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NENJIANG PREFECTURE - MECHANISATION, INTENSIFICATION AND THE ALL-ROUND DEVELOPMENT OF THE RURAL ECONOMY

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1. INTRODUCTION

Heilongjiang is the largest of the three provinces which comprises the Chinese "North-East", the old "Manchuria". The most northerly of China's provinces, Heilongjiang's principal physical characteristic is the severity of the winter cold, the frost-free period being as low as 120 days in some parts, compared to 250 days immediately to the North of the Yangzi and 180 days at Beijing.

In human terms, Heilongjiang is an area experiencing the full flood of Chinese colonisation. Broadly speaking, until this century, Chinese farm settlement was prohibited (Leeming). As a result, gross population densities are lower than for China as a whole - 70 persons per km² in comparison to 106 persons per km² - while the amount of cultivable land per agricultural labourer is much higher than the national average - 30.9 mu per agricultural labourer in comparison to 4.3 mu per agricultural labourer (*Zhongguo Tongji Nianjian 1983* p.106.148).

The combination of these physical and human characteristics, in conjunction with the State's perception of Heilongjiang as a major source of commodity grain, has had an important influence upon the development of the rural economy of the province. The purpose of this paper is to outline and comment upon this development, with reference to one specific area of the Heilongjiang: Nenjiang prefecture. In particular, the paper intends to discuss how local production units are responding to what is a potentially rich, yet also difficult, natural environment.

2. NENJIANG PREFECTURE : THE SETTING

"It is rare for a province to have so rich and such a satisfactory variety of natural resources of farmland, forests, grasslands and water. To describe it as a "golden bowl" is not an exaggeration."

Yang Yichen (a) S.1

Nenjiang prefecture - hereafter Nenjiang - is located in the South of Heilongjiang, and as such, represents an area where settlement is relatively well-established (figure 1). The prefecture itself is a vast plain generally below 200 metres above sea level, though becoming more elevated towards the east (figure 2). It contains the important city of Qiqihar, ten counties - Longjiang, Tailai, Gannan, Fuyu, Nehe, Lindian, Yian, Keshan, Kedong and Baiquan - and the autonomous county of Duerbote. The plain is bisected North to South by the Nen river and broadly East to

West by a number of smaller rivers, including the Wuyur, Arun, Nemor, Yalu and Chaor. Railway lines follow a number of these river valleys (figure 3).

In the main, soil conditions are good - black earths, calcareous and fertile. The frost-free period is about 150 days (although this varies within the prefecture) with the short summer period (June to September) generally hot. Rainfall is usually about 400 mm (Leeming).

Apart from winter cold in general, the farm environment in Nenjiang faces two important practical problems: drought in spring and early frost in autumn. Spring drought results from the continuing continental conditions of winter in these northern latitudes into midsummer with very little rain until June. This creates obvious difficulties both for the germination and also for the growth of grain crops. These difficulties are intensified when the strong northerly winds which persist into spring are also considered. The combination of low spring rainfall and strong spring winds create conditions where wind erosion of the top-soil is always a potential hazard. Frost early in autumn is obviously serious when the crops have not been able to make rapid growth in spring. It is disastrous when it comes in early-September when the grain is forming in the ears.

In spite of these difficulties, it is possible to see from figure 4 why the natural resource base of Nenjiang could be considered an integral part of the "golden bowl" of Heilongjiang. Figure 4 is abstracted from a broader study of the Nen river basin, based on Landsat data, by Welch *et al*, and purports to show the diversity of land use within Nenjiang.

From figure 4, it is possible to identify a significant amount of "wetland" in Nenjiang (concentrated along river valleys outlined in figure 3). This wetland is the result of poor drainage combined with the concentration of rainfall in the summer and low evaporation rates. Much of this wetland will serve as pasture during the dry periods of the year, and thus can possibly be classified as rangeland. Rangeland - Steppe, scrubland and grassland - is currently being converted to cropland. What remains is concentrated in the South of Nenjiang and is characterised by rough terrain and/or poorly drained alkaline soils. However, there remains much scope for the development of animal husbandry.

The significant pockets of new agricultural lands throughout Nenjiang

are reclaimed from rangeland, wetland, rough terrain or dry/saline soils. Reclamation involves much improvement of the natural environment through a variety of measures, including the construction of drainage ditches, irrigation channels, shelter belts and so forth. State farms are often located on such lands.

The most important category of land use is that of extensive field cropland which is predominantly found to the East of the River Nen. Extensive field cropland describes farmland traditionally cultivated for soybeans, corn, Chinese sorghum, wheat and millet. In Nenjiang, such farmland is characterized by regular farm patterns and relatively large field sizes (300 to 600 mu per field), both indicating that agricultural production is mechanised to a significant extent.

Of the other land-uses in Nenjiang visible from figure 4 - urban, intensive market gardening, water and forest - little needs to be said. Nenjiang, in contrast to the Nen river basin as a whole, has only a small amount of forest area and this is confined to its periphery. Finally, an area of intensive market gardening is noted around several of the numerous identifiable urban settlements (Welch *et al*). However, with the exception of that around Qiqihar, it is unlikely that such intensive market garden areas have anything more than a marginal influence upon Nenjiang's rural economy. It would appear that the natural resource base of Nenjiang offers scope for a range of diverse agricultural undertakings.

Finally, some comment should be made about rural settlement in Nenjiang. Liang Yuxun *et al* estimated that in early 1984, the natural resource base outlined above, supported something over 900,000 rural households - a rural population of about 4.6 million. Of these households, over 107,000 were classified as specialised or key households in 1984 (Pei Shouju). Aside from state farms, the literature utilises a variety of spatial units to describe the locations of households. These include both the common collective terms and the more localised terms of "*Xiang*"(township) and "*tun*" (village). For the purposes of this paper, it would be appropriate to equate the *Xiang* with the commune and the *tun* with the brigade, though this relationship is by no means formalised.

3. COMMODITY GRAIN PRODUCTION - MECHANISATION AND INTENSIFICATION

The State's perception of Nenjiang has long since been as a source of commodity grain, yet the prefecture's performance in grain production has not matched the State's demands of it. While not ignoring the damaging

impact of cultural revolutionary policies upon the motivation of producers, much of the fault for this weak performance has been a failure over a number of years to make real progress with the creation of new farmland, with land improvements on the existing arable, or with the raising of levels of production technique which remain low (Leeming).

In recent years, policy makers have been attempting to rectify the serious production problems of Nenjiang's numerous commodity grain bases in particular and grain producers in general (11 of the province's 13 commodity grain bases are situated in the Nen river basin, although it is unclear how many actually fall within the prefectural boundaries (Bing Yushu)). The path taken by the prefectural authorities is one of mechanisation and intensification of production techniques allied to the adoption of a variety of new production management forms which have been available since the third plenary session of the eleventh C.C.P.C.C. in 1978.

3.1 Mechanisation

Given the farming characteristics of Nenjiang - the high amount of cultivable land available per agricultural labourer; spring drought; the short frost-free period; extensive cultivation and so forth - it is unsurprising that agricultural mechanisation is important in the development of grain production. Under such conditions, mechanisation can ensure timely early sowing, preserve seedlings in the initial stages of growth, promote intensive and meticulous cultivation, and facilitate harvesting (Yang Yichen (b)).

Neither is it surprising to discover that mechanisation has been concentrated upon developing grain production. As the *Beijing Review* notes (p.24) "almost two-fifths of the 2216 brigades in the Nenjiang river plain have been given the signal to mechanise first because they grow wheat and soybeans". In Nenjiang and throughout the Nen river basin, the State's concern for large stable supplies of commodity grain is channelling mechanisation towards the development of grain production ahead of other areas of agricultural production.

The impact of mechanisation upon grain production can be illustrated by a number of examples. Liming brigade, Beilian commune, Keshan county has an interesting history. This brigade was established in 1956 by 250 people from Ju county in Shandong who came to Keshan as an organised migrant group to clear and settle new arable land (Yu Quanyu *et al*). They raised

per unit grain yields from a little over 100 jin/mu to 244 jin/mu in 1968. At this time, the question of mechanisation was first suggested, no doubt in an effort to combat the short frost-free period of 110 days (Yu Quanyu). At that time, the State tractor station was selling off machinery cheaply and Liming brigade purchased a Caterpillar tractor on hire purchase and then a plough attachment. Since then, the brigade has consistently purchased large-scale agricultural machinery. In 1978, the brigade had 8,140 mu of cultivable land, of which 7,420 mu is sown with wheat and soybean, and 720 mu with maize and millet. Wheat and soybean cultivation is completely mechanised while maize and millet cultivation is over 90% mechanised. Grain production in 1978, 1979 and again in 1980 was impressive:

TABLE 1. LIMING BRIGADE. KESHAN COUNTY. GRAIN PRODUCTION CHARACTERISTICS. 1978.1979.1980.

	1978	1979	1980
Total grain production (million jin)	3.614	3.61	3.92
Commodity grain quota (million jin)	0.466		0.46
Commodity grain supplied to the State (million jin)	2.284		2.3
Commodity rate of grain (%)	63.19		58.67

Some figures deduced.

Compiled from materials in Yu Quanyu *et al.*
Yu Quanyu p.2.
Li Tianxing etal (b) p.2.

Liming brigade is one of 11 brigades in Beilian commune and each brigade has, it is claimed, followed this path of agricultural mechanisation. In 1979 alone, each brigade spent over 100,000 yuan on the purchase of agricultural machinery with the county authorities contributing a further 1 million yuan (Jing Bo *et al*). The principal concern of these purchases was to raise the level of mechanisation in weeding and storage techniques for example, to that of ploughing, sowing, fertiliser application and so forth. Jing Bo *et al* argue that by early 1980, agricultural production throughout Beilian could be considered virtually completely mechanised. Grain output in 1979 for Beilian commune as a whole was only marginally less impressive than that illustrated for Liming brigade in Table 1.

A similar example of development through mechanisation is given by Li Tianxing *et al*(a). They note the development of Jianshe brigade, Keshan county. Before 1979 it was considered a backward production unit. All cultivation was extensive, production organisation was incomplete and the labour force was insufficient to meet the production tasks placed upon it. At the beginning of 1979, the brigade purchased 7 large- and medium-scale tractors, 3 complete harvesters and a complete set of agricultural implements. Many aspects of the production process were mechanised and important improvements in grain production were noted as a result.

TABLE 2. JIANSHE BRIGADE. KESHAN COUNTY. GRAIN PRODUCTION CHARACTERISTICS. 1977. 1979.

	1977	1979
Total grain production (million jin)	1.13	3.97
Commodity grain quota (million jin)		0.57
Commodity grain supplied to the State (million jin).		2.1
Commodity rate of grain (%)		52.9

Some figures are deduced.

Compiled from materials in Li Tianxing *et al*(a). p.2.

However, the benefits of mechanised agricultural production illustrated above have not been universal. Xu Bu, referring to Heilongjiang as a whole but no doubt true for Nenjiang, comments that:

"...we must also look at Heilongjiang's promotion of mechanisation in terms of state investment loans, and commitment of goods and materials and in terms of the price paid by the peasantry. If we compare all of the above to the beneficial results of mechanisation and the material benefits derived therefrom by the peasants, we should say either that the benefits are not commensurate to the costs or that they are unsatisfactory. This is concretely indicated by the failure of the rapid growth of mechanisation to produce beneficial results at the same rate."

Xu Bu offers a number of reasons why this should be so. First, the path of mechanisation has for too long been one of an "isolated force penetrating deep into enemy territory". That is, mechanisation has not been accompanied by agronomic, biological or engineering measures to improve the productive capacity of the soil. Mechanisation alone has not been able to relate relatively high land and labour productivity. This situation is only now beginning to change.

Secondly, the composition of mechanisation is poor. The current allocation of farm machinery exhibits "a big head and a small tail". That is, great power but few complete sets of farm machinery. It is said, for example, that 1,000 million jin of grain goes unharvested annually in Heilongjiang due to a shortage of combine harvesters (Leeming). Significantly, only in 1979, a decade after beginning mechanisation in agriculture was Liming brigade strengthening its harvesting capacity. Furthermore, the farm machinery is often inferior in quality. All of this adds up to a low utilisation rate for farm machinery, a narrow range of suitable uses and low benefits.

Thirdly, there is still a tendency - fostered, according to Xu Bu, by leftist influences - to blindly mechanise irrespective of natural conditions and the availability of fuel supplies from the State. Bing Yushu, for example, notes that State supplies of petroleum, oil and lubricants are insufficient to meet the demands of agricultural machinery - a shortfall throughout Heilongjiang of 160,000 tons. This seriously reduces the utilisation rate of the available agricultural machinery.

Finally, before the introduction of production responsibility systems into agricultural machinery work, management and service of farm machinery was contracted out either exclusively to farm machine brigades or jointly to farmland brigades and farm machine brigades. While this system was workable in large, sparsely-populated areas of monoculture, it was argued that in other areas crop variety and agronomic complexity tended to produce poor results.

Thus, major problems were to be found with agricultural mechanisation. It is significant that the examples given above from Keshan county have tended to avoid the problems outlined by Xu Bu. Equally significant, the Keshan county authorities have, it is claimed, co-ordinated the development of mechanised farm production with a policy of intensification and the introduction of production responsibility systems into agriculture.

3.2 Intensification

Historically, agricultural production in Nenjiang has been based upon extensive exploitation, large areas producing low yields. Increases in total output were dependent upon increases in sown area. This was certainly true of 1976, for example, when Welch *et al* undertook their work on the Nenjiang river basin (see figure 4).

However, Xu Bu and others propose that future improvements in output are best achieved through intensification on the existing arable. In particular, an intensification policy can contribute to reducing fluctuations in output which remain significiant, as well as improving the ecological conditions of the natural resource base (*Renmin Ribao* 25.1.1980).

The natural resource base of Nenjiang certainly seems to have suffered in recent years. The destruction of forest and grassland in order to reclaim wasteland for arable, the contamination of water, the indiscriminate excavation of mines and quarries have all seriously disrupted the environment (Yang Yichen (b)).

Soil erosion is becoming a serious problem and in some places the organic content of the soil has dropped to 2% from its original level of 8%. Bing Yashu, for instance, notes that (p.73):

"In Baiquan county, which has all along been called a county that could not be worn down, seven per cent of the hilly land has been changed into loess hills, thirty per cent of its land has become alkali and some of its land has begun to change into sand."

There is little doubt that such a decline in the natural resource base is a major contributory factor to low grain yields. Furthermore, the effective irrigation area is very low, farmland water conservancy work weak. As a result, the capacity for resisting natural disasters remains low.

In recent years, some production units have responded to the decline in the natural resource base through an intensification policy which encompasses a variety of measures to improve productive capacity. First, land inappropriately converted to arable has been returned to pasture. In 1980, Longjiang county for example, returned 40,000 mu of arable land back to pasture contributing to a total of 400,000 mu of arable returned to pasture in Nenjiang in the same year (Yang Yichen (b)).

Secondly, the implementation of a variety of techniques has aimed at reducing wind and soil erosion. Lianmin brigade, Xihe commune, Keshan county for example, is situated on a loess ridge. To reduce wind and soil erosion this brigade constructed shelter-belts, "fish-scale" pits (pits arranged like fish-scales, dug on mountain slopes for holding water or planting trees) and terraces. Indeed, Nenjiang is just one prefecture

in western Heilongjiang which is being aided by the State's "Sanbei" shelter-belt construction project. Shen Jiken *et al* report that this project aims to build sufficient shelter-belts to preserve 40 million mu of cultivable land in western Heilongjiang. In the year up to mid-1984, it is claimed that shelter-belt construction helped to preserve 8,010,000 mu of cultivable land, four times the amount that had been preserved by shelter-belt construction in the previous 26 years.

Within the limits of this shelter-belt, Shen Jiken *et al* claim that it has been possible to reduce wind-speed by 20 to 35 per cent; reduce water evaporation rates by 16 to 18 per cent; increase the soil moisture content by 9 per cent; increase temperatures by 0.9 to 1.4°C; and extend the frost-free period by 2 to 6 days. If these claims are to be believed, ecological conditions- and therefore productive capacity - will undoubtedly improve.

Thirdly, increased applications of fertiliser - organic and inorganic - to improve soil fertility has been potentially of great importance. Lianmin brigade, for example, managed to increase the organic content of their soil from 2 to 4 per cent by applications of fertiliser obtained from the development of pig-keeping. Yang Yichen [b] notes this as being an important factor in the improved grain yields of Lianmin brigade between 1978 and 1980 (see Table 3 below).

Finally, crop rotations are also encouraged as a means of improving soil fertility (Yang Yichen [a]).

Production units are urged to capitalise upon such improvements in productive capacity by utilising advanced agricultural techniques - fine seed strains, pesticides, and so forth - to improve per unit grain yields. Given Nenjiang's production characteristics, the use of early-maturing, drought-resilient seed varieties for example, can do much to improve grain yields.

The adoption of such a broad set of intensification measures alongside agricultural mechanisation is clearly important in the development of Liming and Jianshe brigades. Yu Quanyu *et al* for example, note that Liming brigade benefited from the utilisation of high-yield varieties of seed developed by the Keshan agricultural scientific methods station as well as increased applications of fertiliser, agricultural pesticides and so forth.

The improvement in grain production in Liming and Jianshe brigades has already been noted in Tables 1 and 2. However, it is clear from Table 3 that this improvement is as yet significantly localised:

TABLE 3. AVERAGE PER-UNIT GRAIN YIELDS. VARIOUS LOCALITIES. RECENT YEARS. (Jin/mu)

	1970's	1978	1979	1980	1982
Lianmin brigade[1]	c.200	320	365	373	
Liming brigade	c.200[2]	396[3]			
Keshan county[3]		242.1			
Nen river basin[4]					287
Heilongjiang[5]					216
China[5(a)]					416

(a) The figure for China refers to the average per-unit yield for one crop only.

Compiled from materials in : [1] Yang Yichen (b) p.4.
[2] Yu Quanyu *et al.*
[3] Yu Quanyu p.2.
[4] Bing Yushu p.74.
[5] *Zhongguo Tongji Nianjian, 1983.* p.173-4.

While grain yields in Nenjiang are certainly above the provincial average, they are still below the target figure of 400 jin/mu. Clearly there is still a need for more widespread utilisation of intensive agricultural production techniques alongside agricultural mechanisation.

3.3 Production Responsibility Systems

It is interesting to note that Liming brigade for example, in addition to co-ordinating intensive and mechanical agricultural production, was also quick to utilise a variety of production responsibility systems. Li Tianxing *et al* (b) claim that the introduction of such responsibility systems into Liming brigade was an important motivational factor behind the improved grain production displayed in Liming after 1978 (see Table 1).

By February 1984, Liang Yuxiu *et al* report that 98 per cent of all production teams in Heilongjiang had implemented the all-round contract system of production responsibility, an increase of 7.2 per cent over the

previous year. However, within this framework much variety of detail is noted. Initially, two types of responsibility system were distinguishable: first, in manual production, the fixing of output quotas for cultivation by individuals, households or groups; and secondly, fixing output quotas for farm machine operators or groups. These, however, are not mutually exclusive within a production unit.

A number of responsibility systems can be identified in the literature of the first type, including a "four specialisations and one link" system (*Heilongjiang Radio* 16.8.1981) and "four unifications and four fixes" (*Heilongjiang Radio* 29.1.1982). The "four unifications and four fixes" system, for example, involves the implementation of a system of unified management alongside assigning production quotas to individuals or work groups. Production teams draw up unified farming plans, unified management of farm machinery, vehicles and draught animals, a unified plan for production costs and unified accounting and distribution. The four fixes comprised fixed plots, fixed output, fixed penalty and bonus and one other which was not made clear in the text.

The extent of mechanisation in Nenjiang heightens the importance of responsibility systems of the second type, that is fixing output quotas for farm machine operators or groups. Once again there is much variety in detail illustrated in the literature and two examples will be given.

First, farm machinery teams undertake assignments on a contract basis, and payment is calculated on the basis of work performed. Contracts between the brigade and the farm machinery team arrange work quotas, and work points are calculated on the basis of work performed with unified distribution of payment.

Secondly, the farm machinery team becomes an independent accounting unit and signs contracts with the production team which requires the work. Nevertheless, interdependence between manual and mechanised production remains inevitable. Some teams in Baiquan county for example, assign production quotas to households and individuals who are responsible for field management while collectively-owned farm machinery is still used to plough the arable. However, by distinguishing the role of farm machinists and acknowledging and rewarding their particular skills, this should not only arouse their enthusiasm for production, but should also increase

enthusiasm amongst those peasants involved in manual labour by the improved livelihoods - as well as eased workloads - which mechanisation can bring about.

More recently, it would appear that the local cadres, implementing the line of the 1984 C.C.P.C.C. Document number 1, have encouraged responsibility systems to concentrate very much upon the individual household. As a result, in some places farm machinery, for example, has become individually managed. Three villages in Shuanghe *Xiang*, Keshan county, for example, began selling previously collectively-owned large-scale agricultural machines to individuals. After six months of individual management it is claimed that machine productivity rates had increased, service quality was improved and so forth. As a result, a further 8 villages in Shuanghe sold 24 caterpillar-tractors and 126 pieces of large-scale agricultural machinery to individual peasants. While this represents a significant move on behalf of the collective, it should also be noted that control over such farm machinists - through local cadre groups, contracts and so forth - remains strict. (Chen Qing *et al.*)

Responsibility has also been applied to scientific technicians promoting, it is claimed, more effective application of advanced agricultural techniques. Pei Shouju notes that 1,260 scientific households were to be found in Nenjiang in 1983 - though still only a tiny fraction (c.0.14 per cent) of the total number of rural households within Nenjiang.

Furthermore, grain-producing specialised households are emerging. In 1984, Jianhua brigade, Changshan *Xiang*, Gannan county, for example, contracted 4,600 mu of cultivable land to 64 grain-producing specialists (an average of 71.8 mu per household). These specialists in turn signed contracts with agricultural machinery teams, technicians and so forth. Results were certainly impressive with grain yields reaching 300 jin/mu, total grain output exceeding the previous year's total by 300,000 jin, and incomes also increasing (Zhao Guo *et al*).

There seems little doubt from the literature that the implementation of production responsibility systems within agriculture - with subsequent developments and modifications - not only aroused peasant enthusiasm for production, but also complemented the growth in the mechanisation and intensity of agricultural production in Nenjiang. Pei Shouju, amongst others, believes this combination of production responsibility with

mechanised and intensive production has already done much to promote bumper grain harvests within Nenjiang in recent years. In 1983, for example, Nenjiang's grain harvest was the third largest in history despite severe storms, low temperatures, waterlogging and so forth which hindered production. Stability of agricultural policy - clearly intended by the introduction of contract periods for up to 15 years (Li Lian (a); *Heilongjiang Radio* 9.3.1984) - will, it is argued, further enable Nenjiang to overcome natural difficulties, achieve stable yields and thereby improve supplies of commodity grains to the State.

While the co-ordinated development of mechanised and intensive production, together with the implementation of new production management forms seems to be the way forward for commodity grain production in Nenjiang, numerous questions need to be asked: first, how commodity grain producers can overcome the negative effect of low State grain prices; secondly, how mechanisation and intensification policies are financed; thirdly, how to employ the surplus labour force created by mechanisation; fourthly, how effectively can the commercial system withstand the increased burdens being placed upon it; and finally, how widespread is rural development in Nenjiang.

4. FOUNDATIONS FOR MECHANISED AND INTENSIVE PRODUCTION

To best answer the questions framed above, four aspects of the rural economy in Nenjiang need to be investigated: State prices and investment; rural industry; diversified undertakings; and commerce.

4.1 State Prices and Investment

There still exists in the current phase a contradiction between the importance of grain production and the relative State prices for grain and other economic crops. This contradiction is reflected in Bing Yushu's concern about the desirability of equalising incomes between peasants involved in grain production and those who are not (p.75):

"As a policy, we must ensure that peasants who plant grain are able to get profits commensurate with the profits from planting economic crops,and then we will be able to sustain the peasants' enthusiasm for planting grain."

Bing Yushu's concern over the undesirability of grain production by individuals within the current price system is also expressed for commodity grain base areas. He calculates that it costs local finances 108 yuan

for every 10,000 jin of grain sent out to the State. This represents a considerable loss to the local economy and, as he comments (p.78), "... if this problem is not solved, enthusiasm for operating commodity grain bases will surely be dampened."

The State's attitude to grain prices is unlikely to change. However, it may encourage grain production in commodity grain base areas through State investment in such areas. Although Nenjiang is not specifically mentioned, commodity grain bases in Heilongjiang are amongst those currently signing joint State-local investment agreements. Under these agreements, from 1985 to 1990, the county building the commodity grain base with the help of State funds, in addition to existing grain delivery quotas shall "annually deliver 5 jin of grain to the State for each yuan of State investment" (Tian Jijin *et al*). To overcome previous difficulties, whereby such State investment did not result in increases in commodity grain supplies, these agreements clarify responsibilities, powers and rights of both parties and, according to Tian Jijin *et al* (K.3):

> "... guarantees that special State funds for building projects in connection with popularisation of agricultural techniques and superior seed strains and for building small farmland water conservancy projects will be ear-marked for their specified purposes only."

It is doubtful, however, if such levels of State investment will be sufficient to promote development, except at a localised level. Certainly it will do nothing to change the fact that State grain prices remain low. Indeed, in Nenjiang, just as in many other areas of China, increasingly, it is the local production unit which is itself subsidising grain production, either directly through income subsidies, or indirectly through the subsidy of the costs of production.

Yangfa brigade, Pingyang commune, Tailai county, for example, is developing commodity grain production through grain-producing specialised households - 70 in 1984 from 9 the previous year - and is implementing six measures in order to safeguard increased grain production and incomes: first, supplying 34,000 jin of high quality seed strains; secondly, supplying 80,000 jin of fertiliser; thirdly, alleviating seasonal shortages in investment funds; fourthly, supplying agricultural machinery services to guarantee the autumn harvest; fifthly, encouraging the transfer of knowledge from other grain specialists in Keshan and Longjiang counties for example;

and finally, organising transport and marketing of the grain (Zhang Haishan).

While such measures may provide one answer to the problems caused by low State grain prices and the absence of more widespread State investment, they still beg the question as to how this local subsidy is financed. The answer to this question rests with the development of rural industry and diversified undertakings, together with the ability of the commercial system to market the produce of these sectors of the rural economy.

4.2 Rural Industry

Generally speaking, it is rural industry which both provides the initial finance - through accumulation funds - for mechanisation and intensification of agricultural production, and is also a major contributor - again through accumulation funds - to the subsidies more recently made available to grain specialists. It is true that there is some evidence to suggest that the financing of mechanisation and intensification is possible through farming income alone, for example, in Taiping brigade, Zhongxing commune, Gannan county. Here, the considerable investments in agricultural machinery seem to have come from farming income with little mention made of industry (*People's Daily* 26.8.1971). However, other examples point to the importance of industrial finance. Given the longstanding difficulties of purely farming units in raising accumulation funds, rural industry seems to be the most likely source of significant local funds.

Li Tianxing *et al* (a) for example, note that in Jianshe brigade, a wide variety of industries - a galvanised iron plant, tile-yard, distillery, a foodstuffs processing industry, and so on - contributed to accumulation funds which were used to purchase farm machinery.

Similarly, Yu Quanyu *et al* and Li Tianxing *et al* (b) separately point to the importance of industrial finance to the development of mechanised and intensive farm production in Liming brigade. Yu Quanyu *et al*, for example, note that between 1970 and 1979, brigade-run industrial enterprises - including a canning factory, a confectionary plant and so forth - contributed over 500,000 yuan to collective investment funds which had subsequently been used to purchase agricultural machinery.

Such industrial enterprises - along with diversified undertakings - also provide an important source of employment for those labourers displaced from farming through the establishment of mechanised production. Yu Quanyu *et al* , for instance, note that in 1979 in Liming brigade, only 20% of the labour force of 550 was employed in farming. Again, in Jianshe brigade, Li Tianxing *et al* (a) comment that only one-third of the labour force was employed in farming in 1980. In both brigades, industrial enterprises are an essential source of employment and income opportunities for surplus farm labour.

However, some doubt remains as to how widespread such industrial enterprises are throughout Nenjiang. It has already been indicated in Table 3 that mechanised and intensive farm development is still very much localised. Evidence concerning the spread of rural industry within Nenjiang seems to confirm this view.

Indeed, it would appear that it was not until the implementation of the all-round contract system of production responsibility that peasants began to consider using personal funds to establish such industrial enterprises. This was certainly true for 7 peasants of Dongsheng brigade, Erdaowan commune, Fuyu county. Only after the implementation of such a system within Dongsheng did they decide to invest 7,000 yuan of personal funds and to establish what appears to be a successful pulp mill (Guan Defeng *et al*).

Certainly there appear to be numerous opportunities for such small-scale industrial development. 8 commune members of Changsheng brigade, Youyi commune, Fuyu county, for example, invested 15,000 yuan of personal funds to purchase the necessary machinery to establish an oil-extraction mill. Previously, peasants in the area had had difficulty obtaining edible oil because there was no available oil mill. Within three months of commencing operations, these 8 commune members had earned a favourable reputation for their work and their net per capita incomes between January and March of 1984 reached 820 yuan (Pang Zhongliang (a)).

There is also some evidence to suggest that, in more well-established rural industrial enterprises, it was not until the recent introduction into such enterprises of a well-defined responsibility system that profitability was achieved and expansion possible. In Duerbote county, between 1980 and 1983, responsibility systems in industrial enterprises

were not clear-cut, penalties were unclear and losses by light industrial enterprises, for example, amounted to 258,000 yuan over the four-year period. Only after implementing well-defined responsibility systems - assessing output values, taxes, profits and so forth - it is claimed, did production and profits improve (Jin Fengshan *et al*). Similar arguments are put forward to explain recent success in county-run industry in Longjiang (Wang Lijuan) and State-run industry throughout Nenjiang (Tong Yongda *et al*).

To sum up, although there is evidence to suggest that financial contributions from rural industrial enterprises to agricultural - via collective accumulation funds - might reasonably become more widespread in the future, it is perhaps too early to expect that such enterprises play anything more than a marginal, localised role in the provision of funds for mechanised and intensive farm production or subsidies to grain producers, and as employers of surplus farm labour. However, as demonstrated in Liming and Jianshe brigades, where rural industry is developed, it is a major driving force behind the development of agricultural production in general, and grain in particular.

4.3 Diversified Undertakings

"Our objectives were to build our province into the following sorts of base area: a modernised agricultural base concentrating on production of commodity grain, and including the overall development of economic crops and diversified operations."

Yang Yichen (d) p.61.

Under the Maoists, diversified undertakings throughout Nenjiang were severely curtailed. As Yang Yichen (a) S.2. comments "... during the 'Great Cultural Revolution', those who engaged in diversifying the economy would be fragrantly labelled capitalists and they would be condemned within the call to cut off the tails of capitalism. Thus, how could a diversified economy be developed?" Indeed, it was not until after 1978 that diversified undertakings began to be re-established in many areas - although it is significant that some brigades including Liming and Jianshe, in the 1970's at least, seemed able to diversify without apparent condemnation.

There is clearly much potential for diversified undertakings in Nenjiang. Although, as Figure 4 illustrates, forestry development is confined to the peripheries of Nenjiang, it can be an important source of wealth. This is true, according to Yang Yichen (b), in Xingshier brigade, Gannan county, where 3,000 mu of forest land was successfully and profitably

developed. Similarly, the development of the fishing industry and orchards are said by Yang Yichen (b) to have much potential.

However, it is animal husbandry which is undoubtedly the dominant sector of the diversified economy. Nenjiang prefecture has an estimated 15.3 million mu of grasslands to complement its cultivable area (Yang Yichen (b)). There has certainly been an increase in the number of cattle kept in the current phase. Saihantala commune, Duerbote county, for example, has increased the number of cattle kept from 2,800 head in 1979 to 5,200 head by the end of 1981 (Yang Yichen (b)).

Similarly, great claims are made for the sheep-breeding industry especially in Longjiang and Gannan counties, where, according to Yang Yichen (a) S.9. "these two counties have made a fortune out of breeding sheep". Nevertheless, even in Gannan and Longjiang, difficulties in sheep-breeding still remain. Xingshan *Xiang*, Longjiang county, for example, an area of extensive grasslands highly suitable to the development of sheep-breeding, up until 1984 had no sheep-dipping facilities. Disease was common and the breeding of sheep suffered (Lin Shufan). In Gannan county, the number of sheep at hand at the end of 1983 was down 15,000 on the previous year. Upon investigation, county *Xiang* and *tun* authorities discovered that sheep-breeders were faced with shortages of fodder materials and herding difficulties (Zhang Ruiguang *et al*). Clearly, there is still room for improvement.

Pig-breeding has also developed in Nenjiang through the implementation of a variety of measures. These can perhaps be best summarised in the "four priorities" and "three guarantees" adopted by Baiquan county to encourage pig-breeding. The four priorities relate to the provision of loans, the supply of fodder materials, the supply of construction materials for the building of pig-sties, and the marketing and transport of goods and materials. The three guarantees refer to technical work, the availability of fine breeding strains and insurance work (Provincial and county animal husbandry survey).

Furthermore, six counties of Nenjiang - Kedong, Baiquan, Keshan, Yian, Nehe and Longjiang - have had an integrated pig semen system established within them. Provincial authorities have invested heavily to establish artificial insemination stations, to purchase fine strains of boar from Hangzhou, Zhejiang province and so forth. Certainly, within

Kedong county at least, such insemination centres were beginning to have a favourable impact upon pig production (Wang Jingzi *et al*; Gui Chen; and Zhang Xueju).

Nevertheless, pig-breeders still face numerous problems, especially the availability of fodder supplies. There is, however, evidence to suggest that this problem is being overcome in a number of ways: first, through the allocation of fodder land to breeders according to the number of pigs supplied to the State (Provincial and county animal husbandry survey); secondly, by allocating fodder supplies to breeders according to the number of pigs supplied to the State (Bai Chunwen *et al*); and thirdly, through the establishment of certain small-scale industrial enterprises - bean-curd plants, distilling plants and so forth - where the by-products and residual materials can be utilised by pig-breeders (Li Tianxing *et al* (c)).

Animal husbandry must be considered a major source of income along with the diversified economy in general. Furthermore, according to Wang Shucai *et al*, the widespread establishment of specialised contracts within the diversified economy and in animal husbandry in particular, has done much to improve output and income. Certainly, in Fuyu county, for example, specialisation in fish-, cattle-, ox-, and poultry-breeding significantly increased in 1984 and made a greater contribution to gross agricultural output value (Pang Zhongliang (b)).

The growing development of diversified undertakings since 1978, especially the animal husbandry sector, will, it is claimed, do much to provide employment for surplus farm labour (Han Xuejian). Diversified undertakings are also an important source of income for collective accumulation funds which, in turn, finances the development of mechanised and intensive farm production and subsidies for grain specialists. However, the full potential for diversification throughout Nenjiang has yet to be realised. Though less so than in rural industry, opportunities for employment in, and income from diversified undertakings - both individual and collective - still appear limited and localised.

4.4 Commerce

"Rural production and marketing are directed by 14 different government agencies. Sometimes the production of one variety of grain is under the jurisdiction of several government agencies. They usually do

not agree with one another and argue endlessly. Unnecessary duplication of links in one chain of distribution hinder the flow of agricultural products. The system should be reformed gradually."

Li Lian (c) p.51.

The effectiveness of the commercial system in Nenjiang is a key determinant to growth in the rural economy. Without an effective commercial structure, industrial and diversified undertakings cannot fully develop thereby limiting the accumulation of collective funds for mechanised and intensive farm production and subsidised grain production, and reducing employment and income opportunities for surplus farm labour. Thus, peasant enthusiasm for all aspects of rural production is depressed. Two aspects of the commercial system can be identified: first, the commercial organisation; secondly, the commercial infrastructure.

Li Lian, the Secretary of the Heilongjiang Provincial C.P.C., in a number of articles is scathing about the commercial organisation within Heilongjiang. He calls for the abolition of the "State monopoly over purchases and marketing and establish the principle of the planned economy supplemented by market regulation" (Li Lian (c) p.51). The major impact of this monopoly, argues Li Lian (b) S.3.:

"... is the gradual strangling to death of buying and selling ... They (i.e. *bureaucrat-merchants*) aim at controlling other people and attempt to contract for everything, or running 'a single store which has no branches' for everything, including purchasing, processing and marketing. Also, the prices are tightly controlled and no leeway in price is given at all. As a result, not only the contracting done is of no avail, but also the circulation channels are closed up."

In recent months, the State has reduced its monopoly over the purchasing and marketing of certain agricultural produce, although important crops - including grain, cotton and oil-bearing crops - remain strictly under the State monopoly. Indeed, a *Heilongjiang Daily* article, 1.10.1984 (S.2) is much more favourable about the commercial system than Li Lian had been in previous months:

"While giving full play to the dominant role of State commercial units, we have supported and developed the collective and individual commerce, and increased circulation channels. The retail sales of commodities through various economic forms have increased generally. Trade fairs have been rapidly restored and developed and the supplies of industrial goods for daily use, as well as non-staple food, including meat, fish and eggs, have improved remarkably. Many commodities that were supplied through coupons are now in unrestricted supply."

Within Nenjiang, it is difficult to gauge how much improvement has been made within the commercial organisations. Certainly in the literature, there are numerous examples of commercial efficiency. Li Yinghua, for example, notes how the Yian county vegetable corporation planned to completely sell the expected bumper harvest of potatoes in that county in 1984:

TABLE 4. YIAN COUNTY. EXPECTED POTATO PRODUCTION AND SALES. 1984. (Million jin).

Expected potato production	30
Sales to "Southern China"	14
Sales to "Northern China"	4
Sales within Heilongjiang	12

Compiled from materials in Li Yinghua p.1.

According to Li Yinghua, contracts guaranteeing quality, quantity, and timing of delivery/purchase were signed by producers and consumers with the vegetable corporation purchasing bagging materials, providing transport and so forth.

Similarly, Liu Jianxi *et al* note the emergence of an integrated agricultural and commercial company in Lindian county, based on existing supply and marketing co-operatives and about 1,000 specialised households. This company not only provides technical services to a wide-range of producers, but more significantly guarantees the marketing and transport of produce. According to Liu Jianxi *et al*, the stability provided by this company has encouraged commodity production to develop, the variety of commodity produce increasing from 29 to over 150 goods.

The company described by Liu Jianxi *et al*, closely resembles an integrated agricultural-industrial-commercial complex, emphasised on several occasions by Li Lian, as being a highly appropriate production management form for Heilongjiang in general (Li Lian (a); (b)). However, further details remain scant.

Despite such examples of efficiency, conflict between what the commercial organs want to purchase and what the rural producers have to sell remains. Even in grain production, it seems, the marketing of

surpluses has no guaranteed market. In 1984, for example, Fuyu county produced 200 million jin of grain. After sales to the State,amounts retained for personal needs, existing fodder requirements and so forth, a significant surplus remained. This prompted the peasants to greatly expand animal husbandry (as described above by Pang Zhongliang (b)). However, if grain production fell, it is easy to see how a conflict between animal husbandry, fodder requirements and State grain demands would arise. More significantly, if grain surpluses are not effectively utilised - unlike the example of Fuyu - enthusiasm for grain production will inevitably be reduced. It is difficult to understand how the State can expect to develop commodity grain bases under such commercial conditions.

When official commercial organs fail to market goods effectively, individual traders often emerge in an attempt to fill the breach. Yongfa brigade, Yongfa commune, Longjiang county, for example, has as its most important sideline undertaking the production of whisk brooms. In 1984, however, the local supply and marketing co-operative decided to reduce its purchase quotas, leaving many peasants with large surpluses of brooms. One peasant, Lin Changwen, seeing this situation, travelled to Dandong city in the South-East of Liaoning province and signed contracts with a local company to sell 30,000 surplus brooms in Dandong and the surrounding area (Ge Zhongliang).

It is difficult to believe that the commercial problems outlined so forcefully by Li Lian in various articles have, in such a short period of time, been removed in Nenjiang. While, it is claimed, the situation is improving - not least through the emergence of individual commerce - commercial organisational rigidity remains an important block to rural development. Inevitably, the experience of 1966 - 1978 can have contributed little or nothing to individuals' entrepreneurial confidence.

A similar picture emerges from an investigation of the commercial infrastructure within Nenjiang. In particular, three difficulties are much commented upon: first, the insufficient grain storage capacity; secondly, the relative inconvenience of road transport; and thirdly, the paucity of the means of transport.

The problem of insufficient grain storage capacity is common throughout Nenjiang (Feng Qian). The State, it would appear, has encouraged commodity grain bases to increase grain production without concomitantly developing storage capacity. Yuan Guoshan for example, notes the problems of grain storage at the Nehe county grain depot. The grain depot annually receives 62 million jin of grain, yet capacity remains only 14 million jin. 48 million jin of grain is therefore stored in the open air and becomes vulnerable to inevitable losses from the climate, vermin and so forth. Similar problems are noted in Shuangyang *Xiang*, Yian county by Wang Weidong *et al*. While in both of these localities, some considerable efforts have been made to improve storage conditions, it remains a major problem. Indeed, it must be said that if such storage problems are found with grain crops in an area which purports to be a major supplier of commodity grain, like problems for diversified produce must also be large.

Opinions as to the state of Heilongjiang's road network differ. According to Bing Yushu, the road network is both dense and well-developed. Alternatively, Zhan Wu (p.74) comments that "the lack of transportation facilities greatly affects agricultural production" while Welch *et al*, referring to the wetland area of Nenjiang as outlined in Figure 4, note that transportation can be difficult in the rainy season. Indeed, Shi Yanjiang notes that in Keshan county, roads to the Keshan *Xiang* granaries were, until recent improvements, in a poor state of repair, had a tendency to flood and were difficult to pass.

Thus, it seems fair to assume that even though the road network in Nenjiang may be relatively dense, much of it is seasonally impassable and in disrepair. While Zhang Qiang noted that 270 km of roads were repaired and made passable all year round in Kedong county in 1984, much more work needs to be undertaken to change this situation for the better. Until such time as this work is completed - and the literature does mention the possibility of a provincial-wide integrated road network, though if such a network were to become a reality, its effectiveness to reach a significant proportion of the smaller production units would remain open to doubt (Wang Liancai) - it is inevitable that those units with access to convenient roads will prosper ahead of more peripheral and less accessible units.

Finally, there is the problem of access to the means of transport. Even in those units where the peasants are able to diversify and produce goods for sale above quota requirements, and where road routes are convenient, it appears the means of transport are often unavailable. To combat this problem, two developments are noteworthy: first, an improvement in public transport; and secondly, the emergence of individual households specialising in the transport of goods.

An improvement in public transport was noted in Longjiang county by Zhao Tiesheng *et al*. By rescheduling buses between Longjiang county seat and Qiqihar (50 km away), so that they arrived in Qiqihar early in the morning instead of at noon, by allowing peasants to carry more commodities onto the buses, and by extending passenger transport routes, the public transport authorities have, it is claimed, promoted the ability of the peasants both to sell their produce at the city markets and to purchase the means of production - inorganic fertiliser, fine seeds, small-scale farm implements and so forth. If such flexibility is shown by public transport authorities throughout Nenjiang, a significant number of peasants may benefit - although, of course, numbers remain limited by accessibility to public roads. Indeed, more pertinent questions might have been answered by Zhao Tiesheng *et al*, concerning road transport away from the main road which would be expected between a county seat and the most notable city in the prefecture.

Of greater significance is the emergence of households specialising in the transport of goods. Such households can be expected to increase in number in the current phase given the growing inability of the official transport organs to handle the increasing burdens being placed upon them by the development - albeit slow and uneven - in Nenjiang's rural economy. Indeed, the extent of the wealth displayed by such households in the examples below indicate both the abundant potential and pressing need for individual transporters in Nenjiang.

Wang Ruiguang, for example, notes the development of 150 specialised transport households in Nehe county. These households were able to transport 31.85 million jin of surplus potatoes for sale in a variety of localities, including Shandong, Jiangxi, Hebei, Shanxi, Liaoning, Shaanxi, Jilin and Tianjin. This earned the producers 1.2742 million yuan, with the transport

households themselves earning 532,000 yuan (an average of 3,546.66 yuan per household - this figure is probably gross income, although nothing is said).

Similarly, Xiangyang *tun*, Baoquan *Xiang*, Kedong county has 37 households engaged in specialist transport work - a total of 68 labourers, 29% of the labour force (Zhang Xueju). These households - both individually and combined with other households - had three major impacts upon the rural economy of Xiangyang *tun*: first, by leaving the land, land-holdings were able to increase from 17 mu per agricultural labourer to 24 mu. Secondly, they complemented public transport which was previously insufficient to meet peasant needs. In 1983, they transported goods and materials with a value of over 1 million yuan. Finally, by easing transport difficulties and improving access to market, they contributed to increased peasant income as well as reaping large incomes themselves. Zhang Xueju estimates that the net income of each household engaged in transport in Xiangyang *tun* in 1983 was 3,162.16 yuan.

However, the emergence of such households - certainly in the examples given above - is closely linked to convenient access to road and rail links. Thus, initially at least, those units with convenient access to markets - through State and/or private commercial activity - will develop ahead of other units. This serves to re-emphasise arguments outlined in earlier sections concerning the localised development of rural industry and diversified undertakings and hence the ability to finance mechanised and intensive farm production and subsidies to grain specialists, and provide employment and income opportunities for surplus farm labour.

This argument is reflected in the differentiation of per-unit yields at alternative spatial levels (see Table 3). Production units at the micro-level - in particular at the brigade and even more so at the household level - have much higher yields than larger spatially-aggregated units. The same is true for rural per capita incomes:

TABLE 5. AVERAGE RURAL PER CAPITA INCOME. VARIOUS LOCALITIES. RECENT YEARS. (YUAN)

	1978	1979	1980	1981	1982	1983
Liming brigade[1] (a)		219	298			
Jianshe brigade [2](a)		240	300			
Jisibao brigade[3]						520
Nenjiang prefecture[4]						300+
Heilongjiang	164[5]	185[5]	206[5]	222[5]	254[6]	313[7]

(a) No figures are available for either brigade after 1980. However, it is expected that such brigades would remain relatively prosperous.

Compiled from materials in:
1 Li Tianxing *et al* (b) p.2.
2 Li Tianxing *et al* (a) p.2.
3 Han Qiang p.2.
4 Pei Shouju p.1.
5 Yang Yichen (c) S.1.
6 *Heilongjiang Daily* 15.5.1983. C.10.
7 Li Lian (b) p.4.

Further to the differentiation evident in Table 5, it has already been noted by Zhang Xueju that net household incomes of over 3,000 yuan are found in Xiangyang *tun* (representing per capita incomes of about 585 yuan), while Fu Xigui reports that one specialist rabbit breeder in Qingshan brigade, Yugang commune, Kedong county, earned 8,885 yuan from rabbit-breeding in 1983.

Until all producers have equal access to markets, both to sell produce and purchase producer goods, this differentiation will continue and economic development within the rural economy will remain inevitably localised.

Some commentators emphasise the potential role of small, rural towns as an important link in the commercial system, establishing more universal access to markets. Such towns, it is claimed, will act as a focus for commercial organisations and infrastructure, and eventually become a key link between rural producers and urban consumers (Xu Jinghong; and Yang

Yichen (b)). It is argued that based upon a framework of rural towns spread throughout Nenjiang, localised economic development can be gradually replaced by all-round development. It seems inevitable, however, that without extensive reform of the commercial bureaucracy and substantial investment in the commercial infrastructure - neither of which seem likely in the immediate future - local inequalities will remain large.

5. STATE FARMS

Before concluding, a brief mention must be made of State farms. According to Bing Yushu, there are 97 State farms in Heilongjiang, with a cultivable area of over 31 million mu (25% of the province's cultivable land). Nine such State farms are located in Nenjiang itself (see Figure 5).

State farms were originally set up to reclaim and cultivate wasteland. In Heilongjiang, this involved changing the "Beidahuang" (great northern wasteland) into a granary. Heavily mechanised - according to Yang Rongqiu 90% of State farms were completely mechanised in 1984 - State farms were envisaged as key suppliers of commodity grain. However, under leftist influences output from State farms suffered,per unit grain yields remained low and for many years, heavy losses were made.

Since 1978, however, the situation has allegedly changed greatly. Aside from 1981 - a year of great natural disasters - grain yields have risen and virtually all farms are making profits. The nine State-run farms in Nenjiang, for example, in 1984 were expected to hand over to the State over 240 million jin of commodity grain (Feng Qian). Grain yields were rising significantly. Keshan State farm (presumably in Keshan county) for example, being the first State farm in the province to achieve per-unit grain yields of above 400 jin/mu (Shen Jiken *et al*).

This improvement in State farm production within Nenjiang can be attributed to two developments. First, and most significantly, the introduction of production responsibility systems into farm production and the movement away from the Maoist emphasis upon grain production. State farms, like most production units in rural China, have introduced responsibility systems in an attempt to arouse peasant enthusiasm for farm production and have also attempted to move away as far as is practical - and permissable - from poorly-rewarded grain production into diversified undertakings. In both respects, it is claimed, the State farms have been moderately successful.

Secondly, because State farms are almost entirely located upon reclaimed land, improving the agricultural resource base and production conditions can be of potential importance. Keshan State farm, for example, has a frost-free period of only 110 days, spring drought is common and is often accompanied by strong winds. Rainfall rarely exceeds 125 mm per annum (*Renmin Ribao* 11.3.1979). Despite these poor natural conditions, grain output and per-unit yields are relatively high. Some of the credit for this situation, according to Shen Jiken *et al*, must be attributed to the shelter-belts which completely protect all 360,000 mu of cultivable land belonging to Keshan State farm. Shen Jiken *et al* argue that the micro-climate is being improved, the farm is strengthening its ability to combat natural disasters, and every year more of the land is recognised as being - by Nenjiang's standards - stable high-yield.

However, just as ordinary production units differ greatly one to another, the evidence suggests that the same is true of State farms (Leeming). Although most State farms have the advantage of being heavily mechanised (presumably State-financed), the nature of the cultivable land would suggest that cultivation is extensive rather than intensive. In 1983, described by Yang Rongqiu as a "particularly fine year", average per-unit grain yields on State farms throughout Heilongjiang reached only 252 jin/mu, well below the provincial target figure of 400 jin/mu and that achieved by the Keshan State farm. Indeed, the difference between the Keshan State farm average per-unit grain yields and that of all State farms in Heilongjiang, is similar to that illustrated in Table 3 for advanced units, such as Liming and Jianshe brigades and the Nenjiang river basin area.

Thus, it would be expected that the development of the State farms in Nenjiang - as well as Heilongjiang as a whole - will follow a similar pattern to that of other production units, with local influences producing wide-ranging differences in production characteristics, employment and income opportunities and so forth.

6. CONCLUSIONS : A MODEL OF AGRICULTURAL DEVELOPMENT - XINGSHISI BRIGADE, GANNAN COUNTY.

A synthesis of previous arguments concerning the mechanisation and intensification of farm production is given in Figure 6, using material for Xingshisi brigade, Yinhe commune, Gannan county. According to Mou Weixu, this brigade had, in 1979, 5,000 mu of cultivable land, an agricultural population of over 700, and an agricultural labour force of about 470.

Mechanised and intensive farm production set against a backcloth of numerous production responsibility systems had, it is claimed, transformed the brigade's agricultural output and all-round development (see Figure 6 for detail). Certainly incomes in 1979 were high:

TABLE 6. XINGSHISI BRIGADE. GANNAN COUNTY. INCOME DATA. 1979

Industrial workday value (yuan)	1.9
Average per capita distributed income (agricultural population) (yuan per capita)	271
Average household income including diversified and sideline undertakings. (yuan)	2,000+
Estimated average per capita income including diversified and sideline undertakings. (yuan per capita)	390

Some figures deduced.

Compiled from materials in Mou Weixu, p.2.

Xingshisi brigade exemplifies what local authorities hope can occur throughout the rural economy of Nenjiang. As such, Xingshisi can serve as a model for the development of agricultural production in the North-East environment. A distinct shift from the "small but complete" Maoist models of the past.

Furthermore, in detail, it represents a model which is unique to the North-East environment. While a dual strategy of mechanised and intensive farm production is well-suited to developing agricultural production in Nenjiang and in the North-East in general, elsewhere different environments will promote different agricultural development strategies (Zhan Wu).

Nevertheless, Xingshisi - like Liming and Jianshe brigades - remains an example only of localised development. As emphasised throughout, in no way are such brigades' development representative of the more gradual development displayed by Nenjiang's rural economy in recent years. While development has undoubtedly occurred in Nenjiang, farm production is neither as developed or stable as that claimed in the models. Similarly, the extent of rural industrialisation and diversification is much more limited. As of yet, Xingshisi brigade and others like it are simply models upon which

it is hoped a more widespread economic development can be based. In the meantime, income and output differentiation continues to be large.

Indeed, Zhou Wei notes that in Baiquan county, for example, large discrepancies in income have prompted some peasants to sabotage production of wealthier neighbours. Clearly, in the long term, it is important to reduce the extent of such differences, though without resorting to the egalitarian policies of the Maoists, which did so much to dampen peasant enthusiasm for agricultural production. In the current phase, the answer to this problem is to encourage production in the poorer units to match that of the prosperous producers. However, as stated above, this remains difficult given local differences in productive capacity, resources. accessibility to markets and so forth.

It is also clear that commercial improvement - both organisational and infrastructural - must accompany the development of agricultural production. Already numerous contradictions have arisen in commerce, which have hindered rural development. Indeed, when Nenjiang has been able to produce the commodity grain which the State has always sought from the area, the official commercial system has proved incapable of handling the quantities of grain awaiting delivery. Little wonder that the marketing and transport of other rural produce remains difficult and a major block on development.

The growth of individual commerce to complement official organs may prove to be an important element in the development of Nenjiang. However, such a growth in individual commerce and in the absolute quantity of commercial activity has prompted a significant amount of corruption - in the form of profiteering, swindling, smuggling, theft, favouritism towards individuals and units in the provision of supplies or in access to facilities and so forth - at all levels of the commercial bureaucracy as well as amongst individual traders (*Heilongjiang Daily* 21.1.1984; and *Heilongjiang Daily* 29.1.1985). Such corruption may prompt the State to curtail individual commercial activity, further over-burdening the official commercial system and reducing rural economic activity.

The North-East environment provides the context for a more basic development problem than that found in more environmentally-favourable (though more densely-populated) areas. The basic problem remains as to how

to create wealth in an essentially difficult natural environment and thus facilitate capital accumulation. This problem is compounded by the State's perception of the area as a major grain base. Income and employment opportunities are limited and development is localised. It remains to be seen if production units in Nenjiang and throughout the North-East can emulate the example provided by Xingshisi brigade and other advanced units.

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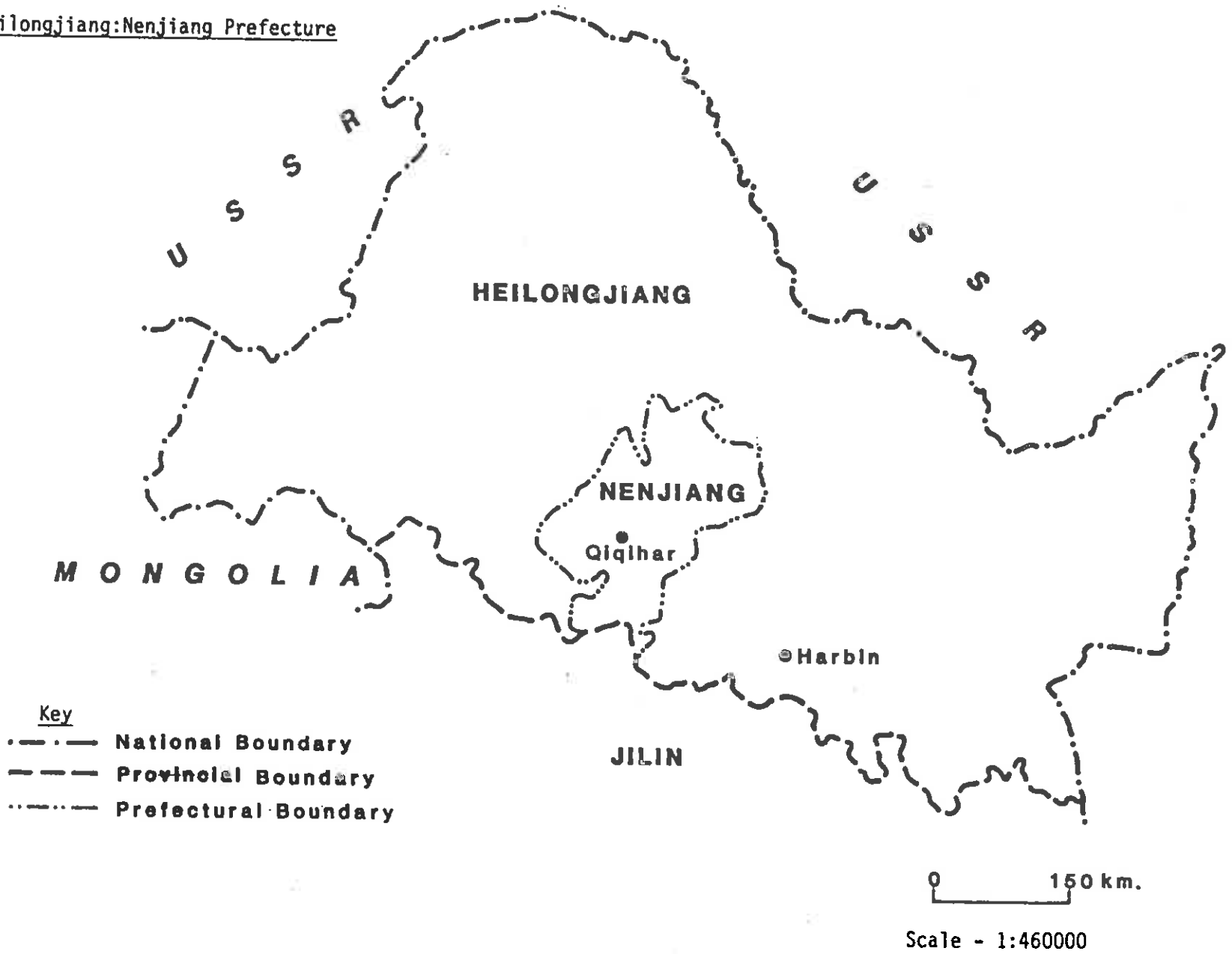
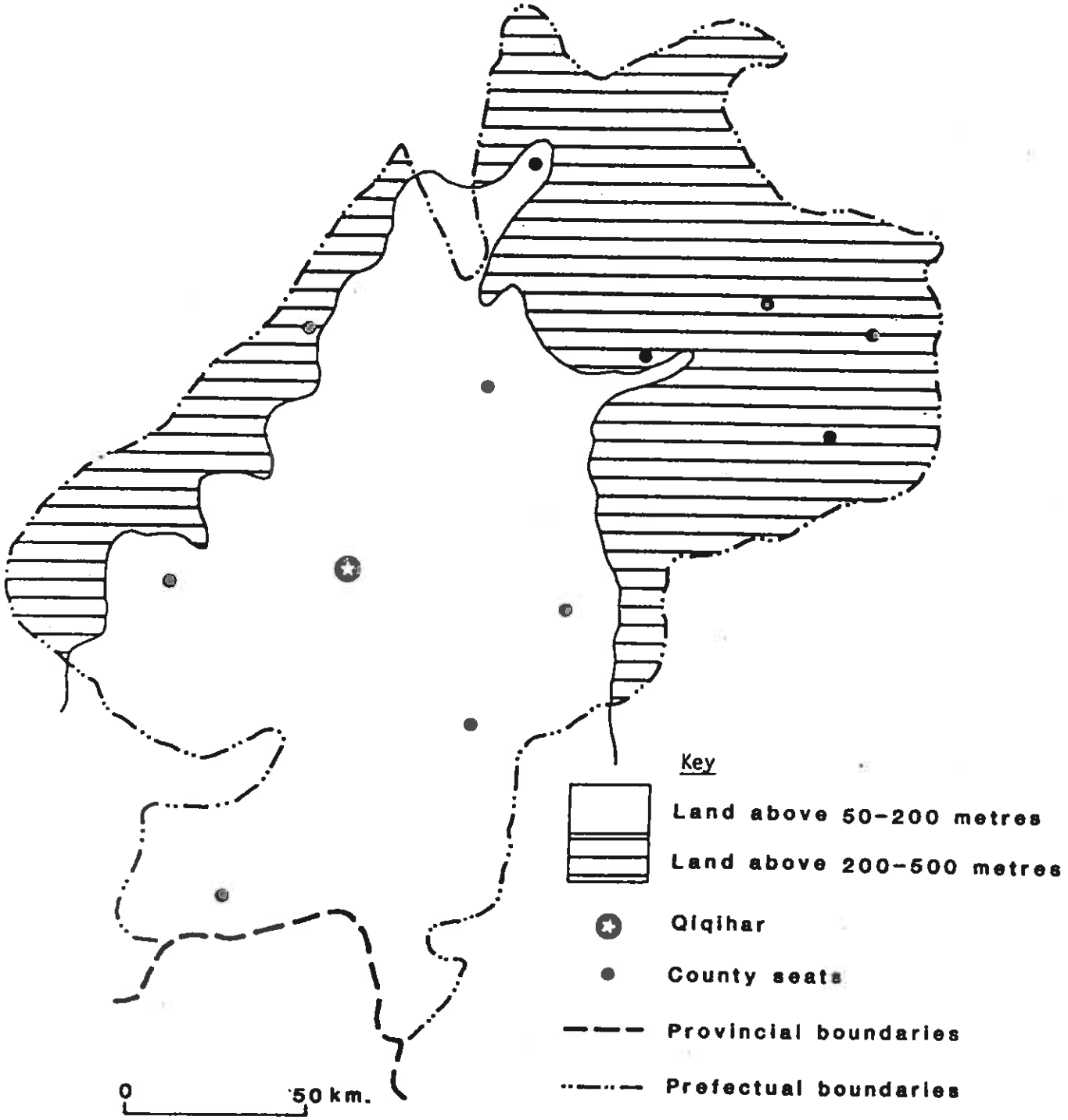
FIGURE 1. Heilongjiang:Nenjiang Prefecture



Scale - 1:460000

Source : *Zhonghua Renmin Gongheguo Fensheng Dituji* p.9.

FIGURE 2. Nenjiang Prefecture : Sketch map of relief



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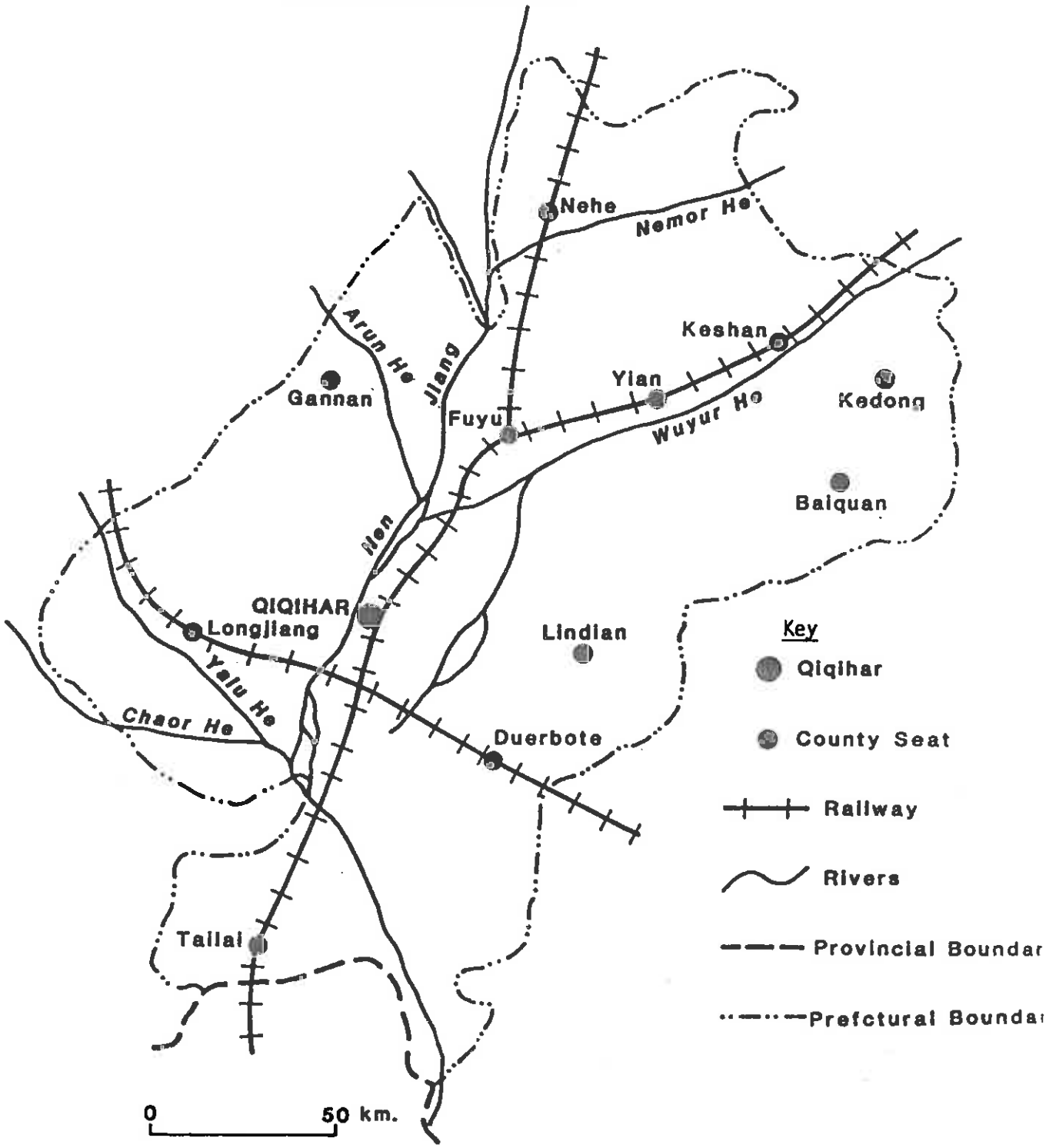
Welch *et al* (inset)

FIGURE 3. Nenjiang Prefecture : Qiqihar; county seats; railways; and major rivers



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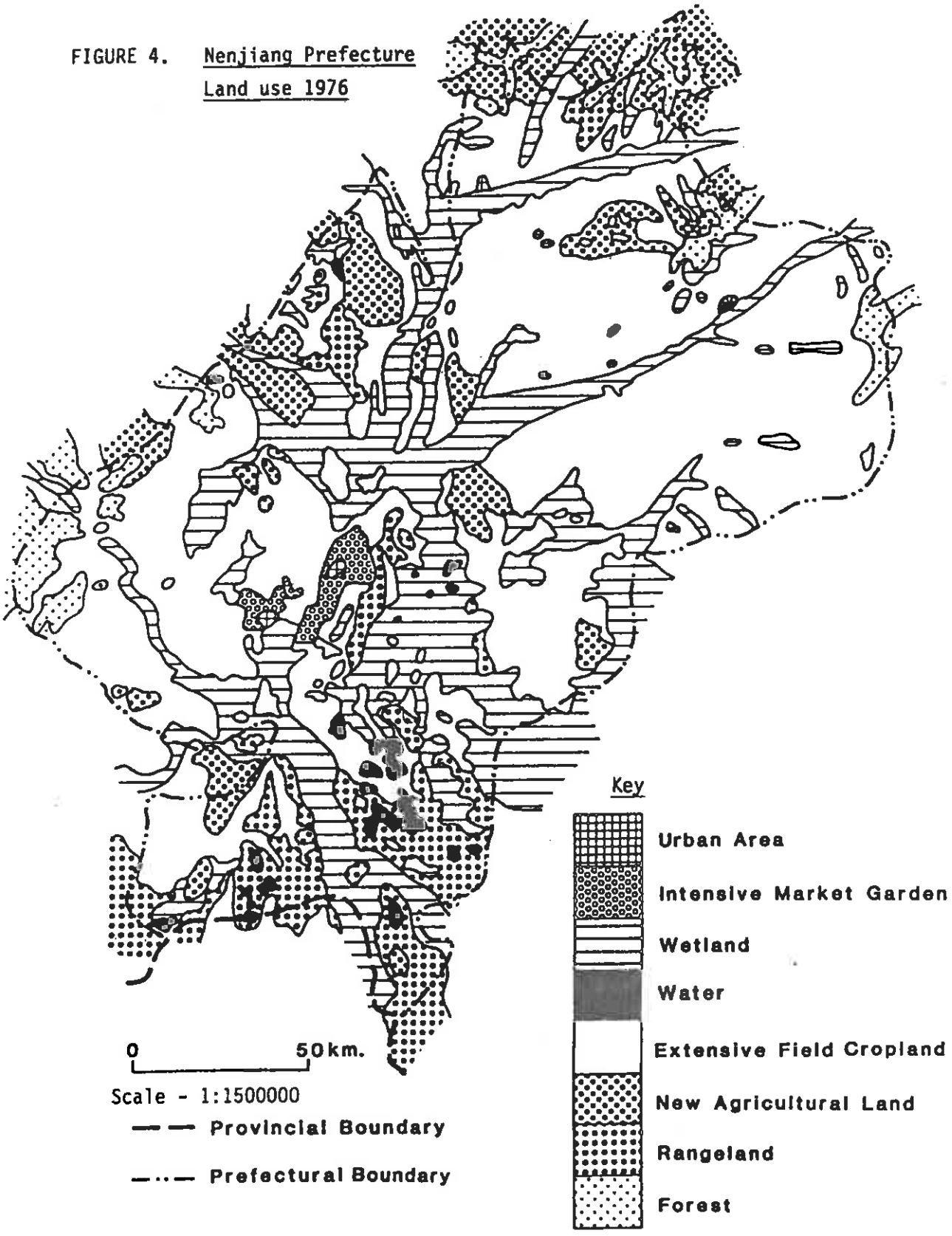
Welsh *et al* (inset)

FIGURE 4. Nenjiang Prefecture
Land use 1976



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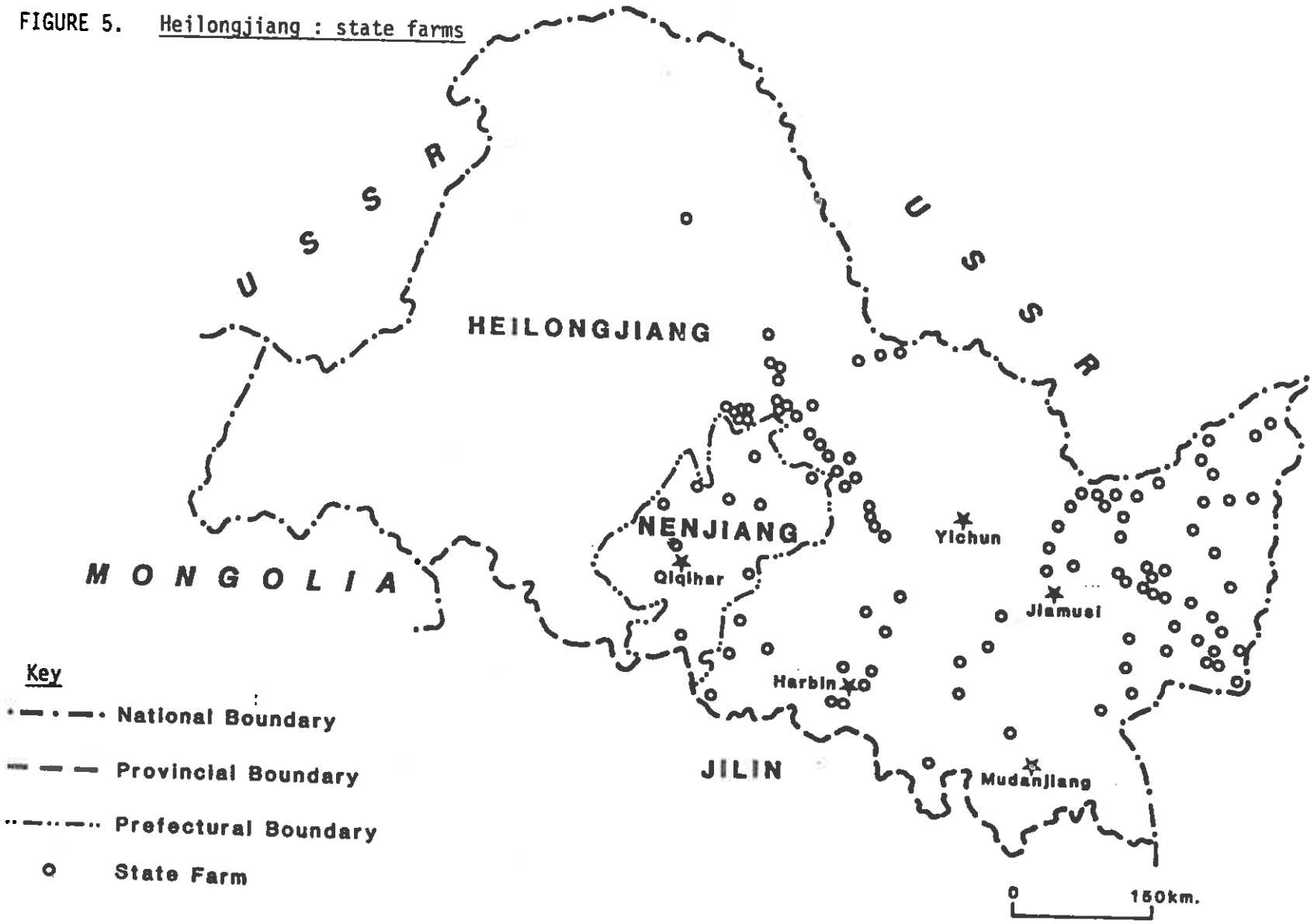
Welch *et al* (inset)

FIGURE 5. Heilongjiang : state farms



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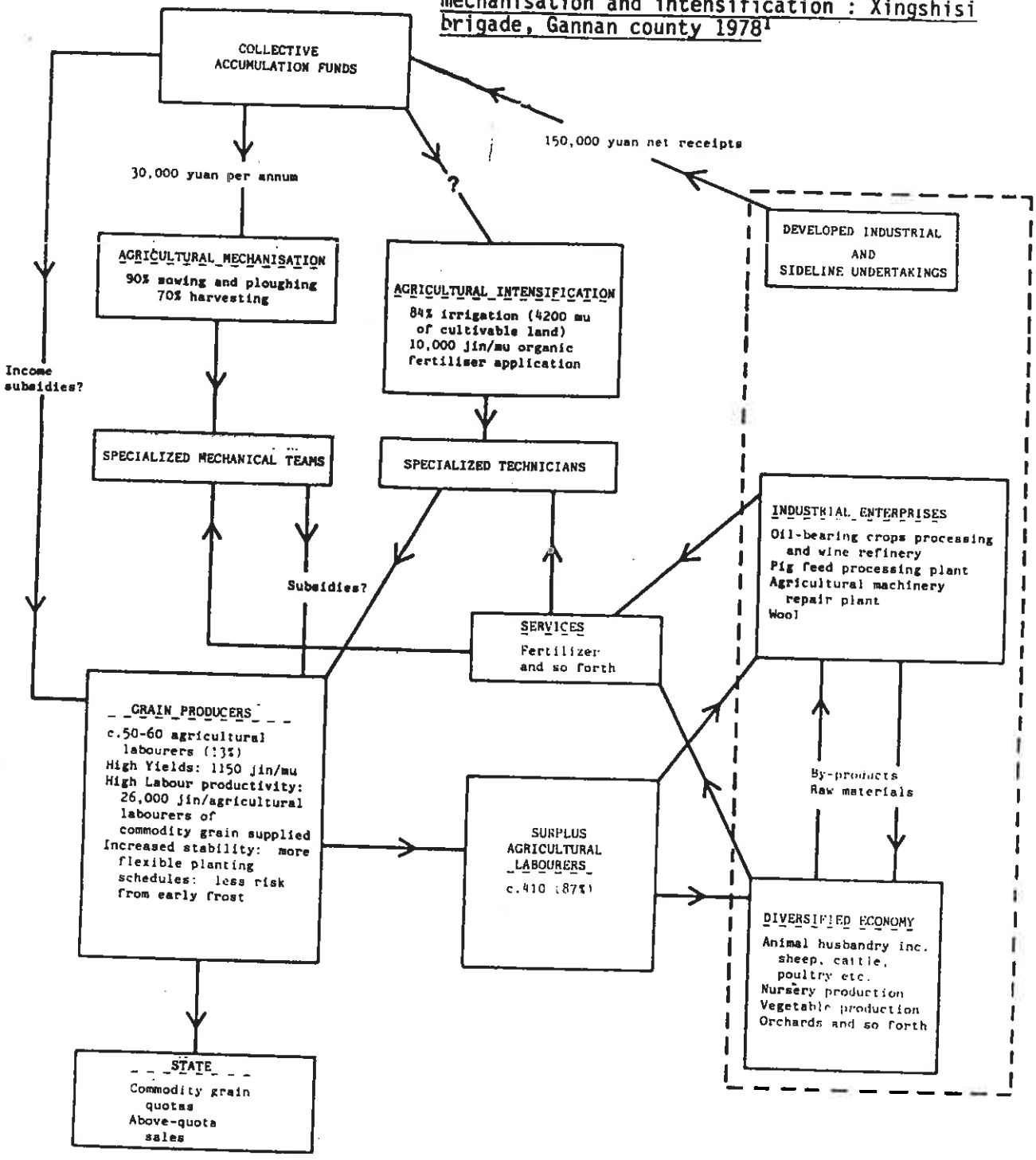
Yang Rongqiu p.2

FIGURE 6. A simple development model of agricultural production through mechanisation and intensification : Xingshisi brigade, Gannan county 1978[1]



[1] For income data see Table 6

Compiled from materials in Mou Weixu p.2