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TURNING POINT IN CHINA'S AGRICULTURAL POLICY

by

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Turning Point in China's Agricultural Policy

Benedict Stavis*

An important debate is now taking place about rural development in China. One viewpoint is that China has been basically successful in feeding its people and in developing its countryside because vigorous input supply and egalitarian institutions have permitted growth with equity. (Stavis, 1975, 1979) A second perspective is that China's rural development has been a failure. "The fact is that all three conditions - - hunger, malnutrition, and famine - - have prevailed in China throughout this decade and were aggravated by Maoist economic policies and the disruption of the continuing Cultural Revolution." (London, 1979:13) "Their current system of agricultural organization has proved unable to push up output at anything approaching the rates they had at first hoped for: since the early 1950's in fact, the rate of foodgrain growth in China has been the lowest of any region in the poor world. Growth in output has been so low that there is a very real possibility it may run second in the race against population." (Eberstadt, 1979:40)

This paper argues that China's rural policies have basically been successful. There are, however, important caveats. First, some regions of China, such as the upper reaches of the Yellow River, remain very poor and subject to ecological deterioration. Isolated hilly areas in the

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southwest may be similar. The North China Plain, although improving, is still poor. Second, the factional struggles associated with the secession crisis (not with Maoist policies) caused substantial disruption, although the precise extent is impossible to gauge. Third, arbitrary, inappropriate bureaucratic behavior (contrary to Mao's ideas, not reflecting them) caused serious problems in some regions, including Szechwan.

Whatever the past, as China's industrial sector continues to expand, as basic infrastructure improves, and as agriculture becomes mechanized, new policies are sensible which will require substantial changes in rural institutions. Far greater economic specialization of production units - - on an enterprise and regional basis - - will be possible and economically necessary, and this will require far greater commercial interaction and integration. This in turn, will impose new demands on the state, which plans and manages these interactions. New patterns of relations between state and society will be necessary.

A. Policy Drift

When Hua Kuo-feng took power after the death of Mao Tse-tung in September, 1976, his political platform had two distinctive planks: 1) An end to arbitrary, vindictive abuses of personal freedom. (This is not the same thing as establishment of Western-style democracy.) 2) A rapid modernization of four aspects of China's economy - - industry, agriculture, national defense, and science and technology, so that in the long run the country would be stronger and living standards would be improved. These two platforms are tied together in the notion of codification of laws, to provide more security in personal rights and to assure more predictability and simplified conflict resolution in economic relationships. Since this paper will look only at the agricultural issues, it must be

borne in mind that it presents only one dimension of China's political economy at this time.

During the several years of struggle between what is now known as the "Gang of Four" and the Party establishment, rural policy languished and was overshadowed by the succession struggle. When the anti-Confucius campaign, created by some to attack Chou En-lai, reached the countryside in 1974, it was deflected into attacks on conservative superstitions and male dominance - - useful but hardly constituting a comprehensive rural policy.

Implicit in the campaigns to restrict bourgeous rights and to consolidate the dictatorship of the proletariat of 1975-76 were the ideas of merging production teams into brigade accounting units in a "transit to communism regardless of poverty" (Xu, 1979:22), of limiting the private sector, and of socializing, at as high a level as possible, the profitable sideline activities. Where these approaches were implemented, they seem to have disrupted incentives, caused demoralization, precipitated a slaughter of pigs and a felling of trees, and caused a serious drop in production. (Xu, 1979:22)

It is not clear that these approaches were seriously advocated on a nationwide basis, or that they were adopted in more than a few areas either as centrally directed local tests of policy or as a result of local officials believing this is what (at least one faction of) the center wanted. Indeed, all the official policy documents of these years, including the Central Committee Directive on Distribution of December, 1971 and the country's constitution of 1975 (presented by Chang Chun-chiao) essentially reaffirmed the rural policies formulated in the 1962 Sixty Pounts. (Central Committee, 1962) However, as any constitutional lawyer

knows, the basic laws of a country are no sure guides to the behavior and attitudes of local officials, courtrooms, and police.

Even though the Tachai County campaign was ostensibly about rural policy, in fact these conferences in October, 1975 and December, 1976 never developed a clear rural policy. (In this view I depart from Dernberger, 1978.) The Tachai policy of 1975-76 stressed "revolutionization" of country cadres and provided a justification, if not a launch point, for a purge of rural cadres. The Tachai conferences seem explicable not as agricultural strategy but as a political device for the Party establishment, headed by Hua Kuo-feng, to claim Mao's rural legacy symbolized in Tachai and Ch'en Yung-kuei. (Friedman, 1978) This would assure that Ch'en Yung-kuei would not side with the "Gang of Four," and more broadly would assure that China's peasantry would trust that the new government, with its policies of development of modern industry, would not necessarily mean neglect of - - or worse, exploitation of - - the rural sector.

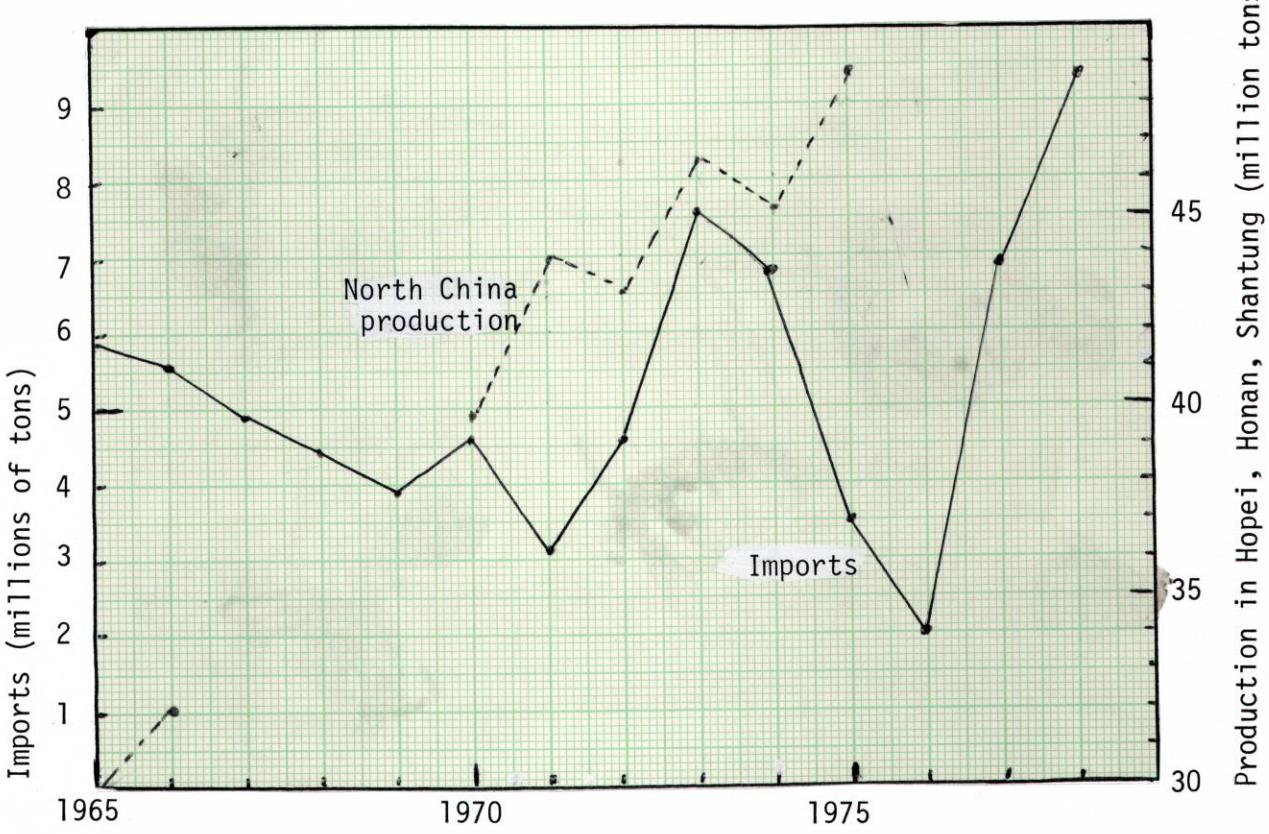
The Tachai conferences spoke of basically completing agricultural mechanization by 1980, and suggested that this was a new departure. It was not. Periodically, at times of intense political conflict (as in 1959 and 1966) Mao promised rapid farm mechanization, as though it could leap ahead of China's overall industrial system which could provide steel for tractors and pumps, petroleum, rural electrification, and transportation infrastructures needed to put all the parts together at the right time and place. In fact, a fairly vigorous farm mechanization program has been under way since the late 1960's, and it does not appear to have been substantially speeded up or slowed down since the Tachai conferences. (Stavis, 1978b:227-36)

B. Short Term Problems: Procurement and Production

What were the results of this period of conflict and uncertainty surrounding the succession crisis? One casulty was information. The politicization of the information system made it impossible to know clearly what was happening in a systematic manner. Each political faction could locate and publicize some village which could serve as a model to demonstrate the appropriateness (or dangers) of any particular policy. The lessons were quickly drawn, but the empirical details of the village's experiences might be overlooked, and the representativeness of a village's experiences would not be surveyed. As a result, the top leadership in China is probably as ignorant as outsiders about the details of China's rural development in the last few years. Hopefully, they are aware of this ignorance.

One obvious indisputable consequence of rural policy during this period was that the government was unable to procure domestically enough grain to meet urban needs. Grain imports rose sharply after 1976, (Figure 1) and necessary improvements have made in port facilities to accommodate this increase. (CIA, 1979a:7)

Figure 1
Grain Imports and Production in North China, 1965-78
(million tons)



Sources:

Imports: CIA, 1979a:1.

North China production: Walker, 1977:558.

Exactly why this happened will remain unclear as long as detailed data about this period are unavailable. I believe the main cause was domestic procurement problems associated with the succession crisis. Imports of wheat are related to several factors. A careful statistical analysis shows wheat and coarse grain imports are related to the two previous years' production of these crops and the previous year's trade balance (which in turn is influenced by, among other things, the prices of the wheat imports and rice exports). Rice exports are related to per

capita rice production and foreign exchange requirements. (Surls, 1978: 663-666) Imports of wheat are loosely related to production and procurement of grain in the North China Plain, surrounding the major urban centers of Peking and Tientsin, where much of the grain is consumed. (See Figure 1)

In the historically grain deficient North China Plain, with its scant and highly variable rainfall, grain production has grown dynamically since the mid 1960's. The grain production of Hopei, Honan, and Shantung (with a combined population estimated by Walker at 182 million in 1975 - - other estimates are as high as 218 million) grew from 1966 (after recovery from the Great Leap) until 1975 at 4.8 percent annually, despite the serious drought of 1972. (Walker, 1977:558, 568) (For higher population estimates, see CIA, 1978a:7.) Drought again in 1976-77 (Groen, 1978:621; CIA, 1977:1) probably brought reduced yields and some local food shortages. The large expansion of tube well irrigation in the early 1970's in this region and the general improvements in water control (Stavis, 1979:26-33) permitted growth in grain production through higher yields and more multiple cropping. In years of drought these measures saved much of the crop and prevented the types of famine seen in 1878, 1920-21, 1928-30, etc. (Stavis, 1979:5, 41) Agricultural growth also required fertilizer and energy resources, both increasingly available due to the development of petroleum in the region. Indeed, yields and cropping intensity increased so much that these production increases were obtained despite a reduction in cultivated area; agricultural land was diverted to industrial, residential, and water management uses.

Nevertheless, this dynamic growth was from a low per capita level, and population was growing; so by 1975 production was only 269 kg. per

capita in these three provinces, up substantially from the 210 level of 1966 and the 225 level of 1955, but still roughly 10 percent below the national average of around 300. (Walker, 1977:568) (The levels are lower if higher population figures are used.) Procurement must still be difficult, especially after the 1972 and 1976-77 droughts and the central and provincial authorities probably have had very few reserves to meet local grain shortages. Recent reports of sporadic food shortages in these regions and migrations to urban cities (eg. Chengchou, Peking) in search of food are credible, but not indicative of long term systemic failure. (London, 1979:12-13) In this situation, grain imports are the sensible way to obtain commodity grain for cities, which are on the coast or along railroad lines.

In neighboring Anhwei, a similar situation may prevail. Extensive work has been done around the Huai River (Stavis, 1979:28), and this has reduced the impact of flood and drought. During the decade from 1964 through 1975, grain production went up roughly 3.6-3.8 percent, according to Wiens' statistics. Food production per capita is above average, at about 340 kg. per capita, (1975), but floods and droughts still cause sporadic severe crop failures. Seasonal migration to urban areas, often in the form of contract labor, is reported from these regions, particularly in bad years.

After 1975, production problems may have been aggravated by disruptions in the industrial sector. By now, agriculture on the North China Plain, the lower Yangtze, and elsewhere is substantially dependent on chemical fertilizer, on electric and petroleum power for tube wells and other machinery, on tractors, on spare parts, and on timely transportation to deliver imports. In the North, industries and communications were

seriously disturbed by the great Tangshan earthquake of 1976. In addition, they were interrupted by intense factional struggles in various factories and in the railroad system. Indeed, the Hopei railroad system was so disrupted that troops were probably sent to Paoting in 1976 to resume schedules. (Field, 1978b:251) Railroad disruptions obviously could interfere with procurement as well as timely input supply for agricultural production. Serious industrial disturbances were also reported in Hangchow, Chekiang in 1974-76, and troops were brought in to maintain industrial production. This must have influenced agriculture. (Tien, 1977, no. 40:27) In Kiangsi, the tractor plant in Nanchang was virtually paralyzed in 1974 and 1976. (Tien, 1977, no. 41:40) Field believes that drops in industrial growth rates in 1974-76 from previous trends are correlated with political instability during 1974-77. (Field, 1978b:247)

Using Field's data (1978b:248, 265) and other reports, it can be hypothesized that disruptions in production of agricultural inputs and in transportation systems, associated with political strife or the earthquake could have affected agricultural production in Chekiang, Kirin, Liaoning, Szechwan, Anhwei, Kansu, Shanghai, Kiangsi, Fukien, Honan and Hopei. Political factors probably did not harm industry and thereby agriculture in Shantung, Heilungkiang, Kwangtung, Kiangsu, Peking and Hunan. In other provinces, agriculture receives so few industrial inputs that this sort of relationship between political strife, industrial inputs, and agricultural production should not be anticipated. When provincial estimates for grain and/or agricultural production are collected for this period, it will be interesting to see if this hypothesis can be validated.

Agricultural production was also disrupted by a wide range of managerial irrationalities, which will be reviewed in a later section. For

all these reasons it was estimated that total grain production stagnated at around 285 million tons for the three years of 1975, 1976, and 1977. (CIA, 1978:11) Obviously this would increase procurement problems.

Procurement problems were further magnified by a drop in the general political power of the central government. With each faction challenging the legitimacy of the other, the central government's ability to procure grain must have declined. If for no other reason, it would be far easier in such times for localities to underreport production to avoid sales to the state.

Moreover, in the heat of political struggle, whenever a faction was in control of a city or region, it was tempted to distribute food reserves for short term political advantage. (London, 1979:15) By 1977, central reserves were precariously low, and quick imports of grain, sugar and edible oils were necessary for political stability. (Chang, 1978:102-103)

C. Long Term Trends

1. Factor Productivity. In the absence of systematic information, it is difficult to gauge precisely where China's agriculture stood and what policies were needed. A few things are clear. First, total grain production has remained at fairly high levels - - about 300 kg. per capita, 40 percent more than in India - - since the mid 1950's. (Field, 1978:380) The per capita long-term trend has been about static. The trend can be tipped up or down by alternative population estimates. Secondly, after the collapse of 1959-63, from 1964 until 1976, grain production has grown at the substantial rate of roughly 3.4 percent. (Field, 1978:380) Third, increasing grain production as rapidly as population growth has required substantial increases in all inputs - - including labor, chemicals, energy, irrigation, seeds, machinery. Some observers have concluded that inputs have gone up faster than outputs, and that agricultural factor productivity (as distinguished from total production) has declined. (Tang, 1977:67; Rawski, 1978; Eberstadt, 1979:39) The alleged drop in factor productivity is presumed to reflect inefficient rural management, inadequate incentives, and insufficient attention to agricultural science and technology. (Eberstadt, 1979:39)

However, data are inadequate to reach this conclusion firmly for China on a national basis for two reasons. First, the outputs can not be fully counted. Some of the labor is utilized to create infrastructure (roads, dams) and to create farm land (terraces, river beds). Some labor is used to construct residential housing. How are these to be valued, particularly in the absence of a market? Moreover virtually nothing is known about the overall production of subsidiary products, which have a high value and generally (in other countries) increase at rates greater

than grain. Probably they are growing faster in China too (Smil, 1977:56-59), but this is not certain. Most of vegetable, fruit, poultry, swine and some fish production remain in the private sector, and marketing is through farmer's exchange markets. Government marketing agencies do not handle these products and there is no indication that the government has done any systematic surveys to specify production and trends in this sector. Indeed, its existance has sometimes been obscured. Where vegetables are in the public sector, as in the vegetable communes that supply major urban centers, there has been impressive growth. (Skinner, 1978) It is almost certain that total agricultural production has gone up faster than grain production; but how much faster is anyone's guess. The Chinese occasionally refer to the gross value of agricultural output (GVAO), but there is no evidence of comprehensive field surveys which would make these figures anything more than the crudest estimates (other than that portion covering grain, cotton, and oil seeds.) Thus Rawski's (1978) and Nuttal's (1978) conclusions that GVAO has been growing faster than grain production must be treated with caution, even though they are probably true.

A second methodological problem deals with problems of specifying the prices of inputs in China. Should Chinese prices or international prices be used? Moreover what prices should be attached to petroleum, whose price has been very low until recently in the world market, but which has become much more widely available in China? This problem illustrates that the factor productivity of agriculture is defined in the context of arbitrary prices, and is influenced by price changes as well as by agronomic factors.

Despite all these methodological problems, data showing labor productivity in agriculture are developed in Table 1. The data show a slight

increase in gross value of agricultural production per laborer. A conclusion that the net value (not gross value) is declining could be consistent with these data, but seems premature, considering measurement problems.

Table 1

Labor Productivity in Chinese Agriculture

year	Gross Value of Agricultural Production (billion 1957 yuan)	Gross Value of Agricultural Production (billion 1952 yuan)	Agriculture Labor Force[a] (million) Assumption A	Agriculture Labor Force[a] (million) Assumption B	Labor Productivity per worker[a] (1957 yuan) Assumption A	Labor Productivity per worker[a] (1957 yuan) Assumption B
1952		48.4[b]				
1957	53.7[a]	60.4[b]	231 - 260		232 - 207	
1965						
1975	81.9[a]	95.7[b]	310 - 339		264 - 242	
	annual growth rate 1957-75: 2.4%	annual growth rate 1952-75: 3.0%			annual growth rate 1957-75: .7%	.9%

Sources:

a. Rawski, 1978.

b. Nuttal, 1978.

A partial analysis of fertilizer utilization suggests that on a macro basis factor productivity may have been improving. (Table 2) During 1965-71, an extra pound of chemical nutrient was accompanied by a 19.3 pound increase in grain; but from 1971-76, an extra pound of nutrient was associated with a 37.9 pound increase in grain. (The years were selected to be near the trend line in grain production.)

Table 2

Grain Response to Fertilizer in China

grain production[a] (million tons)		grain increment (million tons)	fertilizer consumption[b] (crop nutrient) (million tons)	fertilizer increment (crop nutrient) (million tons)	grain increment per fertilizer
1957	191	3	.43	1.69	1.78
1965	194	52	2.12	2.70	19.3
1971	246	39	4.82	1.03	37.9
1976	285		5.85		

Sources:

a. Field, 1978.

b. Central Intelligence Agency, 1978a.

The rising productivity of fertilizer probably comes from complementary improvements in irrigation (low lift pumps in the coastal and southern plains, tube wells on the North China Plain) which assure that fertilizer is used more efficiently. Moreover, although there are numerous reports of tragic mismanagement of specific agricultural research stations and underutilization of many individual scientists, it does not appear to be accurate to say that the entire agricultural science and plant breeding system totally collapsed after the cultural revolution. (Eberstadt, 1979:39) Continued improvements in rice and wheat varieties were reported, some coming from innovative (and labor intensive) techniques of tissue culture and hybridization, others from improved international exchange. (Stavis, 1978a:638-639; Some..., 1978; Li, 1978) The deficiencies in research have been in the area of subsidiary crops, not basic food grains.

Whether or not total factor productivity has declined on the average, it certainly is true that some production units find production

costs increasing very rapidly. One county near Peking with half a million people has spent ¥70 million for machinery - - ¥140 per capita. The per capita collective distributions have been kept at ¥80-90 per capita. (Huang, 1978) Another brigade invests many mandays of labor annually in farmland capital construction, only to see it washed away each year by floods. (Tung, 1978a) Some localities have spend much on tractors but still lack implements. These large investments have little impact on production, and if population is growing, per capita production can decline. In one case, reported in Heilungkiang, a unit of fertilizer increases corn production four units; but one unit of fertilizer costs as much as 3-3½ units of corn. When the extra labor requirements of using fertilizer are added, the returns of this investment are nil. (T'ung, 1978b)

It is interesting to do the same, partial macro analysis of factor productivity for Indian agriculture. Eberstadt (p. 39) claims to do

Table 3

Grain Response to Fertilizer in India

grain production (million tons)		grain increment (million tons)	Nitrogen consumption (million tons)		Nitrogen increment (million tons)	grain increment per fertilizer increment
1961-62	82.7	6.7	.21		.31	21.6
1964-65	89.4	16.6	.52		1.15	14.4
1970-71	108.4		1.49			
Av:	106		Av:	1.67		
1973-74	103.6		1.84			

Source:

Mellor, 1976b:54.

this using Mellor's (1976a) data but gives no hint of his methodology.

However, Mellor's charts appear to be based on the assumption of constant factor productivity (1976b:311) because he is exploring other issues. Contrary to Eberstadt's claim, Table 3 suggests that India's agriculture may be utilizing fertilizer with declining factor productivity, while China's is increasing. Moreover it is possible that a pound of fertilizer gives more increment in grain production in China than it does in India. (To make this comparison, the Chinese grain figures should be cut by about 20 percent, to account for the differences in definition of grain.)

In addition, productivity of the labor input in Indian agriculture, which has been the most important factor for increased production (Mellor, 1976a:161), has been dropping on the average, although a few states show contrary trends. (Ballah, 1977:1904) (It is not clear if this is gross or net productivity.) Undoubtedly, problems in measurement make this report for India as problematical as are the comparable figures for China.

It would be reckless to draw any firm conclusions about factor productivity in China, in India, or in comparison with each other on the basis of these crude computations. The measurement and definitional problems are vast, as are the problems introduced by changes in weather and regional variability. Riccardo long ago pointed out the problems of declining returns to agriculture when the area of land can not be expanded. Technological changes can alleviate this problem but not eliminate it. In the long run both China's and India's agricultural development will require costly investments for water control, chemicals, machinery, transportation infrastructure and research. Shifting more land to high value crops and animal husbandry, as has been done in Taiwan, is necessary to pay the costs of agricultural development. A growing interaction with industry (domestic and/or foreign) is needed to provide the inputs and to provide a market for high value products.

2. Ecology. Ecological deterioration has caused long term problems in some regions of China, most notably the upper regions of the Yellow River valley. Deforestation of this loess soil area has resulted in a reduction of the already low rainfall, a spread of the desert, and greater irregularity in climate, including changes in the frost-free period. Moreover, there is serious soil erosion, not only harming the local soil, but carrying silt into the Yellow River, aggravating the problems of river management. Virtually all observers in China since the turn of the century have considered the reversal of this process to be one of the top priorities for China's development; they have also recognized the complex institutional problems and considered this a "super human" task. (Stavis, 1979:27)

It now appears that this region remains very poor. A recent survey has been made of 123 counties of Shensi, Kansu, Ninghsia, Inner Mongolia, Isinghai, and Shansi covering over 200,000 km^2 with a population of 24 million. (T'ung 1978a; partially available in Science..., 1979) Perhaps this report was a background document for a conference in Yenan in Summer, 1977. (Erosion..., 1977:48) In this region grain yield averages only 1.3 tons per ha., and some regions manage only .2 to .4 tons per ha. In 45 of 121 of these counties, the per capita grain ration (not to be confused with per capita production) is under 150 kg. per capita per year, and in 69 of these counties, the per capita (collective) income is under ¥ per year.

Some Chinese economists believe that the government's long term agricultural policies have aggravated these problems. The agricultural planners have required this region to emphasize cultivation of food crops, by refusing to purchase animal husbandry or forestry products and by

refusing to sell commodity grain. As a result, cultivated area is up by 76 percent. (Erosion..., 1977:48) The implications for erosion may be startling, as shown in Table 4. Unfortunately, the source does not indicate whether the cultivated and fallow land are terraced, so it can not be ascertained whether China's policy of building extensive bench terraces adequately controls erosion or, on the other hand, aggravates it. The Chinese reports do not mention felling trees for firewood to cause problems.

Table 4

Erosion in North West China (with 346 mm rainfall, 1973)

land use	kg. per ha.
forest	60-75
grass	93
cultivated	3,480
fallow	6,750

Source:

North West Soil and Water Conservation Institute Research reported in T'ung, 1978a.

Whether on the aggregate the forests and pastures are being cut down and plowed under is disputed. T'ung suggests they are, while other reports say that .6 million ha. have been afforested and grass land is up by 110 percent. (Erosion..., 1977) Perhaps these increases have been concentrated in just a few localities, as suggested below. In any event, it may not matter, considering the overwhelming impact on erosion of expanding the cultivated area. The critical statistic is that the total annual silt at Sanmenhsia has increased from 1.3 billion tons in the early 1950's to 1.6 billion tons in the mid 1970's. The average erosion is about 4-5,000 tons per km^2. (4-5,000 kg. per ha.) (T'ung; Silt..., 1979) This is a measure of aggregate erosion in the region, and this increase

clearly indicates erosion is increasing. Within this region, however, there are a variety of experiences. In the Wuting River, a tributary of the Yellow River, silt has been reduced from .2 to .1 billion tons. (Silt..., 1979:30)

What deforestation and erosion mean concretely is shown in one example. One county in Ninghsia, Kuyuan, had previously been a rich granary and source of edible oils and animal products; it is now very poor. Grain production has dropped from 410 kg. per capita in 1949 to under 190 kg. per capita in 1977. Large drops were noted in sales of cattle and oil. In this county the cultivated land had been expanded by 82,000 ha. but grain production went up only 10,000 tons - - the new land brought only .12 tons per ha. Forest coverage dropped by 20 percent.

These types of ecological problems were not limited to the Northwest region. Indiscriminate tree felling and inadequate replanting was also reported in the Peking shelter belt. (Large..., 1979:6) Similar problems might be expected in the mountainous southwestern region, because the policy of food self-sufficiency presumably has required expanded cultivation of hillsides.

It should be noted that this ecological deterioration in the upper Yellow River area may be running contrary to a broader trend. The Chinese government has been well aware of the need to increase forest coverage, and has managed to increase it from 8 percent of total surface in 1949 to 13 percent in 1978, a striking accomplishment. (Ross, 1978:4) However, much of this improvement seems to have been in state planted forests in the Northeast and on the edges of Northwestern deserts (partially to protect railroads). (Ho, 1978) In Inner Mongolia it is reported that .8 million ha. have been reclaimed from the desert by planting trees and pastures.

(Kao, 1977) How much was lost was not specified. It seems that the government has not been too successful in convincing peasants to undertake at their own expense the costly task of refforestation, particularly when the benefits will accrue to people of later generations in distant regions (Ross, 1978) and when they are not given access to trade for food. The upper Yellow River region seems to manifest this problem.

3. Management. Management and political errors in some other places have caused problems. An important case seems to be Szechwan, traditionally a wealthy region, with a population estimated in one source at 105 million in 1977. (CIA, 1978:7) Weins (p. 139) believes that from 1964 until 1975, grain production stagnated at roughly 23-24 million tons, a level which had been reached by the mid 1950's. Population increased all the time (reportedly 3.11 percent in 1970, Families..., 1979:7), so by 1975, per capita production would have fallen to 238 kg. per capita, substantially below the national average. Other estimates do not indicate such stagnation. In 1976 the CIA (1976:18) estimated Szechwan's grain production for 1975 at 31 million tons (about 310 kg. per capita). More likely production was in between these estimates--perhaps 27-28 million tons (270 kg. per capita). Whatever the precise figures, grain per capita was a problem. When Jerome Ch'en visited Schechwan in 1973 and 1974, he reported extensive rationing of foodstuffs, very rapid population growth, lax family planning work, and an irrational grain quota system that gave a full quota of 310 kg. per year (perhaps this high only in a few localities) to everyone over age three. This system gave an incentive for larger families and was not changed (in at least one locality) until 1973. (Ch'en, 1975:39-41)

Whatever the production levels in the early 1970's, 1976 was a bad year in Szechwan, with grain production at 25 million tons--

about 243 kg. per capita. (China's..., 1979:23) The central government sent in .6 million tons of grain to relieve shortages. (London, 1979:13; Chou, 1978, no. 48:20) Teng Hsiao-ping is reported to have said recently: "I knew that Szechwan had suffered much, but only now after visiting do I realize the extent of the misery, ruin and destruction which you have experienced." (London, 1979:13-14) Perhaps this statement includes political rhetoric, but it may have much truth.

The seriousness of the population pressure on food reserves is reflected in a new, extremely strict family planning program in Szechwan. Parents are encouraged to have only one child. Strong material incentives back this up. In cities parents who "guarantee" to have one child receive a ¥5 per month child allowance, receive housing equal to what they would receive with two children, and the child receives priority in admission to school and assignment to work. In rural areas, parents of an only child will get child care allowance, and will get extra rations and more private garden space. Reportedly, population growth dropped to 0.87 percent in 1977 and 0.61 percent in 1978. (Families..., 1979)

What brought about this situation in Szechwan? In the mid 1960's there had been reports of a substantial beginning in the technical transformation in Szechwan's agriculture. By 1966, .6 million ha. (of roughly 7.5 million ha. cultivated land) were benefiting from mechanized irrigation, and extensive machinery and transport were being made available. (China's..., 1966) Scientists from the Szechwan Agricultural Science Academy, working near Chungking, reported selection and development of rice varieties yielding close to 6 tons per ha., 40 percent higher than a neighboring commune. (Ch'en, 1965:8) A high yielding wheat variety capable of 3.75 tons per ha. was introduced from Albania. Over twenty research institutes were reported

doing seed breeding work, and the government had set up a system for growing and distributing improved seeds. (Southwest..., 1965)

Why was this start in agricultural modernization not continued? First, despite the rich resources of natural gas, industrial growth in Szechwan was in the lowest quintle. (Computed from Field, 1978b:282) Jerome Ch'en shared this impression of slow industrial growth, and reported that the Criticize Lin Piao, Criticize Confucius campaign of 1974 disrupted industry "to an undesirable degree." (Ch'en, 1975:43) Conceivably, some of the low growth rate reflects high capital costs and technical problems in developing natural gas industries.

With regard to the chemical fertilizer industry in Szechwan, a plant was set up in 1958, and its capacity was increased from 72,000 tons to 180,000 tons per year. (Chou, 1978, no. 49:17) In 1963 a 175,000 ton urea plant was purchased from the Netherlands and set up in Luchou, and a 100,000 ton plant was established in Chienchiang in 1964-65. (China's..., 1976:101) In 1973 the Chinese contracted with Kellog for a giant 330,000 ton ammonia/urea complex, also for Luchou. (Heymann, 1975:701, 727) The plant was completed in 1975. (Chou, 1978, no. 49:18) Whether these plants produced at capacity, what other facilities were available, and what total production trends were, are unknown. However, it is possible that fertilizer production was static from roughly 1966 to 1975, and that this contributed to agricultural stagnation.

It seems peculiar that this province so rich in natural gas should be at the forefront in developing rural methane generators, both for gas and compost, even though the temperature is suitable for fermentation reactions and the swine numbers (and manure availability) may be high. (Stavis, 1978a: 639; Chou, 1978; no. 48) Perhaps this is symptomatic of the failure of industry in Szechwan to provide increased agricultural inputs.

Another problem is that the agricultural research system apparently was inadequate or deteriorated. When wheat rust bacteria mutated in the early 1970's

the wheat varieties were no longer resistant to this disease. Some crop losses resulted. (Tsai, 1978:21)

The Chinese are now reporting another reason for agricultural problems - - namely the irrational expansion of double cropped rice in conjunction with a third winter crop. The expansion of double cropped rice was considered a matter of political line and was pushed vigorously in Szechwan. However, in some regions of western Szechwan the combined production of the two rice crops was not high. This happened because the autumn rain was not well timed to the needs of a late rice crop, and manpower and fertilizer shortages meant deficiencies in cultivation and further reduction in yields of the late crop. The shortened growing season of the first rice crop hurt its yields. In some cases it would have been better to take one good summer rice crop, followed with a winter crop (such as wheat or rape). (Chou, 1978, no. 48:22) In Kiangsu, where double cropping rice as part of a three crop system was also encouraged, complex problems of soil fertility, weather, and pest control were encountered. (Hsiung, 1979)

If the provincial government were able to force production teams to adopt wasteful, inappropriate cropping plans, this would indicate that these teams had in practice far less autonomy in day to day economic management than was called for in the national directive for rural organization. (Central Committee, 1962) This explains why the new management guidelines, to be described below, (re)emphasize the ownership and decision-making power at the production team level.

With industry stabilized, with fertilizer production presumably up, and with irrational political orders eliminated, Szechwan is reported to be recovering. In 1977, grain production reportedly went up 2.65 million tons over the bad year of 1976. (Chou, 1978, no. 48:21; Szechwan..., 1978:31) By 1978, grain production was up about another 2-2½ million tons and rations were raised 62 kg. per capita. (In 1978, grain production was reported to be 5 million tons, or 18 percent over 1976. Rural..., 1979:5; Yu, 1979:27)

In addition to this major problem of Szechwan, a wide range of management problems, reflecting both rightist and leftist tendencies, have been

reported. It seems impossible to gauge the aggregate scope and significance of these practices, but they may have been widespread. In Hsienyo County, Fukien, one faction had previously allowed individuals to reclaim and manage private farmland. This faction took advantage of the political confusion in 1976 to stage a comeback. In many brigades of one commune, land was distributed in individual households; in the county as a whole, 60 percent of the land was divided up among individual households in fall, 1976. Production of late rice fell 40 percent, and peasants instead cut down many trees, damaging the long term forest economy and overall ecology. (Tien, 1977, no. 37-38:40-41) Similarly, in 1976 over 80 percent of the production teams in Yungchia County, Chekiang, land was distributed to individuals. (Tien, 1977, no. 39:28)

In some cases, urban disruptions reinforced these rural changes. When state purchasing channels of Wenchow, Chekiang, failed in 1976 to purchase meat, eggs and vegetables, private market forces moved in quickly. (Tien, 1977, no. 39:29)

The opposite management problem has been reported in some places, namely, strictly controlling private subsidiary production and collectivizing all pigs, fruit trees, fishing activities, and vegetable production. People who tried to produce individually such commodities were criticized for "capitalist" behavior. Without a vigorous program to supply the collective sector with suitable technology, inputs, and markets, such a policy undoubtedly led to sharp declines in subsidiary production, which is critical for both nutrition and income. It is impossible to know for sure the timing and location, and overall significance of such "ultra leftist" interventions. Indeed, one might expect widespread difference from county to county. Instances of this sort were reported in a commune in Shantung for

1970-76 (Let..., 1979), a county in Hopei in the same period (Broom..., 1979), and widely in Anhwei (Chang, 1979).

Another pattern of managerial abuse has been for commune (and other) officials to commandeer teams' labor, funds and materials without compensation. Sometimes these funds were used for the private benefits of officials - - such as feasting, gift buying, speculation, etc. (Lighten..., 1978) Naturally, such abuses would reduce enthusiasm for collective activities. It can not be gauged how widespread such practices were. They are reported even in Hsianghsiang County in Hunan province, presumably efficiently managed by Hua Kuo-feng's associates; Wu County, Kiangsu (Yu..., 1979:16, 24); Hsinyi County, Shensi (Cadres..., 1978:27); Huiyang Prefecture, Kwangtung (Provincial..., 1978:18); and Chumatien Prefecture, Honan (Deputy..., 1978) It appears that in periods of political confusion the Party and government are surprisingly ineffective in controlling these types of behavior.

A word might be added about the felling of forests, reported above in the Peking shelter belt (Large..., 1979:6) and Fukien. (Tien, 1977, no. 37-38:40-41) Long term institutional stability and effective police action are both necessary to protect trees. Otherwise, if the owner of a tree is unsure he will get the long term benefits and unsure his tree will be protected from poachers, he will be tempted to take the short term benefits that come from cutting the tree, knowing full well the long term irrationality. These institutional issues become even more complex when the ownership of the trees are in the collective or state sector, when police power and social order deteriorate, and when there are economic difficulties. Under these circumstances, private cutting of public forests is almost unavoidable, despite long term social costs. For these reasons

there was extensive deforestation in Ethiopia during the 1975-76 revolution. Unregulated tree cutting in China during this period of political confusion should not be surprising.

It probably is inaccurate to charge that these types of management failures reflected policy preferences of the "Gang of Four" and indicate what did happen in Shanghai, under Chang Chun-chiao, or what would have happened if the four had been able to arrest Hua Kuo-feng, instead of vice-versa. It is even more absurd to suggest that these failures reflect Mao's policy preferences. His tolerance for disorder was high, but he did not believe that fertilizer distribution should be interrupted, that forests should be cut down, that peasants should be forced to adopt inappropriate cropping systems, or that arbitrary, corrupt local officials should poison peasant incentives. Indeed, a major portion of his energies were devoted to the problem of reducing bureaucratic irrationalility, indifference, and corruption.

Over the years the Chinese developed a set of policies to control bureaucrats by enforcing direct, personal face-to-face interaction with bureaucrats. Extensive meetings; participation in manual labor; being "sent down" to live, eat and work with the masses; going to May 7 cadre reform schools; extensive democracy and "open door' rectification - - all these policies were designed to control the bureaucrats. Moreover, counties, communes, brigades and teams established experimental plots, on which farm system innovations could be tested and evaluated before being widely implemented. Production team mass meetings could provide an opportunity for the masses to review empirical data and discuss the implications with cadres. It now appears that political and bureaucratic pressures were not adequately controlled by this system in many regions for many years.

A full understanding of these failures will probably have to include recognition of China's cultural heritage in bureaucracy, and the role of coersion in an authoritarian state. Perhaps, however, the main problem is the confusion accompanying the succession struggle, when each faction was seeking political allies and was lax in checking the actual background and behavior of its allies. In such a political environment, discipline dissipated. Chinese politics is not devoid of local and national political actors with egos, who enjoy holding power and ordering people to do things. Leftist rhetoric, with its stress on changing society, can easily be used to justify their exercise of power, and can easily disrupt incentives for many parts of the rural economy.

The difficulty the Chinese have had in implementing and maintaining the participatory, democratic aspects of the Chinese development model is sobering. Even in China, the bureaucratic tendencies cannot invariably be controlled. It is clear that for other developing countries, with their own bureaucratic heritages, to adopt the participatory style implicit in much Chinese rhetoric is a great challenge - - perhaps too great for realistic planning.

D. New Policies

The policies being recommended now (and gradually being adopted) represent a major watershed in China's agricultural development, comparable in importance to the decisions in the early 1950's to socialize production relationships and to the decision in the early 1960's to supply industrial inputs on a large scale to the rural sector. (Stavis, 1975:95) In many ways the new policies have antecedents in the rural policies of the 1961-66 period, but now these policies are being conceived on a much broader and systematic basis. They constitute a qualitatively different policy. The new policies will be controversial and difficult to implement for political, social, and technical reasons. But they have strong economic and technical logic as well, and probably will be implemented fairly broadly. They will have far reaching consequences for China's political economy. The policies were described in general by Hua Kuo-feng in February, 1978. (Hua, 1978)

1. Specialization and Mechanization. The core of the new policy is specialization. Production teams, communes, localities, and whole regions will be encouraged to specialize, at least partially, in the production of particular commodities which can be sold to other regions at a high price.

Economist Hu Chiao-mu, now President of the Chinese Academy of Social Sciences, quoting Marx and Lenin, laid out the theory of specialization and how it fit into overall development in a speech in July, 1978.

> Developing the national economy in a planned, proportionate way calls for specialization and cooperation. This is an inevitable law of development of modern, mass production and a very important way for raising production skill, labor productivity and quality of products, saving on power and raw and other materials and reducing the cost of production.

> In order to speed up the development of agricultural production and the modernization of agriculture, it is also necessary to develop all kinds of specialized agricultural techniques and productions in the countryside, to set up industries for processing farm products and other industries according to state plan, develop forestry, animal husbandry and fishery; develop education and culture and greatly raise the scientific and technological level of the peasantry, particularly of the young peasants. (Hu, 1978, no. 46:17; no. 47:20)

The same argument was made by T'ung Ta-lin and Pao Tan (1978b) in an article specifically about agricultural modernization:

> The modernization of production demands the specialization and socialization of production, and requires the change of social organs of production based on self-sufficiency; it requires increasingly close relationships between city and countryside between various specialized agencies, and between various regions. (T'ung, 1978b)

Previously, production units have been sharply restricted by the general requirement that each unit (with some exceptions) be self-sufficient in food grain. This policy has been easily enforced in the past because the state has a monopoly over grain trading, and it could simply refuse to sell grain to a production unit, except under exceptional circumstances. Moreover, the state controls long distant, large scale marketing of all other commodities, and can simply refuse to purchase the produce of a unit which proposed to specialize. Unable to sell specialized products and unable to buy commodity grain, each production unit had little choice but to be self-reliant, and to "take grain as the base and have all round development."

This old policy has its logic. First of all, with a very limited transportation infrastructure, the large scale long distance shipping of agricultural commodities between specialized units would be impossible. Moreover, this approach would require a far larger food processing and preservation industry (canning, freezing) to prepare foods for transportation and storing. In addition, the bureaucratic problems of handling

the tremendous interactions implicit in specialized production pose major problems. The opportunities for corruption and inefficiency would be immense, and the Party would be drawn away from political-ideological work and absorbed by the problems of commerce. Finally, from the production unit's point of view, specialization involves numerous agronomic problems, such as eshaustion of soil fertility and pest control. Synergistic interactions between some crops reduce the need for expensive and ecologically destabilizing chemicals.

Why give up these advantages? Many reasons. First, the old system seemed unable to provide the wide range of high quality commodities at a low price increasingly desired by urban consumers. Top on the list are pork and poultry products (eggs). When animal husbandry was in the private sector or was a sideline activity for teams, economies of scale (in sheltering animals, in machinery, and in marketing), highly efficient technology (inherent in animal breeds), and sophisticated management could not be generated. Costs of production remained high. Aside from economic reasons, there was an ideological problem. The socialist system could hardly make major investments in research and technological development for animal husbandry when it was largely in the private sector.

The new policy proposes four types of specialization: enterprise, regional, grain base and service companies. Enterprise specialization means that some production units, particularly in (but not necessarily limited to) city suburbs, develop large scale, technologically sophisticated swine and chicken (egg) farms. Symbolizing the importance the government attaches to this program, Hua Kuo-feng personally visited modern chicken and pig farms in the Peking suburbs in September, 1977. (Chairman..., 1977) A year later several farms were in operation. (Mechanized..., 1978) Equipment and birds

purchased from the United States were used for one large farm near Canton. (Hongkong..., 1978) Capital from overseas Chinese is being solicited for these activities. Improved fish farms are encouraged also.

Enterprise specialization seems required by mechanization. In the suburban areas, the state is eager to buy all sorts of products - - fruits, vegetables, oil seeds, cotton, animal husbandry. As long as the state could not sell food to units growing these commodities, each production unit could allow only a bit of land for these commodities. It was found that each type of crop required different, specialized machinery, and a production unit would have to buy many sets of machines, and then not utilize them efficiently. In this way, the machinery costs were very high. In the Peking suburban T'ung county, machinery costs ran up to ¥150 per capita - - double the per capita income. (Huang, 1978) Previously it was hoped that China could design small, different farm machinery that would be compatible with China's traditional, complex mixed cripping, interplanting, and relay planting systems. An alternative is to utilize machine tractor stations which rent machinery to production units, but the managerial problems in coordinating the station with the production units in the past have been immense. (Stavis, 1978b:93-101) Instead, in a sense, the Chinese are faced with the necessity to redesign the cropping system in the direction of specialization to accomodate the needs of machines.

Since the late 1960's and especially after 1975 mechanization has been receiving great emphasis, and is now fairly widespread. In many regions, over half the land is machine plowed. (Stavis, 1978b:202) In the long run, mechanization will displace agriculture labor. This will allow labor to be shifted to economic activities with higher labor productivity. Equally important, mechanization will reduce the labor intensity for the Chinese peasants. The hard manual work, long hours, and exposure to the elements lead peasants to insist on mechanization, and the Chinese government must respond to this to maintain the "worker-peasant" political alliance. The

ideological goals of reducing the differences between industrial and farm labor and between city and countryside reflect this practical desire of peasants to share the benefits of modernization. (Stavis, 1978b:254) In the short run, however, these changes have not yet happened. Not enough alternative, more productive employment has been created to allow a major reduction in the agricultural labor force. Moreover, because of lack of farm implements, tractors are still used primarily only for plowing and transportation. The labor intensive operations of weeding and harvesting are still done by hand, so the agricultural labor force is not yet reduced substantially.

In many cases, mechanization can increase agricultural yields. Mechanization can break seasonal labor bottlenecks and facilitate increased multiple crops. It can permit rapid field operations before or after unseasonal weather. In the Northeast, with its short growing season, machinery that rapidly plows, plants, packs the soil, and spreads fertilizer and weedicide, and then harvests, in effect lengthening the growing season by 20-30 days, with significant impact on yields. In areas which lack rainfall in the spring, rollers can help preserve soil moisture, improving yields. Mechanization can also open up wasteland, plow deeper, and can plant seeds and spread fertilizer and weedicides very carefully and uniformly. All these factors contribute to higher yields. For these reasons, mechanization can be considered to intensify cultivation. It is not simply "extensive" cultivation. (T'ung, 1978b) To the extent that mechanization displaces draft animals, it also permits land to be shifted to higher value crops.

Mechanized irrigation is, of course, crucial for improving yields of high yielding rice and wheat, which are so sensitive to water management. Low lift pumps have been very important in the river valleys and lake basins of south, central and coastal China. Tube wells have played

a major role of developing North China. Most recently, China has been experimenting with sprinkler irrigation, as a way to use the water and energy more efficiently. (Sprinkler..., 1977; Field..., 1978; Modern..., 1978)

Eventually, mechanization permits an improvement of labor productivity in agriculture, so that labor can increasingly be diverted into more productive, more profitable activities, such as animal husbandry and industry. (For this reason the Chinese are also showing great interest in chemicals that can displace labor, such as weedicides.)

That mechanization may require specialization seems more apparent to economists than to the people immediately concerned with agricultural mechanization. The Third National Conference on Mechanization was held in January, 1978. (Entering..., 1978) Previous National Conferences were held in 1966 and 1971. (Stavis, 1978b:226, 232, 254) The available reports of this conference (Entering..., 1978; Farm..., 1978) show no indication that a fundamental rearrangement of the structure of farm production would be required. The reports speak simply in terms of increasing the quantity of machinery, so that machines could be used in about 70 percent of the main farm work by 1980 and 85 percent by 1985. (Fang, 1978:6) Targets were set, and technological problems (machine design, steel availability, etc.) were reviewed. The problems of standardization, interchangeable parts, and quantity of manufacture, which have been discussed by the central machine building ministries for decades (Stavis, 1978b:168, 232), were again reviewed. (Ching, 1978:10-11) With machinery made in so many factories, it remains a perpetual problem. Apparently the institutional mechanisms that had been designed to deal with these problems (such as special factory work teams to go to the countryside to ascertain needs and

special research departments) have not worked very well. According to William Hinton, the American who played an important role in training China's agricultural machinery cadre in the early 1950's (Stavis, 1978b: 35; Hinton, 1971), some Chinese tractors have only three point hitches and lack drawbars, so they cannot pull implements efficiently. Moreover, the tractors are not maneuverable in field operations. The tractor factory's engineers have not driven the tractors, much less used them in farming operations. (Miller, 1979:101-102) New institutional mechanisms clearly are necessary to assure that mechanization policies, allocations, and engineering accurately reflect actual field needs.

Important experiences emerged from experiments carried out by the No. 2 Team of the Fifth Branch of Friendship Farm in Heilungkiang, using sixty modern machines imported from the U.S. (Modern..., 1978; T'ung, 1978b) Symbolic of changes in China's foreign policy orientation, Friendship Farm had been established in the early 1950's with material and technical support from the Soviet Union. (Stavis, 1978b:35) The importance of supplying full sets of machines and implements was underlined. A tractor, without plow, seeder, cultivator, or harvester, can be used only for transportation, and will not have a significant impact on labor productivity. In Heilungkiang, peasants call a tractor a "running out of breath plow," because the tractor pulls a traditional plow and a person must run behind, guiding the plow. Appropriately designed plows are not available. (Tung, 1978b) Again, this problem is not new. In 1962 Hsian Nan, a leading Chinese analyst of agricultural mechanization, recommended that implement factories should receive the same level of investment as tractor factories. (Stavis, 1978b:168) In 1965, many new implements were designed. (Stavis, 1978b:213) Why are implements still not available? Probably there are two

reasons. The most important is that during this period, the Ministry of Agriculture and the Party has strongly encouraged (and sometimes required) production units to adopt complex intercropping and relay planting patterns. It is virtually impossible to mechanize cultivating and harvesting in such systems. In addition some may have feared the problems for finding employment for the labor released by mechanized weeding and harvesting.

Decisions were made by the Third Plenum of the Eleventh Central Committee to implement mechanization rationally. (Correct..., 1979; partially translated in On..., 1979) The Ministry of Agricultural Machinery has been reestablished, and machine tractor stations are being reestablished in some areas to permit better control and management. Collective ownership of machinery is not being terminated, however, as it was in 1962. (Stavis, 1978b:148) Rather, it is being supplemented, where it is weak or where mechanization is new. Machinery will be assigned carefully in full sets to specific locations that can use them efficiently. This is reminiscent of the plan in 1965 to mechanize 130 key counties, supported by Liu Shao-ch'i and P'eng Chen. They had argued that machinery should not be scattered like pepper, but should be concentrated to win wars of annihilation. (Stavis, 1978b:194-195) The same metaphors are used now. Furthermore, it would not be surprising if a national corporation is established to manufacture machinery and implements. This had been set up in 1964, along with other "trusts" (Stavis, 1978b:193), and Hu Chiao-mu has recommended that this system be reevaluated and resumed (with appropriate improvements). (Hu..., 1978, no. 47:15-16) However, inasmuch as collective ownership of machinery is to continue, there would be no reason to expand the responsibilities of such a corporation to include ownership and operation of farm machinery. It was this proposed increase of responsibility that sparked

great controversy in 1966. (Stavis, 1978b:194) Nor would there be any need for major state investment in machinery. (The 1965 plan presumed state investments of ¥10-20 billion.) However, loans will be needed to enable production units to buy the machinery.

In these decisions, it was recognized that there should be "specialized production on a regional footing." Moreover, the link between mechanization and specialization was acknowledged: "The major share of the state agricultural investments should go into the construction of a number of marketable grain and cash crop production centres and livestock breeding, fishery and forestry bases." (On..., 1979:13)

Paying for expensive machinery is a problem. Some production units can sell profitable crops such as watermelon and buy inexpensive food. Obviously if all units try to do this, the supply of watermelons will be excessive, the price will drop or the marketing unit will have to provide huge subsidies. What appears simple and rational to one production unit will require careful planning and market controls, lest it end up disasterously.

Communes and brigades are also encouraged to develop small scale industries, both to provide agricultural inputs and repair facilities and to generate profits which can be used to buy farm machinery. (Yu..., 1979: 28) In 1977, there were 1.39 million commune and brigade enterprises without an output value of ¥39.1 billion, and profits of ¥7.7 billion. (Small..., 1979) These rural industries generally have triple the labor productivity of farm labor. (Stavis, 1978b:252) The tax-exemption on profits of communi industries has been raised from ¥600 per year to ¥3,000 per year to stimulate rural industry and to facilitate capital accumulation at the commune and brigade level. (Tax..., 1979)

Regional specialization will have important advantages in responding to the differing ecological settings. The urgent example in this regard is the Upper Yellow River area. Forced to grow their own food, communes have plowed open more land and cut down forests, resulting in more soil and water erosion. With inadequate water, grain yields have stayed low, and income from forestry products and animal grazing has declined. For this region as a whole, Chinese economists are now recommending a large drop in grain area and renewed efforts to rebuild the environment. It is not clear that they are fully aware that overgrazing of animals can also lead to environmental degredation, and that careful management and improvements in both pasture lands and animal breeds will be necessary. Nor is it clear that animal husbandry and forestry would generate enough employment. If not, would migration to other regions be encouraged?

In fact, there is some evidence that urban migration is far more widespread than is implicit in Chinese rhetoric. From one county in this Upper Yellow River region, in the early 1960's, over 20 percent of the labor force left the countryside or stopped working in agriculture. (Tsou, 1979:141-142) There are other reports of commune members from poor regions working in urban factories or in transportation on a temporary contract basis. Often the urban wages go to the rural work team, and the individual worker continues to receive work points. The magnitude of this is not known, but it may be just as widespread as the extensively reported system of settling urban youths in the countryside. A reduction of population in some regions to reestablish ecological stability may be needed, and the migration patterns necessary to do this may have some historical precedent.

An example of the new approach is the experience of Kaohsikou Brigade in Shensi. Over the past 20 years, it reduced cultivated land

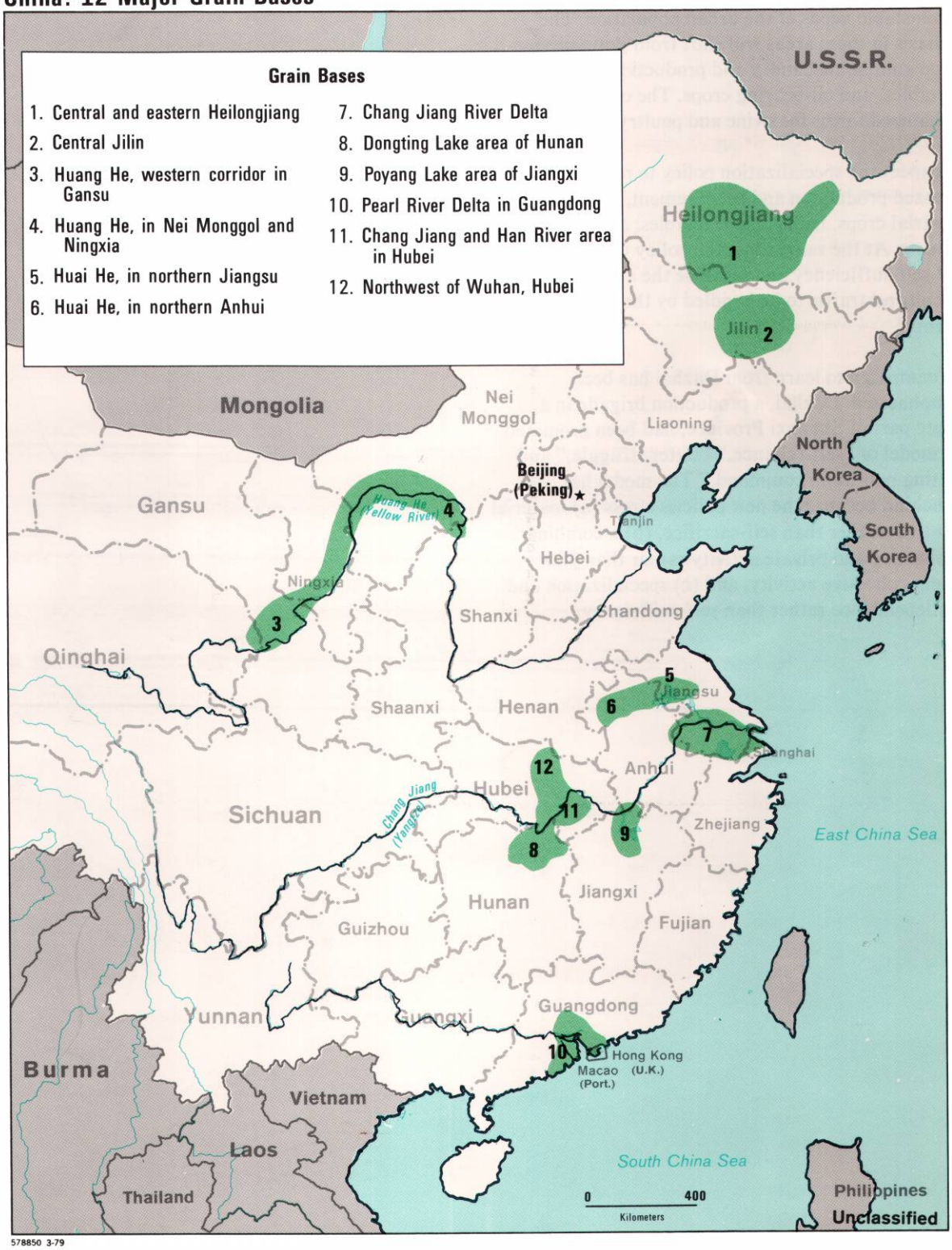
from over 200 ha., which yielded about .2 tons per ha., to 70 ha., which yields 4 tons per ha. Total grain production has increased from 40 tons to 280 tons. Moreover, it planted trees and grass, so each labor power was able to earn ¥1,140 from animal husbandry and ¥917 from forestry products. (T'ung, 1978a)

An analogous suggestion was made for the Peking suburbs. (Huang, 1978) The communes to the southwest, with low lying land, should emphasize rice and wheat. In the sandy soil near the Hupai River and the Peiyun River, oil crops should be planted. The communes to the south with salty, flooded land should plant animal feed and fodder, and emphasize animal husbandry. Hilly areas should plant maize and wheat. In Hukechuang commune, a seed farm should be established.

Implicit in all these plans to increase enterprise and regional specialization is the requirement that the state (or marketing system) be able to sell the regions more food. This, in turn, means that the state will have to procure and deliver far more food. Indeed, some people in China do not see how this can be done from financial, technical, or logistic points of view, and therefore oppose regional specialization. (T'ung, 1978a) The government's plan in this regard is to develop twelve major specialized commodity grain bases, from which it will procure grain. Most of these bases are located in the fertile, irrigated valleys and lake basins of central, eastern, and southern China and in the Northeast (CIA, 1979b:9) (Figure 2), precisely the regions of China that saw a "green revolution" in the 1960's. (Stavis, 1975:x) It is also possible that the state will meet part of its need for commodity grain for both human rations and animal feed by increased imports, in a sense paid with exports of high value crops (hogs, vegetables, aquatic products, dairy, etc.). It is likely

Figure 2

China: 12 Major Grain Bases



Source: Central Intelligence Agency, 1979b:9.

that increased grain imports will be perceived by China specialists and others as reflecting failure in agricultural policy, even though in reality it will reflect a more efficient utilization of agricultural resources.

To develop these grain bases, increased inputs will be provided, including fertilizer, water control machinery, and power. Many new dams are under construction. The age old idea of diverting water from the Yangtze River to North China is now probably being implemented, using the Grand Canal. (Some people fear the Lower Yangtze area could be hurt by this scheme, and are urging redesign of the plans.) (Discussions..., 1979:7) Perhaps equally important, new financial incentives will be utilized. Grain prices are being raised in 1979 by 20 percent, and production sold in excess of targets will receive an extra bonus of 50 percent. (Communique..., 1978:13) The financial requirements for investments and procurement for this program are very large, especially if, as planned, the consumer price of grain in cities is not raised. (Communique..., 13) It is not entirely clear, even within China, whether the state's profits from the heavy and particularly light industrial sector will suffice to satisfy the implied subsidies. The recent readjustment (cutback) in industrial imports probably reflects a realization of the financial dilemmas.

The development of these commodity grain bases will reduce the grain procurement burden on other areas, and will enable them to have more surplus grain for livestock purposes, through which their incomes can be raised more. (On..., 1979:14)

The fourth type of specialization is the idea of specialized agriculture service companies, presumably state run. At the moment a national seed company (described below) is being developed as a model for this idea, and companies for agricultural processing, along the Yugoslavian model, are

being discussed. The same model could be used for machinery repair services, veterinary services, etc. One of the remarkable aspects of these proposals is that production units be permitted to seek services of companies from other counties. This would introduce competition into what has been a highly bureaucratic system. (T'ung, 1978b)

This is not the first time that Chinese economists have spoken about the need for specialization. However, it is now likely that these recommendations will be carried out because of the already significant extent of mechanization, which now puts new pressures for specialization. Huge investments have been made in tractors, and new management systems are needed to assure these investments are not wasted. Moreover, the basic transportation and communications infrastructure has improved to the point that complex integration is possible. (Indicative of the improvement of the rural infrastructure is the report that by 1976, 99 percent of the communes and more than 70 percent of brigades have telegram service. Postal..., 1977:31)

It might be noted that there are some structural similarities between China's plan for more specialized enterprises and the pattern of development in the U.S., the Soviet Union, and elsewhere. L.I. Brezhnev (1978:42) stated: "Comrades, specialization and concentration of production, that is, a further socialization of socialist production and labor, as the Marxist-Leninists call it, is an imperative demand of our life, one of the decisive foundations for our advances." In China and elsewhere, specialization seems both possible and necessary as the transportation system improves and as farm machinery is widely used. However, the Chinese system is very different from that of the Soviet Union, inasmuch as two-thirds of the Soviet farm land is owned by the state, whereas in China the collective system is dominant.

In the United States, mechanization of agriculture is a continually evolving process taking several decades. By 1940, most farms had tractors;

but obviously mechanization was just beginning then to change profoundly the rural economy and society. The economies of scale (and existing institutional patterns) required farmers to enlarge their holdings and specialize in their farming activities. A tremendous concentration of rural assets followed, with smaller farmers pushed into selling their farms, while larger farmers expanded. This process is still underway in the U.S., and similar processes are underway in most capitalist economies.

China will not identically replicate this pattern as long as farmland and farm machinery are collectively owned. However, it should be expected that the mechanization of China's agriculture, already underway for a decade, will inevitably have some profound impact on the structure of the rural economy over coming decades.

2. Private Sector. Closely related to the policy of enterprise specialization is the renewed determination to enliven the private sector. China's leaders now believe that the state planning system is not capable of dealing creatively and efficiently with the hundreds and thousands of commodities and products of a flourishing rural economy. It is better for the state to concentrate its efforts on a few critical crops, and to encourage a private sector to facilitate production and exchange of agricultural, livestock and handicraft products. (Xu..., 1979:23) This will give consumers what they want and will also give producers an opportunity to enjoy a higher income. A recently cited example was the benefits to be gotten by encouraging farmers in Leting, Hopei to resume their traditional handicraft activity of making brooms from sorghum stalks. (Brooms..., 1979) The government claims it will supervise markets carefully to prevent the emergence of a professional, specialized trader class which could benefit from speculation and market manipulation.

3. Food Policy. The policy of regional and enterprise specification implies much more domestic exchange of agricultural produce. This will require huge investments in the food processing, preservation, transportation and packaging industries. This may well turn out to be a major bottleneck in the new policy. A sensitive indicator of the extent to which the policy of specialization is being implemented will be progress in canning and freezing plants, refrigerated railway cars, etc.

Specialization and stimulation of the private market are both designed to provide those commodities that will improve the quality of the diet, i.e., increase protein, vitamins, taste, etc. and reduce the time and energy required for preparation of food. Many programs are being suggested to help in this regard. (Proposal..., 1978) Modern bakeries are being suggested to reduce the time (and fuel) spend on making mantou. More ready made noodles, sausages, meats, bean curd, jam, fruit juices, and soups were suggested. New packaging systems for vegetables and meats, stressing plastic bags, were recommended. In addition improvements in the restaurant industry were encouraged so people could get "snack foods." (More..., 1979)

4. Agricultural Science. The new policy puts strong emphasis on improving agricultural science. Research units are being strengthened, and new ones are being established. (New..., 1979) Senior scientists are given enlarged responsibilities. Basic research is encouraged and international exchange is enlarged. Agricultural education is being improved and more rigorous demands are placed on students, some of whom are being sent abroad. Research administrations who interfered with research activities in the past are probably being removed as supporters of the Gang of Four.

It is not clear yet what will be the fate of some of the substantive suggestions made over the past decade to assure relevance and diffusion of research. Will the four level research and extension network, with county commune brigade, and team research stations and groups, be retained? (Stavis, 1978a) What will be the impact of this new direction on agricultural education? During the early 1970's a model for agricultural education (Chaoyang) stressing practical field work and close interaction with peasants was developed. Curriculum was planned to train rural youths to be technicians for the commune and brigade levels, not to be government employees. Adult farmer training was included also. (Hsin, 1975; Compiling..., 1976) This school was later denounced, because its graduates were used to form a rural political network to strengthen the control of the province by allies of the Gang of Four, and because its scientific training was inadequate. Excessive attention to manual work and practical demonstrations meant that students did not learn the theoretical reasons for various techniques. (What..., 1977) It is not yet clear whether the basic philosophy of Chaoyang is being criticized along with the implementation.

If the principles of combining research, extension and education in a way that is responsive to practical farming needs is dropped, it is possible that agricultural science might loose relevance for the needs of production. There is a danger that the personal and political antagonisms arising from the struggles of the past decade may interfere with the retention of some of the functional innovations of this period.

There is some evidence that at least in some localities the rhetorical support in past years for the four-level agrotechnical network was not reinforced by appropriate investment and personnel policies, so that in

fact the system did not establish a strong base. In the Canton area for a while agricultural college graduates who were assigned to the research network were expected to live, eat, and work with peasants and travel a great deal. Some were criticized during political investigations. Husbands and wives were often separated by being assigned to different places. Despite all these problems in living conditions, salaries were low and did not compensate for these hardships. As a result fewer students went to agricultural colleges, some people assigned to agricultural departments refused to take up their jobs, and some people in agricultural departments sought transfers out of agriculture. It was reported that half of the trained technicians in Kwangtung in agriculture, forestry and animal husbandry were working out of agriculture, in areas such as women's cooperatives, hospitals, food processing plants, metallurgical mills, etc. After the fall of the "Gang of Four" the new leadership of Fanyu County, Kwangtung, tried to correct these problems. Agricultural technicians were promoted, given more status, responsibilities, and higher salaries. Investments were made in equipment and residential housing for technicians assigned to county and commune agricultural institutes. Efforts were made to rejoin husbands and wives. Trained technicians moved back to agricultural work. As a result of these changes, it was reported that grain yield reached a new record in 1977, and was increasing more in 1978. (Wang, 1978) This report implies that the four level network will, in fact, be strengthened by appropriate investments and administrative practices. What is not clear is the extent to which control over the system will be vested in the commune and brigade (i.e., non-government) level.

To assure improved distribution of improved seeds from the research units, a national China Seed Company was established in July, 1978.

(Seed..., 1978:31) Seed companies will be set up at the province, prefecture, and county levels and seed farms will be established. This new form of organization seems to have been necessitated by the success in developing hybrid rice. The preparation of this seed is highly complicated and requires very high levels of professionalism to assure appropriate crosses, to get high levels of seed production per acre, and to control plant diseases. (Some..., 1978:13-14) Hybrid vegetable seeds are also being developed and have the same needs. (Li, 1978:21) One of the major advantages of hybrid vegetable seeds is that they mature simultaneously, which is desirable as agriculture becomes mechanized. This requires, of course, a more sophisticated planning and marketing system to avoid seasonal gluts. As these preconditions are being met, hybrid vegetable seeds become sensible, and with them new specialized organization structures. With reference to hybrid maize, the organization of seed production appears not to be a major bottleneck. Already by 1975, hybrids were used on 55 percent of the maize area under cultivation, with an increase of yield of 69 percent. The problems were in breeding shorter varieties with better root and leaf structures, that would give higher yields, not in producing the seeds. (Wu, 1978a; 1978b) Nevertheless, a specialized seed company may help hybrid maize also.

It is likely that economics and agricultural economics will be encouraged also, to assure economically rational plans. As industrial inputs are increasingly available and as costs of production are rising, it is increasingly necessary that production units have not only accountants and record keepers, but also economists to help make efficient choices for alternative production systems. Thus the training and placement of economists will also be an important indicator of the implementation of

the new policy. It is likely that various types of rural surveys will be carried out also, so that the attempts to create rational plans are based on accurate information. The recent republication of Mao's "On Conducting Rural Surveys" in 1979 demonstrates this renewed interest in surveys, and is unlikely to confine the methodology of new surveys. Already underway are general rural surveys and soil surveys to develop agricultural zoning plans for planning purposes. The Northwest area is receiving special attention. (Agricultural..., 1979:5-6)

In fall, 1978, over forty of China's agricultural economists, representing 19 institutes and colleges had a National Agricultural Economic Management Specialty Conference. They developed a plan for education in agricultural economic management, and discussed curriculums, teaching materials, admission of graduate students, etc. The program was considered necessary because rising costs of production in agriculture were threatening to eat up the production gains. Far better economic analysis and management was considered necessary to assure real benefits from costly investments. Better economic management was also recommended to improve incentives by assuring distribution according to work; at present, "the bias toward egalitarianism is rather serious."

The goals of the new education program are fairly comprehensive: "In order to study economics well, aside from learning the political economics of Marxism and the agricultural economics of socialism, the managers must also learn agricultural statistics, agricultural accounting, agricultural planning, and the economics of agricultural production technology. The students must be made to possess the ability of carrying out social economical surveys and of resolving actual problems of economical management; they must also have the ability of managing socialist agricultural

organizations, managing planning, economic accounting, and analysis of economic efficiency. They must use the value principle correctly so that production of consumer products is made to serve socialism... Experts... should understand the historical achievement and developmental tendency of modern economic management of agriculture here and abroad." (Ma, 1978:15)

This reconstruction of agricultural economics was reported to be necessary because of extensive disruptions in the discipline over the past decade. "Lin Piao and the 'Gang of Four' made up the 'two estimates' [that the bourgeoisie controlled science and education] to spread the theory of agricultural economics being useless. The departments of agricultural economics in many colleges were eliminated. Those that were not eliminated were moved around to the extent of not functioning. Many teachers were forced to work in other professions. Large quantities of scientific data that were products of cumulative labor or many years were thrown away as waste paper. Some departments were made to be completely devoid of a single piece of paper. There is no way to calculate the extent of the loss." (Ma, 1978:15)

To provide a better foundation for agricultural science, rural education is to be improved. The goal is eight years of schooling throughout rural China by 1985.

5. Management. The overall patterns of rural management have obviously been subject to wide ranging debate. Should the commune system be maintained? Undoubtedly some people have recommended that the collective system be (at least partially) dissolved, and that the responsibility for production, if not the actual ownership of land, be transferred to the individual family. In late 1978 when P'eng Teh-huai and T'ao Chu were rehabilitated (Memorial..., 1978), debate about collective ownership must have

been reopened, because P'eng had criticized the commune system at the Lushan Conference in July, 1959, and T'ao had organized experiments with a household responsibility system in Kwangtung in 1961-62. (Stavis, 1978b: 205)

With the decisions of the Third Plenum of the Eleventh Central Committee in December, 1979, it now appears this debate is resolved. The collective system, as set up in the early 1960's and specified in the Sixty Points (Central Committee, 1962) is being reinforced. (Xu..., 1979:16) Each level is reassured of its ownership of assets and its right of decision making power with regard to cropping system and labor allocation. The state is prohibited from assigning collective labor without payment or demanding sales of commodities in excess of planned targets. (China..., 1979) The quotas are to be fixed for five years (Ching, 1978:10), at the 1971-75 level. (Communique..., 1978:13) The team, however, may prove too small to benefit from the economies of scale inherent in some activities. It is not anticipated that the team will disappear from grain production; but as grain becomes a smaller portion of rural production, the relative role of the team may well decline.

In addition, production teams, brigades, and communes will all democratically elect their own leaderships. It is not clear whether the higher levels must approve the elections, but cadres are subject to recall. (China..., 1979:9, 11) Unclear is the Party's role in making nominations.

These provisions clearly are designed to prevent the arbitrary, inefficient, destructive, corrupt type of leadership that lead to stagnation in Szechwan and elsewhere. (Lighten..., 1978) However, these types of provisions were included in directives of the early 1960's. It is not obvious why local cadres will follow these laws in the future more closely

than they did in the past. Perhaps it will help if they are reinforced by rigorous and rational cost accounting and use profit as an indication of success. If each production unit has its own test plot (as specified in past policies), and if the unit's analytical competence is increased by economists, the production units will be in a far better position to resist inappropriate suggestions from higher levels. These measures have not been announced yet, but would seem necessary. Recent policy statements indicate that contracts will be negotiated between fairly autonomous enterprises, this will introduce additional checks on the bureaucracy. (Hu, 1978, no. 47:14) Even competition between state-owned companies is being contemplated. (T'ung, 1978b) It is premature to discuss institutionalized electoral competition between political parties, but the idea of rule of law is being strengthened to control bureaucrats.

While the collective system is retained, individual incentives are to be strengthened by more closely relating wages with work. In addition, small work groups are being suggested to provide better labor organization and incentives. (Establish..., 1979)

As for administrative links in the context of the commune system, Butler (1978:47) noted a trend towards increasing power at the brigade and county level (not team and commune) to provide better political control and technical assistance. This may have been true at the time, but the trend to specialized enterprises may well breathe additional life into the brigade and commune. (Hua, 1978:5) The commune, as a traditional marketing center, may well take on increased importance with the great increase in commercial activities that are the corollary of specialization.

6. Distribution of Benefits. What will happen to the benefits from increased agricultural productivity? There are many claimants.

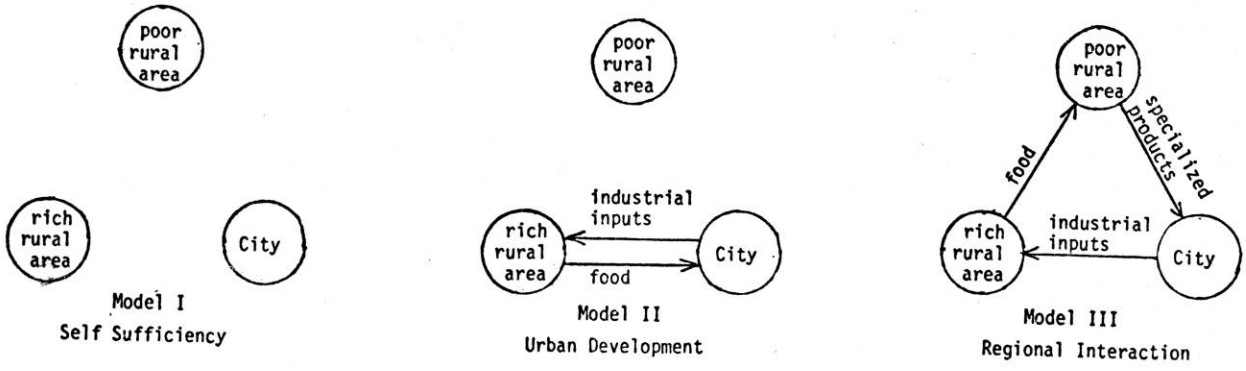
Factory workers want (and have gotten) higher wages; military leaders want new weapon systems; and increased investment in industry is needed. Will there be any benefits left for the rural sector? This subject has probably been debated intensely in China. Peasants have demonstrated and protested in Peking, demanding higher prices. (London, 1979:12) This probably more reflects concern about future distribution of benefits than about past trends and existing standards of living. In most countries, peasants have very weak political linkages through which to express their concerns. Urban, bureaucratic, and military interests, in coalition, usually do better. (Lipton, 1977:13) With the death of Mao and the passing of a generation of rural-based military leaders, peasants in China may well be worried about the emergence of an urban bias in China's economic plans.

This issue seems to have been substantially resolved at least for a while by the Third Plenum of the Eleventh Central Committee, meeting in December, 1978. (Indeed it is possible that the peasant demonstrations were organized to put pressure on this meeting.) A clear decision was made to raise the purchase price of grain 20 percent and an additional 50 percent for sales above quotas. It is likely that much grain will be sold at this high price, as quota levels are to be fixed for at least five years at the 1971-75 level. (Communique..., 1978:13) Purchase prices of other agricultural products will also be raised. The prices of agricultural inputs (fertilizer, machinery, etc.) will be dropped by 10-15 percent. (Communique..., 1978:13) Moreover, areas with grain production lower than specified minimum will be completely exempt from agricultural tax. (Tax..., 1979) These decisions do much to assure that benefits of agricultural development will accrue in rural areas.

It is, of course, likely that the policy of enterprise and regional specialization will increase regional income differences in the rural areas.

Some places will have the resources to specialize in a profitable commodity, and will get rich. This seems inevitable and local officials are reassured it is permissible. (China..., 1979:11) If the government is concerned about this, it can take corrective actions through careful control over marketing, through subsidies, and through migration. However, the net effects will not all be negative, because if the new policy helps poor regions get away from low productivity grain production, it can help reduce regional differences. In figure 2, three models are suggested for regional interaction. In models 1 and 2, the poor regions get no particular benefits from economic development, but they do in model 3.

Figure 2
Alternative Rural Interactions



Income inequalities within the village are likely to increase also, as some individuals use the private sector more creatively, (Let..., 1979) Also, differences in income between weak and strong, and old and young may increase, as wages are tied more closely to actual physical labor.

7. Price and Markets. A major questionmark involves the extent to which the natural forces of supply and demand will determine prices and marketing patterns. Many of the suggestions for economic rationality (Hu, 1978) would appear to move in this direction. Naturally, many in the bureaucracy would resist, citing the need to maintain political control over economic relationships. This issue will not be resolved quickly.

E. Consequences

Whether or not specific targets are achieved in particular years, China's agriculture is likely to grow under these new policies. Inequality may grow somewhat, but not excessively. Apart from these quantitative changes, implicit in this plan is a qualitative charge in the role of government. The state can play a far greater economic role in the procurement of food and cash crops and in the provision of inputs. Whether or not villages become more inward looking socially (Parish, 1976), the economy will be far more integrated. Perhaps the state will be overwhelmed by this task of integration and may prefer to allow market forces a larger role. As the economy becomes more specialized, more complex, and more integrated, the potentials for mismanagement increase. During the cultural revolution, industrial disruption had a minor impact in agriculture. In the 1970's it may have been more, and it will be even more in the future. For its own survival, the government may have to isolate even more of the economy from politics, and this would imply a major transformation of a socialist economy. This withdrawal is possible in China, unlike in the Soviet Union, because in China agriculture is primarily in the collective sector, whereas in the Soviet Union the state sector is predominant. T'ung (1978b) seems to have this in mind when he says:

> It is very possible that in the future the extension of the results of agricultural science will depend not on government administration methods, but rather on general science education and on specialized agricultural service companies.
>
> Under the conditions of politics in command, we must talk about science, technology, doing business, and efficiency to definitely overcome bureaucratism.

The opposition to this approach should not be underestimated. Bureaucrats will not be happy to surrender control of resources, even if this contributes to economic growth. The new policy will require enthusiastic cooperation of ministries of planning, agriculture, industry, marketing food, education, law, etc. Any agency with a divergent interest can sabotage the new program. Urban interests will not want to pay higher food costs; they may resist major investments in the countryside; and they may not like the idea of urban migration. On the other hand, urban interests should be happy about improved supplies of pork, eggs, etc. Urban and bureaucratic forces can join to resist this new agricultural policy. They could use slogans that emphasize proletarian dictatorship over market forces to prevent polarization; another slogan would be self-reliance. In the present context, these slogans serve to protect bureaucratic and urban privilege. Some people, however, will have genuine fears that specialization and market integration will cause hierarchy, income differences, and a loss of spiritual development towards socialism.

Despite such opposition, the new policies seem necessary now if China's economy is to grow faster than population, and if long term stagnation is to be avoided. There are, of course, cases where ruling elites have blocked structural reforms which would have undermined their relative power, even though this brought tong-term stagnation. In China the political and economic power of the peasants will reinforce a basic nationalistic desire to see China rich and strong and probably prevent such stagnation.

When and how thoroughly these new policies will be implemented cannot be guessed, but the forces setting these changes in motion are beginning now. When they are implemented, some will say China will have ceased being socialist; others will say China will have invented a new, more advanced form of socialism. Whatever the rhetoric, the change will be important.

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