur: Claude Freeman, Cornell  
Panel: Quentin West, USDA  
Halsey Beemer, NAS  
Philip Thomforde, FAO  
Jaw Kai Wang, NASULGC

12:15 P.M.\* Lunch, West Lounge, Statler

\* By invitation

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List of Papers Received\*

Lardy, Nicholas R.

The Prospects for Chinese Agricultural Growth

London, Miriam and Ivan D. London

Hunger in China: The Failure of a System?

Reiitsu, Kojima and Mark Selden

The Great Leap Forward and the Chinese Road to Socialist Development

Timmer, C. Peter and Walter P. Falcon

Solving China's Food Problem

Wang, Jaw-Kai

Agricultural Engineering in China, A Status Report

Wiens, Thomas B.

Agriculture in the Four Modernizations

\* Copies of these papers may be obtained from the authors directly.

