3. RICE CULTIVATION

No precise date has so far been available about the time when Koreans started the cultivation of rice in the Maritime Region. In a previous account it was mentioned that it began in 1905,[189] but according to another source it started in 1913.[190] Some are even of the opinion that at the beginning of the 1860s there were some vestiges of rice cultivation by Koreans in the Maritime Region.[191] From the above it is believed that Koreans started to cultivate rice more or less regularly between 1905 and 1913.

Rice cultivation is perhaps the most significant cultural activity which Koreans have propagated in Central Asia after their migration from the Soviet Far East. Rice cultivation is of course practised in other areas of the Soviet Union besides Central Asia.[192] In the Soviet Union much effort has been given to the greater production of rice by reclaiming virgin land, developing new rice-strains, adopting the cultivation of rice during alternating years and applying trust management, etc. and incentives for better production have been given to sovkhozes and kolkhozes. Among the areas of rice cultivation, Kazakhstan and Uzbekistan occupy a central position and, despite the mixture of tens of different nationalities, Koreans still play the most essential role in rice cultivation in this area. In the following, the position of rice cultivation mainly by Koreans in Central Asia is treated.

3.1. General situation of rice cultivation

According to a statement in *Lenin Kichi*, "At present, rice occupies the leading position in the list of main crops in the cereal production area apportioned by the Republic."[193] In other words rice has become one of the main crops in the Soviet Union.

3.1.1. Background

Rice production in the Soviet Union in 1983 was about 3 million tonnes, of which 800,000 tonnes (26.7%) were produced in Kazakhstan[194] and 500,000 tonnes (16.7%) in Uzbekistan.[195] Thus nearly half of the total quantity of rice produced in the Soviet Union comes from Central Asia and the main producers are Koreans. Although on a very small scale, rice had been cultivated in this area even before the Koreans moved to Central Asia in 1937. In 1928 several dozen Korean families migrated from the Maritime Region to the environs of the city of Kzyl-Orda beside the River Syr Darya in present-day Kazakhstan, a hot region called at that time South Russia, and organized the first rice farms *Khazriz* and *International*.[196] This was the beginning of rice cultivation by Koreans in Central Asia, which they continued after their migration in 1937. Among the migrants, Kim Man-sam (cf. ill. 19 and 20) was known as the most famous rice

cultivator, who had worked on the *Avangard* Sovkhoz. Kim taught rice cultivation to Ibrai Sahayev, a member of the *Kzyltu* Sovkhoz. It means that Koreans have propagated rice growing culture among the Turkic peoples. For this reason *Kzyl-Orda* is called the "Rice Capital" in Kazakhstan.

The 1940s did not favour the spread of rice cultivation because most energy was given to the war effort. However, since the 1950s the Soviet Union began to concentrate on rice cultivation in order to increase cereal production. This was a part of its comprehensive policy in 1954 to change the vast barren virgin lands in the central and northern part of Kazakhstan into crop-producing farmland. The area of Kazakhstan is 2,717,300 km^2, which means that it is more than ten times larger than the Korean peninsula. The development of farmland in this region was not only aimed at rice cultivation but also at developing plantations of cotton and sugar-beet, etc.

According to official Soviet statistics, in 1960, the area of rice paddies was 95,000 hectares but by 1972 it had increased to 462,000 hectares. In an article entitled *"Bases for Rice Cultivation"* V. Duzenko, a senior scientific worker and agronomist at the Kazakh Rice Cultivation Science Research Institute, described how rice cultivation had been started in the southern and south-eastern oblasts of Kazakhstan where the earth was salty, because rice can even be grown in saline soil and still produce a good harvest, and it simultaneously eliminates the salinity of the land.[197] In 1954 in Kazakhstan, there were in total 29,000 hectares of rice paddies, of which 27,500 hectares were in Kzyl-Orda Oblast.

From 1961 the area for rice cultivation began to expand, and in 1966 two main organizations for rice cultivation, i.e. The General Directorate for the Construction of Rice Cultivating Sovkhozes and The General Directorate for the Construction of (the River) Ili Irrigation Canals were established, which, in 1974, were amalgamated under The General Directorate for the Construction of Rice Cultivating Sovkhozes. According to this programme, e.g. in the area of Kzyl-Orda, as a result of the completion of the irrigation system and farmland management, eight large rice cultivating sovkhozes were established. Rice is not cultivated in all of the 19 oblasts of Kazakhstan, but principally in the four southern ones: Taldy-Kurgan, Alma-Ata, Chimkent and Kzyl-Orda.

The northernmost area of rice cultivation in Central Asia is located in the Balkhash Rayon along the River Karatal near the southern part of Lake Balkhash in Taldy-Kurgan Oblast, i.e. on the *Bakbaktinskiy* Sovkhoz.[198] Rice cultivation in Uzbekistan was started at the beginning of the 1960s along the Amu Darya River mainly on the southern coast of the Aral Sea. It means that the Karakalpak ASSR and Khorezm Oblast occupy an important position. In the Karakalpak ASSR special rice cultivation sovkhozes are known to exist. In Uzbekistan in Syr-Darya Oblast which borders on the Chardara area, rice cultivation has recently been recently started. In Turkmenia to the North of Amu Darya,

i.e. in the northern part of Tashauz Oblast and in Tadzhikistan, rice is cultivated in a few areas.[199]

3.1.2. Method of cultivation

In recent publications in Korean in Central Asia, the term *monaigi* 'transplantation of young rice-plants' is rarely seen. But in an article in *Lenin Kichi* on October 27, 1983, about Kim Kŭm-yŏng who is working on the famous *Politotdel* Kolkhoz on the outskirts of Tashkent, it is mentioned that in his childhood he transplanted young rice-plants and weeded the paddy-field while helping his parents. Judging from the fact that Kim is over 60 years old, it is presumed that this habit might have been used in the Far East. Nowadays instead of 'transplanting young rice-plants' an expression 'sowing rice seed' is used in Central Asia. But this does not denote rice cultivation in dry fields which is only rarely found in Korea; on the contrary this description is understood to mean the growing of rice in paddies by broadcasting the rice-seeds without carrying out *monaigi*.

Stating that there exist two ways to bud rice, Cang Valentin, agronomist and senior researcher of the Kazakh Rice Cultivation Science Reserarch Institute wrote as follows:[200]

> "The soil conditions of Kzyl-Orda Oblast in fact proved to guarantee a high production of rice when all the rice seeds are germinated between May 1 and 25. Taking this fact into account it is important to combine two different methods; planting seeds in the early spring deeply and watering directly after having sown them. Normally they are sown at a depth of 1.5-2 cm. The essence of sowing them in the early spring lies in the carrying out of sowing when the temperature of the ground at a depth of 10 cm reaches 8°C. Rice seeds sown at a depth of 4-6 cm will burgeon from the moisture stored in ground."

Kang Viktor, an advanced rice cultivator of the Sovkhoz named after *Pravda* in Taldy-Kurgan Oblast, Kazakhstan, relates his experiences as follows:[201]

> "The water level should be adjusted directly after having sown the seeds. When water has been absorbed by the paddies, and that which is left is let out the paddy-field beds are exposed to the sunshine. At that time weeds begin to grow quickly. When the rice seeds have sprouted and start to grow, we fill the paddies with water. The rice plants survive but the weeds perish under water. After we have adjusted the level of water, the bank of the paddy should be cleared. If too many reeds grow on the bank of the paddy, a shadow will be formed and hinder the growth of rice."

V. Duzenko writes in his article entitled *"On the Agronomic Technique in Rice Seed Sowing"* as follows:[202]

> "At the farm, seeds are carefully chosen by an effective selecting machine. In order to insure a high percentage of sprouting, they are exposed to sunshine about two days before sowing. They are treated with ammonium sulphate. This provides us with a possibility to reduce weeds. On the sovkhozes rice is usually planted in a rectangular shape. The advanced method of rice planting is designed to yield, on average, 2.5 centners more rice per hectare.[203] ... Currently, the normal quantity of rice planted per hectare is 210-240 kg. Seeds are sown in the watery paddy instead of being submerged."

This means that in Central Asia rice seeds are sown by broadcasting them in the watery paddy between May 1 and 25 and then water is supplied to the paddy. This is completely different from the rice-plant transplantion in Korea.[204]

Lenin Kichi also mentions that ammonium sulphate and organic fertilizers are used with about one tonne per hectare.[205] V. Duzenko also writes the following about fertilizers:[206]

> "On the sovkhoz following the advice of scientists of the *Kazakhstan Rice Cultivation Science Research Centre* and the experiences of advanced rice cultivators, fertilizers are applied to rice paddies and fields of rice under alternating cultivation. The quantity of fertilizer is determined by the condition of soil fertility and how much rice has been sown. Before the ears start to fill out, nitrogenous fertilizer should be given to the paddy fields as a final measure. If fertilizers are applied prematurely or excessively to fields, it would result in poor harvests. In other words the rice will mature slowly, the rice stalks will grow too tall and thus be susceptible to the wind and lodge. There will be many unripened rice ears in this case. All these will delay the harvest time a little. On the sovkhoz ammonium sulphate is used on normal paddies. Ammonia nitrogen will be broadcast on fields where the ears of rice do not grow well and become yellow. ... And the water level should be accurately adjusted in paddy fields. If fertilizers are applied to wet paddies or paddies full of water, good results would not be achieved."

Sometimes aeroplanes are said to be used in applying fertilizers. On *Bakbaktinskiy* Sovkhoz in Alma-Ata Oblast, zinc fertilizer has begun to be used on the advice of scientists, which increases rice harvests by 3-5 centners per hectare in saline soils.[207]

To eradicate weeds, herbicides are used. While the rice is growing, the most important task in summer is said to be the supply of correctly adjusted amounts of water to the paddies. In an article entitled *"Advanced Rice Cultivators"*, Li Andrey Yemsanovich, who has been cultivating rice for more than 15 years in Taldy-Kurgan Oblast was presented and his experiences described as follows:[208]

> "Li Andrey and members of his team, who are well experienced in rice cultivation, waged a tense struggle for a better harvest throughout the whole summer. He carries a ruler and thermometer to measure the water level of paddies and the temperature of the air. He uses all his efforts to lower the water level when the day time temperature is less than 25°C and to supply more water when it is higher than 25°C."

In Central Asia, the rice is harvested, in the case of an early harvest, from around August 25, but the usual harvest time is in late September and early October. It is harvested in the following way: firstly the paddies are drained, secondly the rice stalks are reaped by combine-harvesters and 2-3 days after that, when the rice is dry, threshing begins. The harvest differs widely according to the area and variety of seeds. The *centner* is used as the unit for counting the quantity of rice.

In the 1950s in Kzyl-Orda Oblast, the production of rice was 30-35 centners per hectare, which increased to 50 centners in 1960. According to V. Duzenko in the case of Kazakhstan, the area of rice planted in 1970 was 81,300 hectares and the average yield

33.7 centners, while the corresponding numbers in 1983 were 134,000 hectares and 47.5 centners respectively.[209] Han Vladimir, economist and party secretary of the Uzbek Rice Cultivation Science Research Institute, wrote that the average production of rice in Uzbekistan was 48-50 centners in 1983, which was higher than the average yield in the Soviet Union.[210]

3.1.3. Difficulties and problems

Even if rice cultivation in the Soviet Union is fairly well mechanized, natural phenomena cause unexpected difficulties, and problems arise due to varying conditions.[211]

Since rice cultivation requires a large amount water, and in Central Asia the water supply for this is largely based on the irrigation system, water is one of the most important factors. A water shortage causes severe loss of harvests. In 1983 in Kzyl-Orda Oblast in Kazakhstan, difficulties arose because of the water shortage; at the time when the rice was about to flower, the temperature rose to 40-46°C damaging the function of the pollen, and then severe winds flattened the rice stalks to the ground.[212] In 1982 in the Karakalpak ASSR in Uzbekistan, water pumps were mobilized due to the water shortage. In order to solve this problem, a new method of reusing water was introduced by pumping it back to paddies, in many areas. In 1986 the water problem in Khorezm Oblast in Uzbekistan was so severe that, for example, on the*Yangiaryk* Sovkhoz water began to flow into paddies as late as at the beginning of June. On the *Begovat* Sovkhoz only 30% of the water needed could be supplied. The shortage of water is the main obstacle to the production of more crops all over Uzbekistan.[213]

Lenin Kichi quite frequently reports about difficulties in rice cultivation due to the freakish weather in Central Asia. The weather conditions in spring 1984 in Uzbekistan were said to have been unfavourable to rice cultivation. Also in the Karatal area of Taldy-Kurgan Oblast in Kazakhstan at the end of May, 1983, when the ears of rice were about to sprout, a cold wind blew and it even hailed, which meant the rice seeds had to be resown.[214] In 1986 in the same area, the spring weather was not good and the temperature was too low when the crops were ripening. At the peak harvest time it even rained heavily seven times. In the Kumsangir Rayon in the Tadzhik SSR, the weather was extremely changeable in 1986, hot wind blew and it rained heavily alternately, which is not at all suitable for rice cultivation. The *Surkhob* Sovkhoz in Tadzhikistan suffered from heavy rain and strong winds in spring 1985, also.[215]

In Khorezm Oblast in Uzbekistan, deserts were turned into rice paddies, which required special care, in other words the moving of earth from other places. Saline land has also been a problem. For example, on the Sovkhoz named after the *50th Anniversary*

of the October Revolution, 1,000 hectares of saline land have been reclaimed as rice paddies during the last five years and in Tadzhikistan there exists a special *Paddy-Washing Sovkhoz.*[216] Earthquakes can cause problems for rice cultivation as happened in Kulyab Oblast in Tadzhikistan in 1985.[217]

The quality of rice sold to the state is also a matter to which more attention has to be paid. Rice cultivating enterprises earn annually 25-30 million roubles of profit in Kazakhstan. The average amount during the 11th five-year plan was 28 million roubles a year, i.e. 294 roubles per hectare. But if the quality of the rice sold were better, then rice cultivators would have earned more. Almost half of the rice which was sold during the 11th five-year plan was mixed with small motes and wild millet. According to the examination, the percentage of small motes and wild millet was 12% or more. For example, of the whole amount of rice which was sold to the state in 1985, 258.4 thousand tonnes were mixed with 2% motes and 26.4 thousand tonnes with as much as 4%. The rice produced in the Dzhalagash Rayon of Kzyl-Orda Oblast in particular was rather mixed with other things, which has meant that the selling price was 31.07 roubles lower than the fixed price per tonne, creating a loss of about two million roubles.

In order to obtain better results the chief of the economy and production department of the Kazakh Rice Cultivation Science Research Institute, K.Sydykov, Candidate of Economic Sciences, suggests the following measures:

- sowing rice at a suitable time,
- the use of a fixed quantity of nitrogen fertilizer,
- the use of a herbicide at the right time,
- harvest should commence when the moisture of the grain is 20-25% and should be completed within a limited time,
- threshing can best be done when the moisture of the grain is 16-19%,
- selecting grains is one of the most important processes in rice production.

The state accepts a quality of rice which contains at most 10% of crops other than rice, 5% of motes and 19% moisture. But rice sold to the state often contains 10-13% moisture with broken grains.[218]

3.2. Agricultural method

In *Lenin Kichi* the term 'brigade trust system' is quite often mentioned.[219] It was advised that this system should be introduced in rice cultivation also. It had originally been adopted for the improvement of production in manufacturing firms and farm management in the Soviet Union. The term 'collective trust system' has also been used and it is understood to have almost the same meaning as the former term. This system denotes that a contract between the administrative authority and production workers is

entered into about the quality and quantity of products, workers receiving their wages on the basis of a subcontract. In other words, workers are not paid a regular salary for their work as before, but are compensated according to the results of their work.

The basic direction taken and to be taken in the economic and social development of the Soviet Union between 1981-1985 and until 1990 is said to be "to improve the organization of labour and production by taking advantage of completely advanced experiences. The effectiveness of the productivity of the soil, the utilization of materials, funds and labour resources should be noticeably enhanced."[220] However, the introduction of this type of labour system into manufacturing firms and farm management has been, if we cite the expression from Central Asia, "carried out slowly". That is to say, despite the relatively long time span since the introduction of this system it has not being practised efficiently.

At the present time, the number of working brigades on sovkhozes and kolkhozes in the Soviet Union applying this system is thought to exceed 30,000. In farm management those who work by this system produce 10-20% more per unit, which can accordingly increase labour productivity by 15-30%. In the case of rice cultivation the rate of mechanization is said to be very high in working brigades and teams. In the change to the collective trust system, one of the factors to be considered is the principle of the independent accounting system, the reason for which is explained as follows:

> "... In a brigade working according to the independent accounting system, higher work perfomances by small numbers of workers are demanded, because the remuneration they receive depends on the final result of the work. And each member of the brigade needs to have skills in related fields and to elevate his professional abilities. ..."[221]

This system is known for the fact that each member of the brigade carries responsibility for the sectors assigned, which fosters a sense of collectiveness and land ownership. For example, by applying this system the yield of the rice harvest increased twofold to 65 centners per hectare during the last ten years, and the unit cost of rice production was reduced from 20.7 roubles to 11 in some cases.[222]

Another reason for the introduction of this system is to solve the question of the labour shortage. When 30 farmers were needed to cultivate 400 hectares of rice paddies previously, after the introduction of the collective trust system one mechanized brigade consisting of 15-18 persons could cultivate the same area successfully. Since farmers get wages on the basis of final results, it is said that they are motivated to work more quickly than before. Furthermore machines that they have devised have proved their usefulness, e.g. a rotating rice-seed sower. By using this new machine the following result has apparently been obtained:[223]

> "... This keeps the seeds sown in the paddies. In the past due to the failure of compacting the soil after sowing the seeds, they floated to the surface when water was let in. But this weakness has now been corrected. ..."

On some sovkhozes it was reported that a 'home brigade system' had been introduced. For example in the sovkhoz named after *Pravda* in Taldy-Kurgan Oblast, machines like combines and tractors are checked and repaired on the basis of this system. It was understood that in 1986 the chief of the tractor repair centre, Li Gennadiy Ivanovich, guaranteed full movement of machines, which is important for rice cultivation. This system is said to work very effectively.[224]

Another method recommended in cultivating rice fields is the 'rice paddies alternating cultivation'. Simply put, this means that rice paddies should be cultivated alternately with rice and other crops because the fertility of the soil is reduced when rice is cultivated in the same paddy continuously. It is a way to fertilize rice paddies, as well as being another way to improve the productivity and quality of rice. This method is also considered to be important for stock breeding fodder.

At the Uzbek Rice Cultivation Science Research Institute, a modern method for alternating cultivation was devised by scientists working in this field. This method is closely linked with the technical irrigation system. But *Lenin Kichi* writes that this method has not been well applied according to the programme.[225] In one case in the Karakalpak ASSR, rice had been cultivated in the same paddy for more than 15 years, which caused problems such as the decrease of rice productivity and quality, as well as allowing weeds to flourish. This happened due to continuous cultivation in one place, despite the fact that mineral fertilizers were supplied sufficiently, and machines had improved over the last six years.

As for the other crops to be used in the paddies in this alternating cultivation, maize and lucerne are considered to be suitable. On the *Oktyabr'* Sovkhoz in the Chimbay Rayon of the Karakalpak ASSR, rice production is known to have greatly increased when lucerne was grown for two years and after this rice was cultivated. The increase, compared with cases 3-5 years ago, was 14.7 centners per hectare in paddies where fertilizers were not used and 16.3 centners in those that had been fertilized. One precaution must be taken when alternating cultivation is introduced and that is that mineral fertilizers should be applied according to the nature of crops. Otherwise the period of plant growth will be delayed and the crop will lodge.

Despite the above-mentioned advantages, there has been some reluctance in adopting alternating cultivation, the reasons for which have been analyzed as firstly, the underestimation of the importance of this method, i.e. the belief that alternating crops does not bring rich harvests, and secondly, the slow progress in the improvement of the present irrigation system.[226]

3.3. Efforts for the improvement of rice cultivars

In the Republics of Central Asia constant efforts have been made in order to improve the rice cultivars. The rice cultivars which scientists are trying to develop are those which have a short growing period, thick ears and sturdy stalks which do not lodge easily. In the Soviet Union there are, in all, 29 cultivars which have been adapted to local conditions and cultivated. Among the cultivars bred in the 1980s the following can be mentioned: *Start, Spalchik, Zhemchuzhnyy, Solnechnyy, Kulon* and around ten others. These cultivars do not lodge easily and in fairly good weather can give almost 100 centners per hectare, according to the opinion of specialists even 160 centners are possible.[227]

3.3.1. Uzbekistan

The Uzbek Rice Cultivation Science Research Institute exists as an exemplary organ for the research of cultivars. There are 47 researchers working at the institute, of whom more than 60% are members of the Communist Party, of them 21 are university graduates and there are six female researchers. Specialists in this field are trained in such a way that university graduates practice research methods by attending courses at the institute. More than ten senior researchers, who guide junior researchers, are working at the institute. The most outstanding person at the institute is Ko Moisey, Candidate of Agricultural Sciences and chief of the department of technical processes of rice cultivation. Han Vladimir, Candidate of Economic Sciences, works as party secretary at the institute.

Ko Moisey (probably born in 1922) is known to have been working at the institute for over 30 years and to have written more than 50 treatises on the propagation of rice cultivars, as well as having been engaged in research work that is much respected by the younger generation. He wrote about rice propagation in his article entitled *"With the Cooperation of Science"* as follows:[228]

> "... The development of rice cultivation should not be attempted only by enlarging the area of rice cultivation but also by ensuring high yields from the rice harvest, which is connected with the application of comprehensive advanced agricultural methods, by improving the work of selecting seeds in a scientific way and by breeding new rice species which will bring 100 centners or more per hectare and introducing them into agricultural production...."

The rice seeds which bring such a harvest were propagated by the institute, and they are nowadays mostly cultivated in the republics of Central Asia. The aim is that the cultivars now envisaged should produce 95-100 centners per hectare, that their stalks should not lodge and whose grains should be large and suitable for machine harvesting during the period of the 11th five-year plan.

As for the history of the propagation of rice species, it is known that in 1939 a researcher,

N. Kozarev, had developed a new cultivar *Uzros-7* on the basis of the *Kyŏngjo* cultivar, and that the new one has been cultivated for about 40 years in Surkhandarya Oblast and the Fergana Valley.[229] The characteristic of *Uzros-7* is its tolerance to the cold weather of autumn, with which other cultivars are not comparable. It has a growing period of 130-140 days and has been recorded as producing 75-80 centners per hectare. However it has the weakness of lodging easily. Therefore a new cultivar was developed from *Uzros-7* by cross-cultivating it with the Japanese *Harabosu*. This was named *Uzros-7-13* and has been cultivated since 1948 in Chimkent Oblast in Kazakhstan, as well as in Tadzhikistan.

In 1959 the rice breeders Sin Aleksandr and N. P. Manannikov developed a new cultivar *Uzros-59* through cross-breeding *Uzros-7-13* and *Krymysala*. *Uzros-59* is known to have a growing period of 125 days and a yield of 80-90 centners per hectare. This cultivar was cultivated as early as 1965 in Uzbekistan and during the period between 1976 and 1980 spread into Chimkent Oblast in Kazakhstan, Tadzhikistan and Turkmenia.

In 1968 Sin Aleksandr and P. A. Pulina developed a new rice cultivar, *Uzbekistan-5*, which has a growing period of 108-117 days, produces 65-70 centners per hectare and whose ears have as much as 80-95% fertility. This cultivar has been cultivated in the Tashkent, Syr-Darya, Khorezm Oblasts and the Fergana Valley, as well as in the Karakalpak ASSR of Uzbekistan. From 1978 they began to cultivate it in Chimkent Oblast in Kazakhstan. It has a rather brief growing period, it produces a good harvest, and it is of high quality with a good taste when cooked. Among new cultivars developed in 1983 is *Intensivnyy*, whose characteristic is a short period of growth plus a yield of 90 centners per hectare. It can also be quite easily machine-harvested due to its sturdy stalks. The cultivation of this cultivar has been started in the Tashkent, Syr-Darya and Surkhandarya Oblasts.

3.3.2. Kazakhstan

To the South of Lake Balkhash in Kazakhstan, the Karatal Rice Experimental Farm (cf. ill. 21) is located. Here efforts for the improvement of rice cultivars have also been carried out. The director of this farm is Hwang Aleksandr Ivanovich (cf. ill. 22 and 23), born in 1907. After having worked for 14 years in developing cultivars with a high production and good taste, he succeeded in introducing three new cultivars called *Alakul'skiy* (cf. ill. 24), *Ushtobinskiy* (cf. ill. 25) and *Karatal'skiy* (cf. ill. 26). *Alakul'skiy* yields 68 centners per hectare compared with 32 centners of the conventional cultivars. *Ushtobinskiy* yields 45 centners. It is known that Hwang is continuing his research not only with rice but also with wheat, maize and other crops at the Kazakh Agricultural Institute named after Williams.

The Kazakh Rice Cultivation Science Research Institute, where work on the development of rice cultivars has been carried out, is situated in the 'Rice Capital' of Kazakhstan, Kzyl-Orda. *Marsan* is among the cultivars bred at this institute. *Marsan* has a six centners per hectare higher yield than *Kuban-3,* which had been cultivated before. The cultivar *Krasnodarskiy-424* is one of those widely cultivated: it grows more quickly than *Uzros-59* and has a high yield but, on the other hand, requires a flat level paddy and well-organized irrigation system. Its cold tolerance is also known to be weaker than *Uzros-59*s.[230]

3.4. Utilization of by-products

Such by-products as straw and rice hull are produced in the process of rice cultivation. It was known that until recently, in the Soviet Union, these by-products were burnt. The chief of the economy and production department of the Kazakh Rice Cultivation Science Research Insititute, K. Sydykov, dealt with the present situation of the use of these by-products and their future possibilities in his article entitled *"The Process of Utilizing All the Products of Rice Cultivation"*.[231]

Sydykov states that in rice cultivation straw accounts for 50% of the biological mass, in the threshing process hull is produced making up 17-19% of the total quantity, and in the cleaning process the quantity of bran produced is 11-13% . In Kazakhstan rice is milled at the Rice Cleaning Kombinat in the cities of Kzyl-Orda and Ural'sk and it is known that the hull produced is sent to the hydrolysis plants in Chimkent. The Kzyl-Orda Rice Cleaning Kombinat sends 35,000-40,000 tonnes of hull annually to the hydrolysis plants in Chimkent and Fergana where enzymes for fodder are produced.

Special technical processing is said to be required for the utilization of straw and it is then used to prepare organic fertilizers. It could also be used as raw material in the manufacture of high quality paper, but so far in the Soviet Union experiences of this have remained slight. The powdery feed produced in the milling process, which is called *muchka* (< Russian мучка, 'bran powder'), is the by-product with the highest nutritional value. It is known that this feed includes 8-24% raw oil, 5-26.8% raw protein, 5.6-27.9% cell membrane, 5-15% lye and 32-59.2% non-nitrogen extract, some vitamin B and E and components of phosphorus. However, the disadvantage of this rice feed powder is its rapid rate of hydrolysis due to the high oil content. Because of this trait, it cannot be kept for long periods and has to be used within a month. For long term preservation the oils must be extracted from it.

Oil extracted from feed powder is known to be widely used as an edible oil. For this reason the method of oil extraction is under research in the Soviet Union, however, it is not yet produced industrially. For example, at the Belorechensk Oil-Extracting Plant in Krasnodar Kray, an oil-extracting experiment was undertaken according to the method

developed by the Krasnodar Technical University, and the result was the production of 56.5 tonnes on average per 24 hours. In the process of the experiment, 30 tonnes of rice oil were extracted, but this is known to be the only example of this kind.

Currently in Kazakhstan alone, 800,000 tonnes of straw, 30 tonnes of rice hull and 80,000 tonnes of feed powder are produced. Sydykov expresses his opinion as follows:

> "... Henceforth, departments for processing by-products should be designed and built or reconstructed in rice cleaning mills and *kombinats*. These departments and *kombinats* should form a joint working process with the rice milling plants and mixed feed plants. ..."

The number of Koreans in the Soviet Union does not exceed 0.15% of the total population. The yield of rice among the total cereal production of the Soviet Union is estimated at about 1.7%, i.e. 3 million tonnes. Of course it does not mean that all Koreans in the Soviet Union cultivate rice nor is rice cultivated solely by Koreans. However, it is an indisputable fact that in the advancement of rice cultivation in the Soviet Union, especially in Central Asia, Koreans have contributed as the main developers.

The importance of rice and its share in the cereal production of the Soviet Union will undoubtably grow in future, judging from the fact that rice cultivation is being continuously extended to places where rice is now considered to be one of the main cereals. The percentage of the population which eats rice as its basic staple is on the increase because nationalities for whom rice has not been a staple now consume more than before.

As a proof of this trend, some years ago a book by K. Sydykov and Z. Makulbayeva about rice cultivation was published in Kazakhstan.[232] Various questions about rice cultivation in Kazakhstan are dealt with in this volume: in Chapter I "The role of collectivization in the development of rice cultivation", in Chapter II "The situation and prospects for rice cultivation in Kazakhstan", in Chapter III "The level of collectivization in rice production by sovkhozes in Kazakhstan" and in Chapter IV "The method of improving the economic efficiency of rice production under the conditions of collectivization".

3.5. Main kolkhozes and sovkhozes for rice cultivation led by Koreans[233]

3.5.1. Kazakhstan

In Kazakhstan rice cultivation is practised in four oblasts: Taldy-Kurgan, Chimkent, Alma-Ata and Kzyl-Orda.

3.5.1.1. Taldy-Kurgan Oblast

Areas where rice is grown are situated near Lake Balkhash in the area called Karatal.

Since the beginning of irrigation work, the quantity of arable land has increased to 7,500 hectares, and 52 million roubles have been invested. During this time four big reservoirs and a irrigation system 2,126 kilometres long were built. During the first four years of the 11th five-year plan, rice production was 94,349 tonnes, which was 14,121 tonnes more than during the whole of the 10th five-year plan. In 1984 the yield was on average 46 centners/hectare, while during the first years of rice cultivation, namely at the end of the 1930s, the yield was 12-15 centners and in 1980 35.9 centners. The increase was the result of the irrigation system. According to Hwang Gennadiy Filippovich, chief of the agriculture management planning department of the Karatal Rayon, in 1984 for the first time, more than 20,000 tonnes of rice were sold to the state. In this rayon, the best year for rice cultivation previous to 1984 was 1981 when 19,000 tonnes were sold to the state.

In the Karatal Rayon, there are the following sovkhozes which cultivate rice: the Sovkhoz named after *Pravda, Ushtobinskiy* Sovkhoz, and the Experimental Farm named after *Frunze*. In this rayon, the total area of rice cultivation is around 6,000 hectares. The average yield was 40 centners per hectare in 1984.

1) *Ushtobinskiy* Sovkhoz

This sovkhoz was established in 1938 near the River Karatal by seven heroes of socialist labour as well as others who had received various orders of merit. The manager of the sovkhoz is Ŏm Afanasiy Aleksandrovich and the assistant manager Ko Sergey. The secretary of the sovkhoz party committee is V. Perepolkin. There are 25 rice cultivating teams connected with three brigades which work on the basis of the collective trust system, which was first introduced into the sovkhoz in 1982. After the application of this system the cost of rice production decreased from 27.30 roubles to 23.55 per centner. Leaders of two of the brigades are Pak Pavel Mikhailovich and Kim Anatoliy Afanas'yevich.

The sovkhoz received orders of the Circulating Red Flag of the Central Committee of the Communist Party, of the Soviet Government, of the Central Soviet of All-Union Trade Unions and of the Central Committee of the All-Union Leninist Communist League of Youth for the fulfilment of the plan for 1985. As for famous rice cultivators, the team leader Kim Erast Alekseyevich and the party member Pak Vladimir Kharitonovich can be mentioned. The No.1 team leader Kim Roman and Li Andrey Yemsanovich are also renowned. According to party members like Sin Yelizaveta, Cŏn Afanasiy and M. Novikova, the sovkhoz party committee did not pay enough attention to the education of younger people, since the average age of rice cultivators is 45. In 1985 some party members were dismissed due to violence, and 25 workers were detained on a charge related to alcohol problems.

The area under cultivation is 1,800 hectares. 6,032 tonnes of rice were harvested in

1985, instead of the planned 5,220 tonnes. The No.1 team harvested 51.1 centners per hectare while the average for the sovkhoz was 44.5. This is the northernmost area of rice cultivation in Kazakhstan. The *Ushtobinskiy* and *Alakul'skiy* cultivars are grown. The *Ushtobinskiy* cultivar became general from the end of the 1960s.

Onions are also cultivated on the sovkhoz, and it engages in stock and poultry breeding as well.[234]

2) The Sovkhoz named after *Pravda*

Generally speaking the 1984 harvest was good, the average yield being 45.1 centners per hectare. The expected production for 1986 was 6,660 tonnes of rice. Still the results obtained in rice cultivation were not satisfactory compared with other enterprises, the reason for which, according to Son Konstantin, chief agronomist, Chai Yevgeniy, agronomist in charge of plant preservation and other agronomists like E. Moldagulov and Hwang Miron, might lie in a lack of principle, faulty policies and idleness.

Among the leading rice cultivators are Yun Sergey Grigor'yevich, the manager of the sovkhoz, Kang Viktor Vladimirovich and Yu Boris. Ko Sergey Ivanovich, a meritorious farmer of Kazakhstan, is the leader of the No. 2 rice cultivating team in charge of 1,050 hectares. Chief of the political education bureau is Cŏn Klavdiya and four propangandists working for party education are Kim Karl Vasil'yevich, Ma Avramovich, Sŏk Nikolay and Son Hyŏl-bong. The weather in 1984 was relatively good. A number of difficulties were evident in rice cultivation, especially the water problem. In order to solve this, it was decided to reuse water by pumping it back to the paddies. The chief of the machine repairing centre is An Gennadiy.

This sovkhoz was also expected to produce 4,400 tonnes of onions, 800 tonnes of meat, 1,650 tonnes of milk and other products. Poultry is also bred.[235]

3) The Experimental Farm named after *Frunze*

Of the 3,196 hectares of cultivated land under the alternating collective system, paddies occupy 1,800 hectares. The average yield in 1985 was 44.4 centners per hectare and the expectation for 1987 is 47 centners. During the 11th five year plan 25,000 tonnes of rice were sold to the state, instead of the planned 20,200 tonnes. The *Ushtobinskiy* cultivars are popular in this area. Altogether 22 teams are working. The manager of this farm is Pak Nikolay Aleksandrovich, and the team leaders are Kang Nikolay Vladimirovich, Hong Leonid, Lim Thai-sun, Kim Oleg Sergeyevich and others. V. A. Motorin was elected as the secretary of the party committee at the end of 1985. The former manager, Kim Kwang-su, died in 1985 at the age of 61. Onions are planted and stock is also raised on this farm.[236]

Besides these, the *Karatal Experimental Farm* is also in existence. It was mentioned as

having cultivated early-maturing rice cultivars, but no further information was discovered.[237]

3.5.1.2. Alma-Ata Oblast

Rice cultivation is concentrated in the area beside the River Ili in the Balkhash Rayon on 25,000 hectares of reclaimed land. Rice has been cultivated on the Akdala Plain since 1965, and nowadays there are five sovkhozes cultivating rice in this region.

1) *Bakbaktinskiy* Sovkhoz

On this sovkhoz, established in 1966, rice is considered to be the main grain crop, and the area under cultivation is 4,050 hectares, this being the largest in Balkhash Rayon. The amount to be sold to the state in 1985 was 10,500 tonnes and in 1986 9,000 tonnes. Among team leaders Kim Vissarion Aleksandrovich, Sin Petr Danilovich, Kim Ivan Yakovlevich and others are to be found. In 1974 Kim Aleksandr Timofeyevich, father of Kim Vissarion Aleksandrovich, organized a family brigade on the sovkhoz for the first time. Kim Vissarion is a member of the Oblast Party Committee and the Oblast Committee of the Communist Union. The party secretary of the Sovkhoz is K. M. Tuymabayev and its manager is T. A. Ardabayev. Barley is also cultivated over an area of 1,300 hectares, with a yield of more than 500 tonnes.[238]

2) The Sovkhoz named after the *50th Anniversary of the October Revolution*

Altogether rice is cultivated in 3,000 hectares of paddies. During the last five years, about 1,000 hectares of saline areas were reclaimed as paddies. In 1984 the sovkhoz produced 10,100 tonnes of rice instead of the planned 9,000 tonnes. The average yield was 44.7 centners per hectare in 1985 which is the highest in the Balkhash Rayon. For example, the yield of the No. 2 brigade, led by Nam Nikolay Ivanovich, was 55.2 centners per hectare from 680 hectares in 1984. In 1985 this brigade cultivated about 900 hectares, which is one third of the sovkhoz paddies. This brigade has increased production as follows:

1982 45 centners/ha
1983 48 "
1984 55 "

There are five rice cultivating brigades in all, and one of the leaders is Yu Vladimir.

In order to save water, a new method was introduced. Thus water is reused in paddies, which has meant a saving of almost 20% and increased the harvest by 2-3 centners per hectare. The manager of the sovkhoz is Sin Gennadiy Hyonmunovich. As an example of a rice cultivating team, we can take that led by Han Aleksandr Borisovich in which Kazakhs, Russians and Germans are working.[239]

3.5.1.3. Chimkent Oblast

Rice is cultivated in the southern part of this oblast, in the area surrounding the *Chardara* Reservoir.

1) *Voskhod* Sovkhoz

It is situated in the Chardara Rayon. To take the case of So Lyudmila Pavlovna, she came to this sovkhoz in 1966 with her husband, So Pavlovich, and four children. They had already organized a family cultivating team in 1971, producing 50 centners per hectare, instead of 27 centners, from 113 hectares of saline paddies. In 1972 Sŏ Lyudmila received an Order of Labour Red Flag and her husband also received the Second and Third Order of Labour Merit. The production of rice for 1982 was 33,000 tonnes.[240]

2) *Kommunizm* Sovkhoz

It is situated in the Dzheltysay Rayon. Hŏ Petr Grigor'yevich (born 1950), leader of the No. 5 team, has participated in reclaiming 800 hectares of saline virgin land. In 1984 the sovkhoz reclaimed 145 hectares and produced 300 tonnes of rice. The brigade-leader of the No.1 brigade is Kim Valentin and the secretary of the party committee is Imankulov.[241]

3) *Kazakhstan* Sovkhoz

It was established in an 80,000 hectare area of reclaimed land on the Chardara Plain. The area under rice cultivation was 3,000 hectares in 1984.[242]

3.5.1.4. Kzyl-Orda Oblast

Kzyl-Orda Oblast produces about 75% of all the rice of Kazakhstan in an area of almost 100,000 hectares. When Koreans were moved to Central Asia, they first began to cultivate rice here. This is also the reason why Kzyl-Orda is called the 'Rice Capital' in Central Asia. There are a good number of sovkhozes and kolkhozes specializing in rice cultivation, e.g. *Avangard* Sovkhoz, the *Third International* Kolkhoz, the Sovkhoz named after *Kalinin* and others. Nearly all of these are situated in the vicinity of the River Syr Darya. In the Chiili Rayon there are 13 agricultural enterprises, six of them cultivate rice.

1) *Avangard* Sovkhoz

This sovkhoz was transferred from the Far East in 1937 to the Chiili Rayon. Here Kim Man-sam (born 1882, died Aug. 19, 1964, in Ussuriysk), a famous rice cultivator, worked during the Second World War producing 150-172 centners per hectare. Kim taught rice cultivation to the local Turkic people. For example, his pupil Ibrai Sahayev from the neighbouring *Kzyltu* Sovkhoz became a double Hero of Socialist Labour.

During the war Kim Man-sam and 16 other Koreans received the same title.

In 1985 the sovkhoz had 2,300 members making up 360 families of different nationalities. The area under rice cultivation is 2,750 hectares, and rice production in 1985 was 76,600 centners instead of the planned 69,000 centners. The first combine was brought to the sovkhoz at the end of the 1950s, and now it owns 113 tractors, 60 trucks, 90 combines and 250 other agricultural machines. There are five rice cultivating brigades three of which are as follows:

a) Hŏ Chŏng-se's brigade (the No. 2 brigade). Members: Hŏ Aleksandr, Pak German, Kim Nadezhda, Pak Gavriil, Kim Georgiy, Hŏ Gennadiy, Yun Slava and others. Hŏ Chŏng-se was named brigade-leader after Cha Ki-sŏp. This brigade has 40 members of different nationalities, and it cultivates 730 hectares. The yield of rice expected for 1985 was 60 centners per hectare.

b) Co Vasiliy Vasil'yevich's brigade (the No. 3 brigade). Members: Kim Tŏk-han, Kim Vladimir, Kvŏn Nikolay, Pak Arkadiy, Kvŏn Robert, Choi Vitaliy, Mun Vladimir (altogether 3 cultivators and 29 mechanics). This brigade cultivates 738 hectares (1985) and the expected yield was 61 centners per hectare. Co Vasiliy has cultivated rice for more than thirty years. The brigade is also test cultivating the *Krasnodarskiy* cultivar, which ripens about a week later than other cultivars but gives a better harvest.

c) Choi Magel's brigade (the No. 5 brigade). Members: Cu Anatoliy, Kim Yong-sun, Yevgeniy Pavlov, Kim Thai-wŏn, Vasiliy Soloviyev, Amangeldy Sygindykov. The other two brigades are led by Askarov and Alzanov.

The spring in 1985 came late, and at the end of August it rained heavily. The sovkhoz manager Han Vitaliy Petrovich, who also speaks several of the languages of the various nationalities living on the sovkhoz, said that success in rice cultivation lies in the collective trust system. The party secretary of the sovkhoz is N. Aydarov. There are around 180 members in the Communist Youth League of the sovkhoz, whose secretary is Pak Mira Borisonova. The sovkhoz was awarded with orders of the Circulating Red Flag of the Central Committee of the Communist Party, of the Soviet Government, of the Central Soviet of the All-Union Trade Unions and of the Central Committee of the All-Union Leninist Communist League of Youth in 1977 and 1978. The leader of the female cultivating team is Han Irina. The chief of the machine repair centre is Kim Pavel.[243]

2) *Gigant* Kolkhoz

Situated in the Chiili Rayon, this kolkhoz is one of the oldest rice cultivating enterprises in this region. The area under cultivation is 2,300 hectares, and there are six brigades. The No. 5 brigade, led by Pak Yŏng-nam, consists of 35 people of different nationalities and guarantees 47-49 centners of rice from 450 hectares of paddies annually. Kang Valentin leads the No. 2 brigade. In 1985 the kolkhoz produced 101,000 centners of rice

instead of the planned 87,000. The manager of the kolkhoz is Sadvakas Balapanovich Rysimbetov, and Hwang Konstantin Vasil'yevich is the chairman of the Executive Committee of the Chiili Rayon People's Soviet.[244]

3) *The Third International* Kolkhoz

This kolkhoz, situated in the Karmakchiy Rayon, was established in 1938. Of the 5,233 hectares of cultivated land, 2,850 hectares are rice paddies. There are the following six brigades cultivating rice:

a) Kim Nikolay Ivanovich's brigade (the No. 3 brigade). In 1985 this brigade consisted of 36 people, and produced 53 centners per hectare from about 500 hectares. In the same year it decided to introduce the alternating cultivating system. Kim Nikolay Ivanovich, receiver of an Order of Labour Red Flag, is a deputy member of the Kazakh Supreme Soviet.

b) Kim Yŏng-yun's brigade (the No. 4 brigade). This brigade consists of 37 people of different nationalities and cultivates 465 hectares. Kim Yŏng-yun has received the Second and Third Order of Labour Merit.

c) Chai Emlis's brigade (the No. 5 brigade). This brigade planned to produce 60 centners per hectare from 400 hectares of paddies.

The other brigades are led by Kim Vladislav Semyonovich, Milis Arinov and Bulen Butiye.

In 1984 the kolkhoz sold 10,200 tonnes of rice (planned 9,280 tonnes) to the state, and 1,650 tonnes of seed rice were sent to other sovkhozes. 80,000 centners of rice were sold to the state in 1985. In 1976 the collective trust system was introduced in this kolkhoz and by 1983 all brigades were working under it. As a result of this system, the production price of rice per centner decreased from the planned 19 roubles to 17 roubles. According to Kim Petr Antonovich, manager of the kolkhoz, the following matters should be guaranteed in order to improve the productivity of rice:

- advanced farming skills which include fertilizing, sowing and water control; 13 different stages of work are needed from spring to autumn
- organizational skill; the brigade trust system had already been introduced
- mechanization of all processes from sowing to harvest.

Kim Petr Antonovich followed Chai Cŏng-hak (1913-1983) as the manager. Kang Chŏl-su is an assistant manager. A small art group is working on the kolkhoz, in which Kim Lavrentiy, Cŏn Yelizaveta and Aizagul Subatkhanova are active. Farmers of different nationalities, e.g Kazakhs, Koreans, Russians, Ukrainians and Belorussians are working together on this kolkhoz. Livestock is also raised. The kolkhoz has many times been awarded with orders of the Circulating Red Flag of the Central Committee of the Communist Party, of the Council of Ministers, of the Central Soviet of the All-Union Trade Unions and of the Central Committee of the All-Union Communist League of

Youth and has annually received awards from the Oblast Party Committee, Oblast Executive Committee, Oblast Soviet of Trade Unions and the Oblast Committee of the Communist League of Youth.[245]

4) The Sovkhoz named after *Kalinin*
This sovkhoz is situated in the Dzhalagash Rayon. 160,000 centners of rice from 3,100 hectares of paddies were sold to the state in 1985. The No. 5 brigade, led by Kim Yefrem and consisting of 27 people, produced 56 centners of rice from about 400 hectares, instead of the planned 44.5, in 1985. Kim Yefrem was named leader after Kim Aleksandr, a famous rice cultivator in the oblast. Kim Yefrem is a deputy member to the Rayon People's Soviet and has received the Order of Honour Designation. Kim Chang-yŏn is the head of the Trade Union Committee of the sovkhoz. The collective trust system was introduced in the sovkhoz in 1983. The chief engineer is Li Klim Denisovich and its manager is Saksibay Manzaripov. The sovkhoz owns 1,600 cows.[246]

In addition to the above-mentioned, there are the following sovkhozes and kolkhozes cultivating rice in Kzyl-Orda Oblast: *Terenozekskiy* Sovkhoz, the Sovkhoz named after *Dzhambul*, the Sovkhoz named after the *50th Anniversary of the Kazakh SSR*, *Toguzkenskiy* Sovkhoz, *Uzgentskiy* Sovkhoz, *Kelintyubinskiy* Sovkhoz, *Tonkurs* Sovkhoz, the Kolkhoz named after *Sahayev, Madeniet* Kolkhoz, *Chirkeilskiy* Sovkhoz, *Tunkeris* Kolkhoz, the Sovkhoz named after *Abay, Aksu* Sovkhoz, *Leninskiy* Sovkhoz, *Kzyltu* Sovkhoz, *Sadarinskiy* Sovkhoz, the Sovkhoz named after the *Kazakhstan Leninist Communist League of Youth* and *Il'ich* Sovkhoz.[247]

3.5.2. Uzbekistan

Rice cultivation was developed in the Karakalpak ASSR, Khorezm Oblast, Syr-Darya Oblast and Tashkent Oblast with the aid of the irrigation system which is possible in areas adjacent to the River Amu Darya and the upper course of the Syr Darya. A recent tendency shows that enterprises cultivating rice are steadily increasing in size.

3.5.2.1. The Karakalpak ASSR
It is known that there exist 19 special sovkhozes for rice cultivation within the republic.

1) The Sovkhoz named after the *50th Anniversary of the All-Union Leninist Communist League of Youth*.
It is situated in the Nukus Rayon. The water problem was severe between the end of May and the end of June, 1986. The brigade led by Cŏng Yong-hwan consists of 19 members

and cultivates 170 hectares. They aimed to produce at least 50 centners per hectare instead of the planned 43. A mechanic, Kim Boris, and a cook, Kim Kŭm-sun, also work in this brigade. Cŏng Yong-hwan is a holder of the Second and Third Order of Labour Merit.[248]

Among other sovkhozes the following can be mentioned (Rayon): *Raushan* (Kungrad), *Rossiya* (Nukus), *Sovet Uzbekistan* and *Takhtakupyr* (Takhtakupyr). The *Uzros-59* cultivar is grown on *Rossiya* Sovkhoz.[249]

3.5.2.2. Khorezm Oblast

In 1984 the oblast sold more than 95,000 tonnes of grain to the state, to which the following sovkhozes and kolkhozes have contributed considerably: *Al Khorezmi* Sovkhoz (Khanka Rayon), *Bagat* Sovkhoz (Bagat Rayon), *Gulistan* and *Yangiabad* Sovkhozes (Gurlen Rayon) and *Kommunizm* Kolkhoz (Gurlen Rayon). At Khorezm Oasis rice is cultivated over an area of 20,000 hectares.

1) *Al Khorezmi* Sovkhoz

This sovkhoz is situated in the middle of the Khorezm Oasis region, surrounded by the Kzyl-Kum and Kara-Kum deserts. Due to its situation there is a strong wind in winter but, on the other hand, it is extremely hot in summer. This kind of weather often causes unexpected complications for rice cultivation. In 1985, for example, after the rice had been sown, a strong wind blew and the rice sprouts floated to the surface of the water, which necessitated resowing in around 20% of the paddies. In autumn just before the harvest, the wind knocked the rice stalks down. This, in turn, made it necessary to harvest by hand instead of by machine. In 1986 the water shortage has caused considerable trouble. The sowing of rice usually starts at the beginning of May on this sovkhoz.

The area under rice cultivation is 3,700 hectares, from which it was expected that 26,000 tonnes of rice would be harvested in 1985. The brigade led by Kim Konstantin Pavlovich (born 1920), who has worked on the sovkhoz since 1969, consists of 34 members and produced 68 centners of rice per hectare in 1985. This brigade has cultivated the *Avangard* cultivar since 1984. The brigade led by Pak Ivan takes care of 144 hectares of paddies. The sovkhoz has produced 204,000 centners of rice and also cultivated the *Uzros-59* cultivar.

The manager of the sovkhoz is Kim Nikolay Vasil'yevich, Hero of Socialist Labour, the assistant manager is Madrim Sabirovich Sabirov. In the No. 17 middle school of the sovkhoz approximately 20 teachers are working: Yun Vikentiy (school master), Kim Galina Yeliseyevna (biology since 1968), Kim Irina Sergeyevna (Russian

and literature since 1972), Cŏng Irina Nikolayevna (chemistry and biology since 1960), Kim Lyudmila Petrovna and Farkhad Baltayevich Urunov (since 1985).[250]

2) *Begovat* Sovkhoz

Organized in 1977 in a former desert area, it is situated in the Urgench Rayon. The area was originally only sand. The work of changing sandy soil into cultivated paddies has been done by bringing earth from other areas. Pak Yakov, leader of a brigade, said that people here have learned how to cultivate rice on sandy land even if it is impossible to build a house there. In this area water soaks into the ground instead of flowing. The difference from other areas lies in the fact that the clayish water of the Amu Darya leaves rich silt behind it. For example, three paddies lying side by side yield different amount of rice, with the third producing least. At first farmers did not know about this phenomenon.

The cultivated area is about 1,200 hectares. According to the latest article (LK 1986 Nov. 6), planted paddies were 716 hectares, of which it was possible to cultivate only 576 hectares because of water problems. It was expected that 1,200 tonnes of rice would be sold to the state. The first year had brought only 14 centners per hectare. In 1985, the average yield was 40 centners and the sovkhoz sold 4,284 tonnes of rice to the state. During the 11th five-year plan the sovkhoz sold a total of 16,000 tonnes of rice to the state. The manager is Kim Radomir Nikolayevich, son of Kim Nikolay Vasil'yevich who is the manager of Al Khorezmi Sovkhoz and a deputy member of the Supreme Soviet of Uzbekistan. Brigades are led by Choi Nikolay (born 1925, the No. 6 brigade), Li Leonid, Cang Grigoriy (the No. 1 brigade). Cang's brigade consists of 24 people and cultivates 79 hectares. Kang Yŏng-hwan, Cu Lyudmila, Cŏng Andrey, Kudargen Yeschanov, Kadyr Kazakov, Bekmet Khudaykulov and others belong to Choi's brigade. In 1985 also, some tens of hectares of desert area were reclaimed. Before sowing and after the rice germinated, nitrogen, phosphorus and kalium fertilizers were used.[251]

3) *Gulistan* Sovkhoz

Until 1976 the sovkhoz specialized in cotton cultivation, but now it cultivates rice, too. The time suitable for sowing is between April 25 and May 10. During the summer the paddies are weeded three times and the herbicides *Saturn* and *Propanid* are also used. The weather in this area is unexpectedly changeable, sometimes spring being cold, summer dry and autumn rainy. In 1984 spring arrived late, and, at the time when the rice germinated, the temperature was very low. The area under cultivation is thought to be 2,000 hectares. During the years 1981–1983, 327,000 tonnes of rice were sold to the state. The planned yield for 1985 was 14,000 tonnes. The *Uzros-59* and *Avangard* cultivars were planted.

The brigade led by Kim Po-ik (born 1911) consists of 22 people and produced 70 centners per hectare in 1985. Kim has been a member of the Communist Party for more

than forty years. Sin Filipp, son of Sin Chang-hwa, who has cultivated rice for 25 years, leads a brigade consisting of 20 people in charge of 50 hectares. The expected yield was 58.3 centners for 1985. In Sin's brigade there are, among others, Kim Anatoliy, Omanbai Kabulov, Cusan Yuldasev and Cang Klara. Hwang Yakov Vasil'yevich works as the chief engineer. The brigade, led by Ham Fyodor Grigor'yevich, consists of 30 people of different nationalities. This brigade has reclaimed virgin land and produced more than 55 centners per hectare in 1984. The No. 5 brigade of the No.1 Branch, led by Lyu Hyŏn-dŏk, who has cultivated rice more than 20 years, is in charge of 81 hectares and consists of 32 peoples, among whom there are Kim Semyon, Li Cang-sŏn, Hwang Kai-bong, Li Vyacheslav, Li Sergey, Ibragim Haitzanov and Narym Yermetov, etc. The branch chiefs are Yu Aleksey and Pak Miron. The manager is Kim Sergey Timofeyevich.[252]

4) *Yangiaryk* Sovkhoz
Established in 1977, it is situated in the Yangiaryk Rayon. In 1986 the sovkhoz sold 2,560 tonnes of rice to the state, but due to water problems, about 200 hectares were not well cultivated. The whole cultivated area is 1,030 hectares. The manager has been Han Aleksandr Sergeyevich since 1980. The average yields (in centners) of the last few years are as follows: 26 (1982), 28 (1983), 30 (1984), 32 (1985), 30 (1986). Six brigades are working. The brigade led by Ha Leonid cultivates 90 hectares. Nariman Omanov and Ruzmet Yadgarov also lead brigades. The chief of the No.1 branch is Kim Nikolay Vasil'yevich. In 1984 rice cultivation suffered from a water shortage.[253]

Besides the above-mentioned, the following sovkhozes grow rice: *Lenin* (Khazarasp Rayon, cultivates *Uzros-59* and *Avangard* cultivars), *Bagat* (Bagat Rayon) and *Karakum* (Khiva Rayon). On the *Kommunizm* Kolkhoz, Choi Pong-chun, holder of the Order of Lenin, can be mentioned as a team leader. On this kolkhoz the *Avangard* cultivar is planted.[254]

3.5.2.3. Syr-Darya Oblast
1) *Solikor* Sovkhoz
During the 11th five-year plan the sovkhoz sold 10,500 tonnes of rice to the state. The area under cultivation is 2,500 hectares, and the average yield was 45 centners per hectare in 1985. The brigades led by Pak Trofim (No. 4) and Nabiasanov (No. 3) produced 70 centners/hectare in 1985. The chief of the Trade Union Committee is A. Tangribergenev. Cang Makar and Kim Viloriy also lead brigades.[255]

2) The Sovkhoz named after the *50th Anniversary of the USSR*
This sovkhoz is situated in the Voroshilov Rayon. Li Vladimir led a team with a production of 75 centners per hectare in 1982.[256]

3.5.2.4. Tashkent Oblast
Rice cultivation is concentrated in the southern part of the Oblast near the River Syr Darya, and in the northern part, in the area adjoining the River Chirchik which flows into the Charvakskiy Reservoir. 30-40 years ago rice was the main agricultural product in the oblast, but nowadays only two sovkhozes, i.e. the Sovkhoz named after the *40th Anniversary of the October Revolution* and the Sovkhoz named after *Kalinin,* still cultivate rice. The others have changed from rice to, among other things, kenaf.

1) The Sovkhoz named after the *40th Anniversary of the October Revolution*
It is situated in the Bekabad Rayon. This sovkhoz was established in 1965, especially to cultivate rice. At the moment 3,020 hectares of paddies are cultivated by 36 brigades. Among the advanced brigades those which are led by Yun Yakov Grigor'yevich (born 1912), Li Andrey, Hwang Nikolay Vasil'yevich, Khurmata Abdunazarova and others can be mentioned. These brigades produce 65-70 centners of rice per hectare instead of the planned 49. In 1985 and 1986 spring came late and the sovkhoz again suffered from a shortage of water. Harvest usually starts on September 20 and finishes on October 20.

Yun Yakov, member of the Communist Party since 1940, came to this rayon as early as in 1938 and has been cultivating rice for 50 years. 16 people, e.g. Sin Nina, Pang Yekaterina, Li Andrey Ivanovich and Abdulmalik Salayev belong to his brigade which has 95 hectares of paddies. Yun Yakov has seven children. The No.1 brigade cultivates 712 hectares. The expected harvest for the sovkhoz in 1986 was 1,600 tonnes, of which 1,200 tonnes were to be sold to the state. On this sovkhoz rice is planted by hand because seeds do not sink deep enough when machine planted. O Roman, Pak Roman and Pak Cai-min are also advanced rice cultivators.[257]

2) The Sovkhoz named after *Kalinin*
It is situated in the Galabinskiy Rayon. The area under cultivation was 1,670 hectares in 1983 and in all 13 brigades are working. The average yield was 55 centners in 1982. Errors committed in 1984 were admitted: the sowing of the rice was delayed and the growth of rice was not controlled well. Accordingly the norm was fulfilled only with difficulty. Rice is now harvested by combines, whereas it was done by mobilizing around 3,000 workers and students until 1982. Livestock is also bred. The party secretary is Pang Levmir. One of the brigades is led by Thai Valeriy.[258]

3) The Kolkhoz *Zarya Kommunizma*
It is also situated in the Galabinskiy Rayon. When An Sŏ-myon (born 1914), chief agronomist, began to work as a brigade-leader on the kolkhoz in 1946, there were only old people, women and children living there. At that time rice was cultivated manually. In 1948 Koreans on the then *Polyarnaya Zarya* earned the title of Heroes of Socialist Labour. The kolkhoz received its present name in 1962, and Han Valentin Andreyevich, Hero of Socialist Labour, became its leader.

Among the workers who contributed to the development of the kolkhoz at the start are, Hŏ Tan-jik, double receiver of the Order of Lenin, Kim Ilya, Hero of Socialist Labour and Cin Chang-yŏn, the first manager of the kolkhoz. Sŏ Chang-se is chief of the cultural and social management department. Pang Levmir Davidovich, who worked as the secretary of the party committee on the Sovkhoz named after *Kalinin* from 1983 to 1986, was elected manager in 1986.[259]

4) The Kolkhoz named after *Kim Pyŏng-hwa*
Situated in the middle of the Chirchik Rayon. Brigades are led by, among others, Hwang Semyon and Li Grigoriy. Some brigades have produced 70-80 centners per hectare in 1985. Hŏ Fyodor, who has already worked for 20 years as a rice cultivator, has been leading a team for the last ten years. Sin Semyon, An Valeriy, Lim Olya, Kim Tat'yana and others are working in this team.[260]

5) The Kolkhoz *Severnyy Mayak*
Situated in the middle of the Chirchik Rayon. The brigade led by Ci Raisa cultivates 100 hectares of paddies and planned to produce 80 centners of rice per hectare in 1986. The manager is Ko Sergey Stepanovich and the chief agronomist Hwang Vasiliy Borisovich.The kolkhoz consists of around 5,000 people of different nationalities; Uzbeks, Russians, Koreans and Kazakhs, etc. Since 1983 a water pipeline has been built, and gas deliveries started. Besides rice, cotton is cultivated (1,410 hectares) and kenaf (680 hectares). The area under cultivation often suffers from a shortage of water. Sometimes it even snows in March.[261]

6) The Kolkhoz named after *Akhunbabayev*
Situated in the middle of the Chirchik Rayon. Brigade-leader Kim Cin-sŏp (born 1927) has been working on this kolkhoz since 1943 when it was called *3.8. Kolkhoz*. At that time the yield was only 20-25 centners per hectare. In 1946 Kim Cin-sŏp obtained the brigade-leader position with 30 hectares. Cŏn Nikolay is also working in this brigade.[262]

7) The Sovkhoz named after *Maulyanov*
Situated in the Bekabad Rayon. This sovkhoz consists of six branches. Cotton is the principal crop, but also rice is produced to some extent. The brigade led by Hwang Roman, who has been cultivating rice for more than 20 years, planned to produce 40.4 centners per hectare in 100 hectares of paddies. Since the sovkhoz has not specialized in rice cultivation, only threshing is mechanized.[263]

3.5.3. Turkmenia

Rice is cultivated in the Nothern part of Tashauz Oblast in the area adjacent to the tributaries of the Amu Darya.

1) The Sovkhoz named after the *22nd Party Congress*
It was established in the Oktyabr'skiy Rayon in 1964 by reclaiming reed fields and saline land. The manager is Kang Kliment. In 1983 the brigade led by Dubsenov cultivated 200 hectares with a yield of 40 centners per hectare.[264]

2) The Sovkhoz named after the *23rd Party Congress*
Situated in the Leninskiy Rayon. The area under cultivation is 2,421 hectares. The cultivar *Krasnodar* was grown, but failed. It was replaced by *Uzros-59*. The average yield on this saline soil was 40 centners per hectare in 1983. One of the brigades is led by An Anatoliy.[265]

3.5.4. Tadzhikistan

Mountains cover 93% of the land area in Tadzhikistan. But, in order to develop agriculture, irrigation has been carried out on a large scale. For example, during the 11th five-year plan 46,000 hectares of land have been reclaimed. Traditionally Tadzhikistan is one of the main cotton producing republics. Besides this, wheat, rice and maize, etc. are also cultivated. Since rice is a staple food for Tadzhiks, Uzbeks, Koreans and other nationalities, the importance of rice has increased. During the last seven years more than 1,000 hectares of land have been reclaimed, of which 700 hectares became rice paddies. Rice cultivating areas lie in the southern part of Kurgan-Tyube and Kulyab oblasts very close to the Soviet-Afghanistan border.

1) The Specialized Rice Cultivating Sovkhoz named after the *60th Anniversary of the Border Guard Army of the USSR*
Established in April, 1978, by twenty young people led by Ci Aleksey Ivanovich downstream on the River Pyandzh in the Kumsangir Rayon of Kurgan-Tyube Oblast, it

has sold 8,824 tonnes of rice to the state during the 11th five-year plan. 50 hectares were reclaimed in the first year and 80 hectares in the second year. The first three years did not bring very considerable results, which caused some people to leave. The Karadum Desert, which covers tens of thousands of hectare, is situated in the rayon. About 1,000 hectares of this desert will be reclaimed before 1990. At that time it is expected that this will produce more than 10,000 tonnes of rice, while the production was 2,315 tonnes in 1985 (2,600 tonnes in 1984) from 690 hectares of paddies. In 1984 the yield of rice was 40-45 centners per hectare. In this area the temperature sometimes goes up to 45-48°C during summer.

In the near future a sovkhoz centre will be established which will include around 300-400 families. The main rice cultivators are Kim Marek, Li Afanasiy, Ci Yuriy, Ko Vissarion, Mun Ruslan, Anatoliy Plugin, Iosif and Franch Lyuch, Hisari Abdusatarov, Cang Boris and Viktor Bonzug, etc. The brigade led by Ci Yuriy cultivates 325 hectares. The manager is Ci Aleksey Ivanovich, receiver of the Order of Meritorious Designation for the harvest of 1983. The party secretary is Song Nikolay. There are Russians, Ukrainians, Kazakhs, Germans, Tadzhiks, Uzbeks, Koreans and Tatars, etc. working on the sovkhoz. This is the only firmly established rice cultivating sovkhoz in Kurgan-Tyube Oblast. The family brigade system has also been introduced. The sovkhoz grows some other grains than rice and breeds pigs to some extent (about 300 in 1985).[266]

2) *Surkhob* Professional Rice Cultivating Sovkhoz

Started to reclaim land in 1964, it is situated in the Parkhar Rayon of Kulyab Oblast. The area under rice cultivation is 1,900 hectares and during the 12th five-year plan it is expected that around 1,000 hectares of paddies will be reclaimed near the rivers Kzylsu and Pyandzh, when the expected yield of rice will be 15,000 tonnes annually. The sovkhoz produces one third of the rice in Tadzhikistan. In spite of severe winds, floods and an earthquake, in 1985 the sovkhoz produced 6,500 tonnes of rice instead of the expected 4,500 tonnes. Mun Valentin Afanas'yevich, chief agronomist, Kim Yevgeniy, leader of the No.1 brigade and Choi Sergey, a mechanic, contributed meritoriously. Mun Valentin Afanas'yevich has been working for more than 20 years on the sovkhoz and received the Order of Meritorious Designation, the Order of the Labour Red Flag, the Order of Peope's Friendship and other medals.

The No. 1 brigade, led by Kim Yevgeniy and consisting of 30 people, cultivates 570 hectares. The No. 5 brigade, led by Kim Mikhail Grigor'yevich, is in charge of 400 hectares with an expected yield of 60 centners per hectare for 1985. A mechanic, Li Trofim, is working in this brigade. The brigade led by Kim Boris consists of 37 people of different nationalities such as Koreans, Uzbeks, Ukrainians and Russians, etc. One of the other brigades is led by An Gennadiy. On this sovkhoz for the first time in the republic,

an experimental farming method of annual double cultivation has been applied. This means that in autumn wheat is sown and the following year in June, immediately after the wheat harvest, rice is cultivated in the same field. This multiple cropping was practised in 200 hectares of fields, and this was expected to produce 100 centners of crops, with 47 centners of wheat and the rest being rice for 1986. This new method of multiple cropping is quickly spreading to other parts of the southern area.

The collective trust system has been introduced. The manager is Kim Petr Grigor'yevich, deputy to the Supreme Soviet of the Tadzhik SSR and Candidate of Agricultural Sciences. The sovkhoz owns more than 50 tractors, 45 rice combine-harvesters and 35 trucks.[267]

3) The Paddy-Washing Sovkhoz

This sovkhoz is not stationed in one area, but moves from place to place in Kurgan-Tyube Oblast. That is why it is also called the Moving Sovkhoz. In 1985 it washed the saline land of the Shaartuz Rayon. After washing fields, the sovkhoz cultivates vegetables, fodder and rice, staying in a place for 2-3 years at most . When the fields have been well washed, they are given to cotton cultivators.

The leaders of the sovkhoz asked for it to be put under the auspices of the Ministry of Land Reformation and Reconstruction of the Tadzhik SSR, which the National Planning Board promised to accept. The main work of the sovkhoz is not production, but the washing of saline land. Still, the sovkhoz has produced rice and sold 300 tonnes of it to the state in 1983, and 455 tonnes in 1984. In 1985 the area of paddies under cultivation was extended to 550 hectares.

The brigade led by Kim Petr Ivanovich produced 18 centners of rice per hectare in 1985. Brigades led by Li Semyon and Kim Vladislav were prominent in enabling the use of saline lands within a year. Other rice cultivators are Kim Vladimir, Kim Gavriil, Kim Dmitriy, Pak Vladimir, etc.[268]

NOTES

189. Cf. note 38.

190. Володин, p. 90. Panchenko says that in 1917 rice cultivation was begun in the Suchanskiy Rayon of the Far East not by Chinese but by Koreans and that in the 1920s it spread to other areas there. He also mentions that rice was at first cultivated exclusively by Koreans and that later Russians were also engaged in it through Koreans (Панченко, p. 3-4).

191. Ibid. p. 89.

192. Rice cultivation is carried out in the Sarpa area of the Kalmyk ASSR. It has also been reported that rice is currently cultivated in the Maritime Region, too, and *Lenin Kichi* wrote as follows: "... Rice is also a staple crop in Primorskiy Kray. Here areas for rice paddies are continuously expanding. In addition to this, rice cultivating sovkhozes have been recently formed. At the same time, great attention is paid to the improvement of the paddy-fields. In such old sovkhozes as *Zhemchuzhnyy* and *Avangard,* rice paddies are also being improved." (1983 May 12, p. 2). Before the October Revolution in Russia, rice was

known to have been cultivated in Turkestan (present Central Asia) and Trans-Caucasia [*Saidokpon (Caraniŭi)*, p. 40].
193. LK 1982 Jan. 7, p. 3.
194. LK 1984 Apr. 25, p. 2.
195. LK 1983 Aug. 20, p. 2. According to a recent article in *Lenin Kichi*, the amount of the rice harvest in the Soviet Union seems to be the same in 1986, i.e. around 3 million tonnes. The rice paddies of the Soviet Union make up 0.5% of the world's total with about one million hectares. The amount of rice produced in Central Asia seems to have decreased by 20% because priority was given to cotton production (LK 1987 Jan. 17, p. 3).
196. LK 1981 June 10, p. 3.
197. LK 1984 March 30, p. 3.
198. The word *bakbaktinskiy* comes from the Kazakh *bak-bak* 'dandelion' but, on the other hand, it could also mean 'to form an orchard' (LK 1982 Oct. 12, p. 2).
199. In the marshland area near Lake Khanka in the border region between the Soviet Union and China in Primorskiy Kray, fully-fledged rice cultivation has been in progress since 1966. Between 1975-1980 five sovkhozes specializing in rice cultivation have been established and the land under cultivation is known to be 42,000 hectares. Perhaps this area is the northernmost region of rice cultivation in the Far East.
200. LK 1983 Apr. 28, p. 2.
201. LK 1984 Feb. 29.
202. LK 1983 May 27, p. 2. The original name of the article in Korean is *"Pyŏphajong'ŭi Yŏngnong Kisure Taihayŏ"*.
203. One *centner* corresponds to 100 kg.
204. In July, 1984, the writer had an opportunity to visit a rice cultivating area near Adana in the southern part of Central Turkey, where the weather and natural conditions very much resemble those of Soviet Central Asia, and confirmed that they were using the same method of sowing rice there as in Soviet Central Asia.
205. LK 1983 May 29, p. 3.
206. LK 1983 May 27, p. 2.
207. LK 1982 May 12, p. 1.
208. LK 1984 Feb. 21, p. 3. The original name of the article in Korean is *"Sŏnjin Pyŏ Caibaiŏpca"*.
209. LK 1984 March 30, p. 3.
210. LK 1983 Aug. 20, p. 2.
211. It is easy to see that rice cultivation is hard work in the Soviet Union, judging from the following: "... Of course the work of rice cultivators has become much easier than before. However, the job of cultivating this crop remains, as yet, one of the hardest tasks." (LK 1983 May 1, p. 3).
212. LK 1983 Oct. 7, p. 1.
213. LK 1986 July 12, p. 2, Nov. 6, p. 3, Nov. 11, p. 1, Nov. 12, p. 2, Nov. 27, p. 2, Dec. 6, p. 1.
214. LK 1983 Oct. 21, p. 1.
215. LK 1986 Feb. 5, p. 2, Nov. 12, p. 1, Dec. 10, p. 2.
216. LK 1986 May 1, p. 1, Aug. 26, p. 2.
217. LK 1986 Sept. 4, p. 2.
218. LK 1986 Feb. 5, p. 3.
219. In Russian it is called "Бригадный Подряд".
220. LK 1983 Apr. 22, p. 3.
221. LK 1983 Apr. 20, p. 2.
222. LK 1983 Apr. 22, p. 3.
223. LK 1984 June 26, p. 3. One concrete example from Tadzhikistan: if a brigade produces more than 40 centners per hectare for 4-5 years successively, an additional wage of 50% is guaranteed. But the additional wage for one person is not valid for longer than one and a half months per cultivating season (LK 1986, Sept. 27, p. 3).
224. LK 1986 Dec. 13, p. 2. For the case of the family rice cultivating team of Sŏ Lyudmila Pavlovna

on the *Voskhod* Sovkhoz in Chimkent Oblast, see 3.5.1.3.
225. LK 1984 March 27, p. 2.
226. Ibid.
According to Ko Moisey, chief of the department of technical processes of rice cultivation in the Uzbek Rice Cultivation Science Research Institute, the yield of rice has hardly surpassed 45-48 centners per hectare during the first half of the 1980s because in Uzbekistan, the same paddies have been cultivated for 10 years or more continuously without introducing the alternating cultivation system. But 200-250 kg of mineral fertilizer and 100-150 kg of nitrogen fertilizer were used per hectare. This decreased the efficiency of the fertilizers. Ko Moisey suggests the alternative cultivation of rice and lucerne. For example, in paddies where lucerne was planted and three years later rice again, in this case *Avangard* cultivar, the yield was 80-85 centners per hectare without the use of mineral fertilizer. Besides this, in paddies where lucerne was once planted, weeds did not grow. Weeds like millet also were removed by using *Saturn* herbicide at 8-10 kg per hectare. There was a case in the Chirchik Steppe where the yield of lucerne was 150 centners per hectare in paddies which had been left to lie fallow, while normal paddies produce only 70-80 centners. Another advantage of the alternating cultivation lies in the fact that the irrigation network can be cleaned meanwhile. (LK 1985 Aug. 20, p. 2)
227. LK 1987 Jan. 17, p. 3.
228. LK 1983 June 22, p. 3. The original name of the article in Korean is *"Kwahagŭi Hyŏpco Ha'e"*.
229. The names of rice cultivars and rice breeders in this part may differ from their real ones because they are transcribed from the forms in Korean script.
230. *Kuban-3* cultivar was propagated in Krasnodarskiy Kray and cultivated in Krasnodar Oblast. This cultivar ripens quickly and endures low temperatures well, thus differing from *Dubovskiy-129*. But *Kuban-3* lodges easily, especially when it begins to ripen. This makes harvest by machine troublesome and in this case the grains are not matured enough. The percentage of the yield is 64-68% and the final yield 68-70%, which is lower than *Dubovskiy-129* (LK 1986 Feb. 5, p. 3). There is also the *Avangard* cultivar in Central Asia. It has not a good taste, but it does not lodge easily. This cultivar endures drought well and ripens a week earlier than *Uzros-59* (LK 1986 Feb. 12, p. 2, Nov. 27, p. 2). Among other cultivars, the *Magister* species, which also ripens a week earlier than *Uzros-59*, can be mentioned (LK 1986 Feb. 12, p. 2).
231. LK 1984 Apr. 25, p. 2.
232. LK 1982 Jan. 7, p. 3. The name of the book is*"The Collectivization of Rice Cultivation in Kazakhstan"*.
233. The names of non-Koreans in this part may differ from their real ones because they are transcribed from the forms in Korean script.
234. LK 1983 Sept. 9, 1984 May 29, June 26, Oct. 4, Nov. 23, 1985 Jan. 11, Feb. 19, May 1 and 4, July 24, Sept. 20, Oct. 7, 16 and 17, Nov. 12 and 20, Dec. 25, 1986 March 18, June 15, Sept. 9 and 10.
235. LK 1984 Feb. 9, Sept. 15, Oct. 4, 1985 Feb. 8, May 22, 1986 Jan. 4 and 24, March 21.
236. LK 1983 Oct. 7 and 21, 1984 Oct. 4, 1985 Oct. 5 and 30, Nov, 23, 1986 Jan. 3, Apr. 15, Oct. 30, Nov. 14.
237. LK 1982 Oct. 26.
238. LK 1983 Oct. 5, 1984 March 30, 1985 June 11, Aug. 6, Spet. 28, Oct. 16, 1986 Feb. 6, Sept. 25, Oct. 25.
239. LK 1983 Sept. 22. 1985 Sept. 28, Oct. 23, 1986 Aug. 5 and 26.
240. LK 1982 Oct. 26, 1985 April 17.
241. LK 1985 April 18.
242. LK 1984 March 30.
243. LK 1966 July 3, 1982 Oct. 26, 1983 July 9, Oct. 7, 1984 Oct. 4, 1985 Feb. 26, March 12 and 22, April 10, May 16, June 13 and 26, Aug. 14, Dec. 4, 1986 Feb. 5, March 19, Aug. 12, Oct. 2, 3 and 30.
244. LK 1983 Oct. 7, 1985 Dec. 4, 1986 Jan. 3.
245. LK 1983 April 16 and 20, 1985 Feb. 28, March 26, April 25, May 22 and 29, June 19 and 22, July 27, Aug. 22 and 23, Sept. 20, Nov. 6, 19 and 23, Dec. 18 and 27, 1986 Feb. 13 and 25, March 18, May 11, June 12.
246. LK 1984 May 16, 1985 July 18, Sept. 25, Oct. 15, 1986 Jan. 17, Feb. 6, April 5.

247. LK 1982 Sept. 20, Oct. 2, 1983 April 13 and 22, Sept. 2, 1984 March 30, 1985 Nov. 6, 1986 April 30, June 17, Oct. 18 and 22.
248. LK 1986 Aug. 9.
249. LK 1983 April 21 and 23.
250. LK 1982 Oct. 2, 1983 Jan. 27, 1985 April 26, May 24 and 31, July 17, Sept. 27, 1986 June 5, July 10, Nov. 1.
251. LK 1985 May 17, Aug. 7, 1986 Jan. 30, April 26, May 1. Sept. 11, Oct. 4, Nov. 6.
252. LK 1983 Jan 27, 1984 May 9, Oct. 27, Nov. 3, Dec. 4, 1985 March 13, Sept. 12, Dec. 19, 1986 Oct. 29, Nov. 11.
253. LK 1984 Nov. 16, 1985 Dec. 21, 1986 Nov. 27.
254. LK 1983 Jan. 27, 1985 Sept. 10, Dec. 21, 1986 Nov. 12.
255. LK 1984 July 12, 1985 Dec. 13.
256. LK 1982 Aug. 27.
257. LK 1985 Aug. 9, Dec. 3, 1986 May 30, Sept. 30, Oct. 10.
258. LK 1983 May 1, 1985 Nov. 20.
259. LK 1985 May 18, Dec. 24, 1986 Jan. 9, June 6.
260. LK 1986 April 2, June 24.
261. LK 1985 June 27, July 10 and 13; 1986 April 25, Sept. 16.
262. LK 1985 May 22.
263. LK 1986 July 12.
264. LK 1984 June 22.
265. LK 1982 Feb. 9, 1984 May 16.
266. LK 1982 Aug. 27; 1985 Dec. 7; 1986 Jan. 4, Oct. 10.
267. LK 1982 Dec. 25; 1984 Oct. 12; 1985 June 1 and 15, Feb. 19, Aug. 6, Oct. 2; 1986 June 26, Aug. 22, Sept. 4.
268. LK 1985 May 21, Dec. 18.