

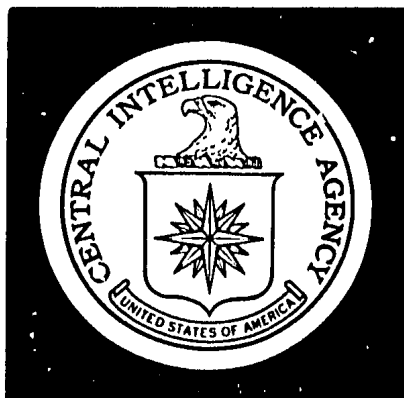
Declassified in Part - [REDACTED] 25V1  
Sanitized Copy Approved for Release 2011/10/31 : [REDACTED]  
CIA-RDP85T00875R00160003

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DIRECTORATE OF  
INTELLIGENCE

# Intelligence Memorandum

*Agriculture In North Vietnam: Performance And Prospects.*

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ER IM 70-49  
April 1970

Copy No. 45

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CENTRAL INTELLIGENCE AGENCY  
 Directorate of Intelligence  
 April 1970

## INTELLIGENCE MEMORANDUM

Agriculture In North Vietnam:  
Performance And Prospects

Introduction

This memorandum evaluates the effects of war-induced priorities and US bombing on North Vietnam's agriculture and the prospects for agricultural development in the next few years. Practically no statistics on North Vietnamese agriculture have been published by the Hanoi regime for several years and eyewitness reporting by Westerners has been sparse, particularly since the initiation of US bombing in 1965. Thus the following discussion is based largely on statements in official publications, [redacted]

[redacted] and on extrapolations from statistics which are several years old.

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1. Agriculture is the mainstay of North Vietnam's economy, as in other countries of Southeast Asia. The great majority of the North Vietnamese people are farmers who barely scratch out an existence through the production of rice and other basic foodstuffs. North Vietnam has never been self-sufficient in food production, unlike South Vietnam which has had frequent exportable surpluses. Cultivation techniques are crude and labor intensive, using little power machinery. Fertilizer is mainly human, animal, and green, rather than

*Note: This memorandum was produced solely by CIA. It was prepared by the Office of Economic Research and was coordinated with the Office of Current Intelligence and the Director's Special Assistant for Vietnamese Affairs.*

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chemical. North Vietnam's agriculture is unique in Southeast Asia in two respects, the well-developed water control system and the centralized control through cooperativization.

2. North Vietnam's elaborate water control system helps to prevent flooding during the summer rainy season and stores water for use during the winter dry season, enabling North Vietnam to grow two wet rice crops a year in much of the Red River delta. Much of the country's terrain is too rugged for cultivation, and North Vietnam's 0.12 hectare\* of arable land per capita in 1964 was among the lowest in Southeast Asia. However, counting the arable land that is double cropped, there was in 1964 about 0.19 hectare of crop land per capita, still slightly below the 0.20 hectare per capita in South Vietnam. Approximately 73% of North Vietnam's crop land, including double-cropped areas, is devoted to rice production, compared with about 85% in South Vietnam. Of the approximately 1.1 million hectares of double-cropped land, more than three-fourths produces two rice crops; the remainder produces one rice crop and another food crop.

3. Unlike the other countries in Southeast Asia, North Vietnam since 1954 has been under the rigid control of a Communist regime which has attempted to industrialize the economy and to socialize agriculture. Under French rule, agriculture consisted of large plantations growing rice and industrial crops and many small private farm plots devoted primarily to subsistence farming. With the ouster of the French in 1954, the new Communist government instituted agricultural reform which first involved breaking up the large land holdings and distributing small parcels to the landless peasants. A few of the estates were retained by the central government and formed into state farms to function primarily as model farms and experimental stations. Through cajolery and stark economic necessity, individual farmers were enticed to pool their labor, farm animals, implements, and land in a cooperative effort with their neighbors.

4. Until 1959, cooperativization progressed slowly, but during the next two years the cooperativization drive was accelerated. By the end of

\* *A hectare is equivalent to 2.47 acres.*

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1960, the regime claimed that 86% of all farm families had joined cooperatives, and more than 41,000 cooperatives had been formed. By the time the bombing program was initiated in February 1965, about 88% of all farm families had joined cooperatives, according to regime statements.

5. To encourage the formation of cooperatives, the regime reserved about 5% of cooperative land for the private use of cooperative members to grow food crops and to engage in animal husbandry to supplement income earned from the collective. The private plot from the start played an important role in the output of subsidiary food crops and the raising of livestock and as a source of farm income, a role which became increasingly important during the bombing years.

6. In the pre-bombing years the Communist regime made some modest attempts to increase agricultural investment. With foreign aid, two large phosphatic fertilizer plants were constructed in the early 1960s to process the huge deposits of domestic apatite. These two plants achieved an annual output of about 120,000 tons of phosphatic fertilizer -- primarily superphosphate -- all of which was used domestically. In addition, a nitrogenous fertilizer plant designed to produce about 150,000 tons of ammonium nitrate per year from the country's coal deposits was nearing completion with Chinese Communist aid when the bombing program started. The plant was never put into operation. The regime also imported small quantities of farm machinery and equipment, but most of the imported machinery was for use on the state farms. The plentiful supply of labor in agriculture and the lack of employment opportunities elsewhere in the economy apparently militated against a large investment in labor saving devices.

#### Pre-War Output

7. Agricultural output in North Vietnam increased under Communist rule through 1964. However, the amount of credit that the regime can take for the increase is open to question. Weather was undoubtedly an important factor. Furthermore, output in the early 1950s had been depressed because of the disruptions caused by the longstanding war with the French, and some increase in output was likely

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under more peaceful conditions no matter what form of government was in control.

8. Production of milled rice\* increased from 1.7 million tons in 1954 to 3.5 million tons in 1959 -- a record year for North Vietnam. During 1960-64, rice production stagnated between 2.8 million and 3.2 million tons. In South Vietnam, rice output lagged behind that in the North in the late 1950s but exceeded it during the 1960s except for 1961, suggesting that the formation of cooperatives in North Vietnam together with the regime's emphasis on industry in the five-year plan may have adversely affected rice output. Output of milled rice in North and South Vietnam for the years 1954-64 is shown below:

<u>Year</u>	<u>Million Metric Tons</u>	
	<u>North Vietnam</u>	<u>South Vietnam</u> <sup>a/</sup>
1954	1.7	1.7
1955	2.4	1.9
1956	2.8	2.3
1957	2.6	2.1
1958	3.1	2.8
1959	3.5	3.4
1960	2.8	3.3
1961	3.2	3.1
1962	3.0	3.5
1963	2.9	3.6
1964	2.9	3.5

*a. For the sake of comparison, a 67% extraction rate is used for both North and South Vietnam, although the extraction rate used for official South Vietnamese statistical reporting is 60%.*

*\* Milled rice is the edible portion of the paddy rice and is extracted from the paddy at an estimated 67% rate.*

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9. The output of subsidiary food crops -- such as corn, sweet potatoes, manioc, and beans -- increased during the period 1955-63, according to regime statistics. Many of these crops are consumed directly on the farm. Therefore, much of the growth may simply reflect more accurate record keeping that would have resulted from the cooperativization of farms.

10. The output of some industrial crops -- peanuts, soybeans, sugarcane, tobacco, cotton, jute, hemp, tea, and coffee -- also reportedly increased during the period 1955-63. Most industrial crops require mechanical processing facilities; therefore, the regime's emphasis on industrialization during the early development years probably contributed to this favorable growth.

Output Since 1965

*Rice Production*

11. All indications are that rice output declined during 1966-68 although no meaningful output data were released by the regime during these years. A substantial portion of the male farm labor force was diverted from agricultural production tasks to military service, and all workers suffered periodic interruptions from frequent air raids. At times, farmers were obliged to work in the fields only at night. Inadequate attention was devoted to the maintenance of vital water control and irrigation facilities. The weather was unfavorable, particularly in 1968 when floods and tropical storms seriously affected the tenth-month rice crop. Indirect evidence also points to declining output. The regime-controlled press has been silent on the actual levels of agricultural output since 1965, but has made frequent reference to bad weather and to US bombing of water control facilities to excuse shortcomings. Imports of foodstuffs grew significantly during these years. Rice output in South Vietnam also suffered a decline during 1965-68, although it was not as steep as in the North, and the recovery of output in the South in 1969 exceeded the slight improvement estimated for the North.



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12. Estimates of North Vietnamese rice production for the war years have been derived from a study of the weather reports and regime claims regarding the progress of transplanting and harvesting. The estimates for milled rice in both North and South Vietnam for 1965-69 are shown below:

<u>Year</u>	<u>Million Metric Tons</u>	
	<u>North Vietnam</u>	<u>South Vietnam</u>
1965	3.0	3.2
1966	2.8	2.9
1967	2.7	3.1
1968	2.5	2.9
1969	2.7	3.4

*Manpower*

13. By far the most significant factor depressing agricultural output during the war has been the diversion since 1965 of possibly as many as 600,000 men from the agricultural labor force -- some 20% of the total males in agriculture. This total includes some 540,000 men mobilized from the countryside into military service and about 60,000 diverted from agriculture to repairing bomb damage and to work in transport. As a whole, while the marginal productivity of farm laborers in North Vietnam is quite low, the individuals diverted were primarily able-bodied young males whose contributions to output would have been higher than average. Likewise, there is evidence that diversions included managerial cadres as well as the common farm worker.

14. The regime attempted to bring larger numbers of women into agriculture to replace the diverted males. The proportion of women in the total agricultural labor force was increased from 62% in 1965 to 67% in 1968 and 71% by 1970. Nevertheless, the total farm labor force excluding those engaged in fishing dropped from an estimated 6.7 million at the beginning of 1965 to 6.5 million by early 1968. Such a decrease contrasts with the pre-bombing growth in the agricultural labor force of about 100,000 a year.

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*Fertilizer*

15. The availability of fertilizer was not a serious limiting factor during the bombing. Most of North Vietnam's fertilizer inputs have been natural organic materials such as animal manure, night soil, green manure, compost, and aquatic plants. These products are generally produced where they are consumed. On the other hand, the disruptions to transportation undoubtedly affected the timely distribution of imported chemical fertilizer.

16. North Vietnam has ample domestic sources of phosphate in the form of apatite which is mined primarily in Lao Cai but also found in smaller, lower quality deposits throughout the country. Sufficient quantities of phosphate ore were mined -- albeit intermittently -- to feed the country's two phosphate fertilizer plants during the bombing. Moreover, the expedient of using raw apatite on agricultural land, although not as efficient as using the more soluble processed phosphate fertilizers, undoubtedly was adopted to an increasing degree partly offsetting any decline in the availability of processed phosphates.

17. The main fertilizer nutrient imported by North Vietnam has been nitrogen. Before the bombing, North Vietnam imported an average of about 150,000 tons of nitrogen fertilizer, primarily ammonium sulphate. The Bac Giang nitrogenous fertilizer plant, with a planned capacity of 150,000 tons of ammonium nitrate a year, was close to production status when the US bombing interrupted completion of the facility. Nitrogenous fertilizer imports continued, however, and the amount available was apparently no lower than before the bombing. Imports of small quantities of chemical potassium fertilizer for application to certain industrial crops have also continued uninterrupted.

*Regime Controls*

18. The demands of the war weakened the regime's control over agriculture, stimulating private production and to some extent lessening the drop in food output. Regime statistics show a continued

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gradual growth of farm families on cooperatives during the bombing years, increasing from about 88% in 1965 to 95% at the beginning of 1969. However, while these gains were being recorded, it appears that within many cooperatives a breakdown of the cooperative concept and a reversion to private initiative occurred. This was largely the result of reduced central control resulting from the wartime distractions and the diversion of managerial cadres to the war effort.

19. Families within the cooperatives were left pretty much to follow their own routines, and there was a marked increase in private farming. Some managers and members of cooperatives rented out the cooperative land and materials in clear violation of regulations. Since traditionally the main products of the private plots were root crops, leafy vegetables, and livestock, it is highly likely that the opportunities to engage in private agricultural activities tended to depress the output of rice, particularly of the rice that would normally be procured by the central government, and tended to maintain output of non-rice subsidiary foodstuffs.

20. It was not until 1968, after bombing of the northern part of the country had ceased, that the regime was able to turn its attention to the loosening of the cooperative system. In June 1968, Party First Secretary Le Duan called for a strengthening of the "collective economy" and stricter guidance of private farming. Five months later the Chairman of the Standing Committee of the National Assembly, Truong Chinh, criticized strongly the practice of treating cooperative land as though it were privately held.

21. An indication of the types of abuses and the seriousness of the situation was revealed in the statute on cooperatives promulgated in May 1969 by the National Assembly Standing Committee. Among other things the statute pointed out that property of the agricultural cooperatives such as ricefields, cattle, agricultural tools, and so forth, are public property and must be "protected, closely managed, and properly used." The cooperative members were admonished not to misappropriate the ricefields and other property of the cooperatives. The cooperative managers were warned not

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to cede or sell the ricefields or other property of the cooperative without the acquiescence of cooperative members.

22. The new statute established no new rules or policies, and to date there have been no signs of a crackdown by the regime to expedite enforcement of policies that had been ignored or subverted to wartime demands during the bombing. The cultivation of private plots has been allowed to continue, as these were the source of about 40% of the income of cooperative members, about 90% of all hogs, and most of the country's leafy vegetables and food crops.

#### Food Consumption and Imports Since 1965

##### *Consumption*

23. North Vietnamese rationing of basic foodstuffs has not been altered because of the war. The rationing system, initiated in 1954, continued to allocate grain and root crops to adults on the basis of the type of labor performed and to children according to age. There is no evidence that the ration associated with a particular occupation or age has been reduced since 1965. The grain ration for adults ranges from 13.5 kilograms per month for sedentary workers to 24 kilograms for heavy workers and soldiers. Children up to age 15 received from 4 to 13 kilograms a month. The minimum per capita grain ration for adults in North Vietnam of approximately one-sixth of a ton a year provides only about 1,600 calories a day, four-fifths of the caloric intake considered essential for adequate health. The additional caloric needs are satisfied from purchases of rice on the free market and from other non-grain rationed foodstuffs -- including Nuoc Mam (a highly favored fermented fish sauce), pork, chicken, fish, cooking oil, and sugar -- and from unrationed fruits and vegetables.

24. Because of the transfer of adults into more physically demanding occupations to satisfy wartime manpower demands, the average per capita grain consumption probably increased during the last five years. This increase together with population growth resulted in an increase in national food requirements during the war period. Under normal conditions the population of North

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Vietnam would have grown at an estimated rate of 400,000 per year, or an annual increase of about 2.3%. The population did not grow normally during 1965-69, however, as North Vietnam dispatched to South Vietnam large numbers of men and suffered abnormally high death rates because of the war. Effective in-country annual average population growth probably was close to 1.5%. A total of about 500,000 men were lost because of the war during 1965-69, and the normal increase in grain requirements was reduced, as shown in the following tabulation:

	<u>Thousand Metric Tons</u>				
	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>
Additional food requirements:					
Normal population growth	70	140	210	280	350
Casualties	7	18	39	80	114
Net increase	63	122	171	200	236

25. The estimated increase in food requirements resulting from military mobilization is shown below\*:

<u>Year</u>	<u>Thousand Metric Tons</u>	<u>Year</u>	<u>Thousand Metric Tons</u>
1965	5	1968	31
1966	24	1969	29
1967	25		

\* For both the military and the civilian mobilization, it was assumed that food rations were increased from minimum to maximum in adult levels. More realistically this assumption allows for: (a) an increase from average to maximum rations for those (mainly males) who were actually mobilized; and (b) an increase from minimum to average rations for those (mainly females) who took over the tasks formerly performed by those who had been mobilized.

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26. Increased food requirements resulting from the mobilization of an estimated 200,000 civilians for heavy labor that included repair of bomb damage and transport work such as driving and repairing trucks and loading and unloading cargo can be estimated similarly, assuming that the numbers of additional heavy workers averaged 100,000 in 1965, 200,000 in the years 1966 through 1968, and then dropped back to 100,000 in 1969. Increased civilian food requirements would have been as shown in the following tabulation:

<u>Year</u>	<u>Thousand Metric Tons</u>	<u>Year</u>	<u>Thousand Metric Tons</u>
1965	13	1968	25
1966	25	1969	13
1967	25		

27. By drawing together the estimated changes in consumption requirements resulting from population growth and war-induced mobilization, the following rough estimate of increased food requirements can be computed.

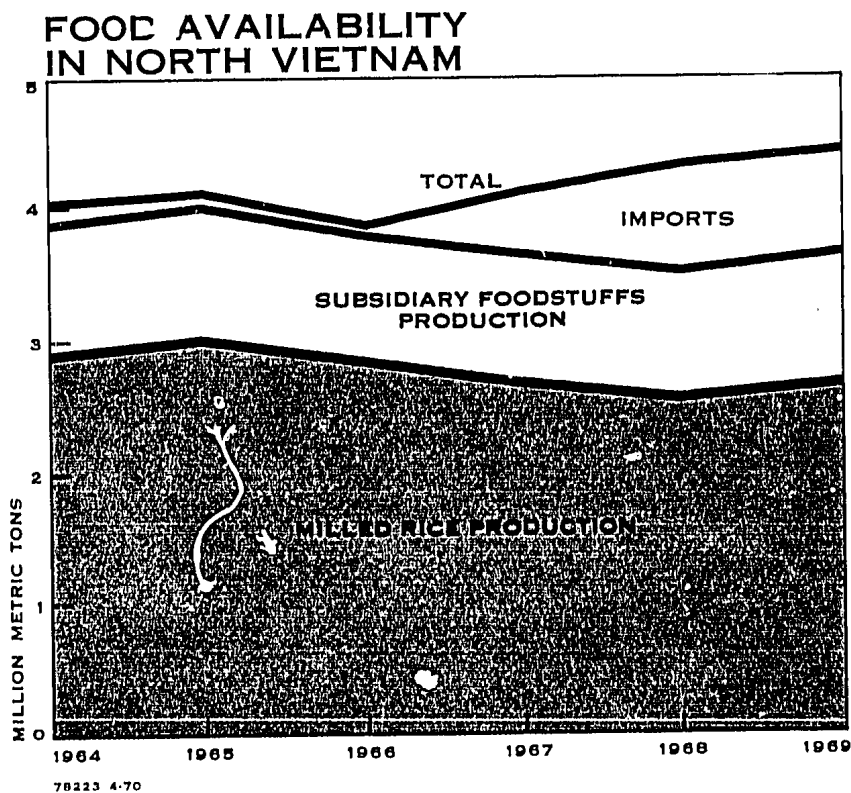
	<u>Thousand Metric Tons</u>				
	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>
Changes in requirements resulting from:					
Population growth	63	122	171	200	236
Mobilization	18	49	50	56	42
<i>Total</i>	<i>81</i>	<i>171</i>	<i>221</i>	<i>256</i>	<i>278</i>

*Food Imports*

28. The combination of reduced domestic output and increased domestic requirements resulted in a sharp increase in food imports during the bombing years. In 1964, identified seaborne imports of foodstuffs amounted to 162,000 tons. Imports of foodstuffs in 1965 dropped because the bombing

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had not yet affected agriculture, and rice output during the year was a respectable 3.0 million tons. Food deliveries continued low until late 1966, when the trend was sharply reversed. In 1968, North Vietnam imported 790,000 tons of foodstuffs, an estimated one-sixth of its total caloric consumption (see the chart). Food imports dropped



slightly in 1969, reflecting the slight improvement in agricultural output after the cessation of the bombing. Most of the increase in food deliveries to North Vietnam during 1967-69 consisted of Soviet wheat flour and corn and Chinese rice.

29. The greatly increased imports enabled North Vietnam for all practical purposes to offset the reduction in domestic output and to cover increased domestic requirements every year since 1965, except perhaps for the substantial deficit in 1966, as shown in the following tabulation:

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	<u>Thousand Metric Tons <sup>a/</sup></u>				
	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>
Reduction [increase] in output over 1964	[130]	70	200	340	200
Increase in domestic requirements	80	170	220	260	280
Total increase [de- crease] in external requirements	[50]	240	420	590	480
Increase [decrease] in observed food imports over 1964	[40]	[80]	300	630	600
Deficit [surplus]	[10]	320	120	[40]	[120]

*a. Data have been rounded to the nearest ten thousand. Because of rounding, components may not add to the totals shown.*

30. In spite of the apparent large deficit in 1966, there is no evidence that food became unusually scarce during the year. A possible explanation for this anomaly is that rice production in 1966 was higher than estimated, but this is not likely, because of the bombing and the fact that weather conditions were not unusually favorable. A more likely explanation is that the country's food stocks were sufficient to cover much of the deficit in 1966. Most of the output of the tenth-month crop is consumed during the first half of the following calendar year. Thus the good rice harvest in 1965 would have provided the country with good carryover stocks at the beginning of 1966. The fact that food imports began to increase rapidly late in 1966 suggests that in about the middle of 1966 a disappointing fifth-month rice harvest and a dangerously low store of food forced the regime to seek extra food deliveries from other Communist countries.

31. During 1970 and in the future, the USSR apparently will supply most of North Vietnam's imported food needs -- primarily wheat flour. Since mid-1969, food deliveries from Communist



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China have been declining, while food imports from the Soviet Union have been increasing. The USSR reportedly has agreed to supply North Vietnam with 600,000 tons of wheat flour during 1970, and in anticipation of this North Vietnam has been constructing bakeries, wheat noodle factories, and other flour-processing facilities in the country with the help of other Communist countries.

**Prospects**

32. North Vietnamese agriculture faces a host of war-associated problems in 1970. Laborers and managerial cadres are still being taken from agriculture for military service, production of domestic fertilizer has not been fully restored, and organizational and control problems are still extant. To regain pre-bombing levels of per capita output, the country must not only make up the decline in output during the bombing years but also must catch up with the growth in population. This would mean an increase in output of milled rice of about 450,000 tons over last year's estimated 2.7 million tons, or a 17% rise. Such a rise is highly unlikely this year even with extremely favorable weather conditions.

33. The regime's concern over agricultural problems was evident in the 1970 state economic plan, which placed considerable importance on increasing agricultural output. A February 1970 article by Le Duan that spelled out long-term goals for the country indicated that emphasis is to be given to increasing the output of food-stuffs for domestic consumption and industrial crops suitable for exports that would earn the foreign exchange needed to purchase industrial equipment. North Vietnam has by this time almost exhausted the area of land that can be added to paddy production without prohibitively costly investments in land clearing and water control facilities. Thus, to bring about an increase in rice production, the regime is concentrating on increasing yields. Pre-bombing yields of paddy in North Vietnam averaged about 1.8 tons per hectare for each crop. The regime goal, at least for double-cropped land, is to increase the average yield per crop to 2.5 tons per hectare. These yields may be compared with average yields per crop per hectare of 2.0 tons in South Vietnam,

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less than 1.0 ton in Laos, 1.3 tons in Cambodia, and 1.5 tons in Thailand.

34. North Vietnam is apparently planning the widespread use of a high-yielding strain of rice which, from the limited information available, seems to have characteristics similar to the Philippine IR-8 "Miracle Rice". The regime claims that the new strain was developed entirely with North Vietnamese resources, but outside help probably was obtained either as a source of genetic material and/or in the form of technical assistance. It is possible that the strain was obtained from South Vietnam, which has had some success with cultivation of miracle rice.

35. Miracle rice appears to be suitable for North Vietnamese climatic conditions. It can be grown during either growing season so long as water is available in proper quantities. There are problems to overcome, however. The new rice requires more careful control of irrigation water levels and considerably more nitrogenous fertilizer per hectare if increased yields are to be obtained. Miracle rice is much shorter than ordinary rice and, while this characteristic reduces the danger of lodging, it also increases the danger of drowning. Because of the heavy rainfall during the tenth-month growing season in North Vietnam, flooding of paddy fields and drowning of rice plants is a danger which would restrict the use of the miracle rice during that season. The new rice will therefore be used primarily during the fifth-month season.

36. The shorter growing time of the new strain permits the crop to be planted two months later than the normal fifth-month rice. This would lessen the manpower strains associated with the overlapping of the harvesting of the tenth-month crop and the planting of the fifth-month crop. Some quick-growing spring rice has traditionally been grown during the spring season, but the area has been small. In 1969 the spring rice area amounted to about 100,000 hectares, or slightly above 10% of the total fifth-month rice area. The regime plans to double the spring rice area in 1970; most of the increase will probably be planted in the new high-yielding rice strain.

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37. To make full use of the yield potential of the new strain, North Vietnam would have to increase considerably the amount of nitrogen applied to rice fields. Up to 1969, North Vietnam obtained most of its nitrogenous fertilizer imports from other Communist countries either as grants or on long-term credits. These imports were primarily ammonium sulphate -- an inexpensive widely used fertilizer with a relatively low nitrogen content. In 1969, North Vietnam purchased from Japan at a cost of almost \$5 million about 75,000 tons of urea -- about half of all the fertilizer imported during the year. Urea, which is a much more efficient nitrogenous fertilizer than ammonium sulphate and contains about twice the nitrogen per unit weight of fertilizer, could be used to great advantage on the new rice. Although the total weight of fertilizer imported in 1969 was about the same as in 1968, the preponderance of urea in the total raised the amount of nitrogen imported to a level 50% above the 1968 level. Imports of urea from Japan have continued during 1970. Such purchases represent a considerable drain on North Vietnam's very limited hard currency holdings, however. It is doubtful, in the longer term, that the regime would authorize purchase of sufficient urea to permit widespread cultivation and maximum yields from the miracle rice.

38. Planned increases in the output of industrial crops are to come largely from increasing the area under cultivation rather than by increasing yields. The 1970 goal for industrial crops reportedly is to increase the area under cultivation by 39% above the largest area ever achieved. Such an increase is highly unlikely in one year in view of the much slower rate of growth in industrial crop area that prevailed in pre-bombing years and the lingering effects of the war. Moreover, the parallel effort to increase output of the miracle rice, which is cultivated at the same time as most of the industrial crops, will undoubtedly receive a higher priority in the allocation of manpower and materials.

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Conclusions

39. North Vietnam's agricultural output declined steadily during 1966-68, a trend that was reversed only slightly in 1969. Several factors adversely affected the output during the US bombing program, and there is no clear way to determine the impact of any one of them. However, the wartime demands on manpower that over the years 1965-69 may have taken as many as 600,000 males from the total agricultural labor force probably had the greatest impact on output. Women were substituted for men on the farms to the extent possible, but the agricultural labor force is believed to have declined about 200,000, compared with an annual growth of about 100,000 in the years before 1965. Equally damaging to the labor force was the loss of cadre and managerial talent in the cooperatives.

40. During the bombing years, increasing amounts of land apparently were turned to private use. Although this practice on balance may have had a beneficial effect on agricultural output by stimulating the output of subsidiary foods that are traditionally grown on private plots, the output of the state-controlled rice crop probably suffered from it. The decreased availability of rice was offset by imports of foodstuffs that started to build up in late 1966 and reached a peak in 1968.

41. During the next few years, the regime apparently will give greater priority to agriculture, but self-sufficiency in food production is not attainable in the near future -- certainly not as long as the war continues. At least a part of the regime's planned investment in agriculture is to go to industrial crops to permit increased exports. Dramatic increases in rice output through the use of the strain of miracle rice will be dependent on the availability of increased amounts of nitrogenous fertilizer, which in turn will require considerable foreign exchange expenditures. In addition, new techniques including especially closer control of water levels are likely to be difficult to introduce to the traditional Vietnamese farmer. The continuing manpower demands of the war, the lack of additional arable land, unreliable weather conditions, and the lack of incentives associated with Communist regimentation will all tend to restrict increases in output.