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INTELLIGENCE MEMORANDUM

EFFECT OF THE 1954 FLOODS ON AGRICULTURE IN COMMUNIST CHINA

CIA/RR IM-399

14 October 1954

WARNING

THIS MATERIAL CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE LAWS, TITLE 18, USC, SECS. 793 AND 794, THE TRANSMISSION OR REVELATION OF WHICH IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW.

CENTRAL INTELLIGENCE AGENCY

Office of Research and Reports

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FOREWORD

This memorandum was prepared in response to inquiries concerning the 1954 floods in Communist China and their effect on agriculture. Estimates in terms of hectares inundated and quantities of production lost can be only preliminary and are subject to revision. These limitations are imposed by the lack of observational evidence in key areas -- a gap which forces the analysis to rely largely on Communist statements and claims; by the use of a comparative base almost a quarter of a century old (the 1931 flood) for estimates of areas flooded; by the use of averages for the determination of crop production lost; and by the possibility of increased damages caused by continued unfavorable weather. In spite of the limitations, the main outline of the development of the 1954 floods in China is clear, and a broad sketch of their impact can be drawn.

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CIA/RR IM-399
(ORR Project 21.584)

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Summary

The 1954 floods in Communist China represent a major development unfavorable in its impact upon the country and its government. A careful assessment of available material indicates that the flooding in the Yangtze Basin is as severe as it was in 1931. This makes likely the loss of summer crop production in the Yangtze Basin on approximately 6 to 8 million hectares. The government's flood control measures in the Huai River Basin have apparently been beneficial, but it is estimated that the flooding in the Huai Basin is approximately 40 percent as severe as in 1931 -- that is, that crop production losses have occurred on 2 million hectares. The total cropland flooded in the two river basins is thus estimated to be 8 to 10 million hectares.

An accurate assessment of total crop production losses in Communist China is difficult at this time. On the basis of 1.5 metric tons** of production per hectare, the estimated crop loss would be 12 to 15 million tons. This loss is about 10 percent of China's total food crop production. The upper North China plain and Manchuria appear to be on the way to a much better crop production year in 1954 than in 1953, and the total 1954 food production in Communist China will probably be only 7 to 10 million tons (from 5 to 7 percent) below 1953.

This assessment of crop prospects for 1954 has several significant aspects. Any one or all of the following problems confront the Chinese Communist regime. (1) Grain exports from China, if maintained at 1953-54 levels (1.08 million tons), will place greater-than-normal strain on available supplies. Any curtailment of exports or any imports to assist in feeding the population will increase the problem of payments for industrial goods imports. (2) The building up or maintenance of stocks will be deferred, probably for the second successive year. The Communist goal of building a strategic and/or

* The estimates and conclusions contained in the memorandum represent the best judgment of the responsible analyst as of 31 August 1954.
** Throughout this memorandum tonnages are given in metric tons.

emergency reserve of 16 to 20 million tons of grain by 1957 is one more year nearer failure. (3) The ability to support Communist Vietnam, itself subject to a bad crop year, will be curtailed. (4) The springs of 1953 and 1954 brought localized famines in various areas of China. These emergencies were met by the government by shifting food from surplus to deficit areas and by the imposition of rationing in most urban and some rural areas. The problem of famine is almost certain to recur, and conditions will probably be at their worst in the spring of 1955. This will be an especially acute problem, as the flood areas are normally surplus food areas which supply normally deficit food areas.

The four problems outlined above suggest the following conclusion: the ability to develop the industrial sector of the Chinese economy at the planned rate, without further compounding the food problem, will be curtailed.

I. Introduction.

The alluvial basins of the Chinese rivers have long been subject to periodic flooding. Of all the river alluvium of China, the Hai-Yellow-Huai-Yangtze-Chientang plain, stretching continuously from north of Peiping to south of Hangchow over a distance of 1,200 kilometers and with a width varying from 200 to 700 kilometers, is the most extensive. 1/* All the rivers which flow through this plain are connected by the Grand Canal, which extends from Peiping to Hangchow.

The method of flood prevention in this region is, primarily, diking. Dikes are usually constructed of earth, but some are provided with stone masonry walls. The total area protected by dikes amounts to 41 million hectares, 2/ approximately 43 percent of the total cultivated area of China.

Some part of this cultivated area is flooded in almost any given year. For instance, the average annual flooded area from

* Footnote references in arabic numerals are to sources listed in the Appendix.

1949 to 1952, inclusive, was 3.3 million hectares. 3/ Average annual flooded areas in the major river basins of China are shown in Table 1. 4/

Table 1

Average Annual Flooded Areas
in the Major River Basins of China

River Basin	Period Averaged	Hectares Flooded
Hai	1917-39	233,000
Huai	1852-1935	371,000
Yangtze		1,930,000 a/
Yellow	1855-1938	231,000
Total		2,765,000

a. As estimated by the Yangtze River Commission.

It must be recognized that these figures are averages and are but imperfect reflections of a truly major flood year such as 1931 or 1954. The most disastrous flood situation occurs when all three rivers -- the Yangtze, the Huai, and the Yellow -- flood at the same time. This particular situation occurred in 1931, and approximately 15 million hectares were flooded.

II. Crop Conditions Outside the Major Flood Areas.

In the first 4 months of 1954, Communist China had favorable weather. As a result, the 1953-54 winter crops harvest was about 8 percent greater than the 1952-53 winter crops harvest.* 5/

* Approximately 41 million tons in 1954 as compared with 38 million tons in 1953. The winter crops are wheat, barley, oats, field peas, broadbeans, and rapeseed. The winter crops constitute between 20 and 25 percent of Communist China's production of food.

Extensive snows fell throughout the Northwest, 6/ North, 7/ East, 8/ and Northeast 9/ Administrative Divisions.* These relatively heavy snows over the northern third of China seemed to assure sufficient ground moisture for favorable germination of spring wheat and other summer crops.

The heavy spring snows also had some adverse effects. They caused spring floods in certain areas of Sinkiang, 10/ and in the Inner Mongolian Autonomous Region they made necessary an air-drop to transport food supplies to herdsmen and feed supplies to hard-hit livestock areas. 11/ Although there is no conclusive evidence of high death losses in the grazing areas, it is possible that they were greater than normal.

With abundant winter moisture, however, and generally favorable conditions up to the end of August 1954, the crop prospects north of the Yellow River indicate a better harvest in 1954 than in 1953. If no adverse conditions affect the crops in this area before the harvest, 1954 crop output in the Northeast Administrative Division could well reach 22 million tons, as compared with 18.6 million tons in 1953. 12/

There is some possibility of flood damage in the Northeast area. Flooding was reported along the Yalu in the middle of August, 13/ and near the end of August the water levels of other rivers in the Northeast were reported to be approaching flood stages. 14/ These floods, however, tend to be localized, and rarely do they seriously affect crop production in the area.

Beginning in April and extending through May, there was excessive rainfall on the South China coast. Total rainfall in Kwangtung, Kwangsi, and Fukien for the month of April ranged from 15.75 inches to 23.62 inches over large parts of the area. 15/ This rainfall is roughly 2 to 3 times the record for April in many previous years. Severe local flooding apparently occurred in Kwangtung as early as the first half of May. 16/ In this area, however, standing water after floods is not a major problem, and replanting of damaged crops could well have taken place. With comparatively little information on which to base an estimate, it would appear that the

* The Communist major Administrative Divisions have, of course, been abolished. Because of their convenience, they are used in this memorandum for reference to certain geographical areas.

South China coast and the Southwest Administrative Division will have a crop production year at least as good as was 1953.

III. Development of the 1954 Floods.

In May the same belt of rainfall that deluged the South China coast passed over the lower Yangtze Basin but did not cause flooding. In June, however, a series of stationary fronts resulted in excessive rainfall over the middle reaches of the Yangtze River. The normal June rainfall at Wuhan for past years has averaged 9 inches. The rainfall in June of this year reached 19.25 inches, 17/ and excessive precipitation continued well into July. 18/

By 18 August, serious flooding and flood control problems had been reported by the Chinese Communists in 8 provinces -- Hupeh, 19/ Hunan, 20/ Anhwei, 21/ Chekiang, 22/ Kiangsi, 23/ Honan, 24/ Kiangsu, 25/ and Shantung. 26/

The extent of the flood disaster is difficult to determine. All three of the great river basin areas of Middle and North China -- the Yangtze, the Huai, and the Yellow -- have been affected. A preliminary assessment indicates that the Yangtze flood has been the most extensive and damaging. The Chinese Communists have announced that the Yangtze River was "in many places between a half a meter and one meter above the previous highest watermarks registered in 1931 and 1949." 27/ The extreme seriousness of the situation is reflected in the official announcement that the Chingkiang water detention basin was opened for 5 days beginning 22 July and was reopened on 29 July in an effort to relieve the pressure on the Tungting Lake area and the down-river dikes.* 29/ On 9 August the detention basin was reported to be holding 6 billion cubic meters, and efforts were being made to evacuate the water to Tungting Lake. 30/ This indicates that the efforts to prevent flooding in the Tungting Lake area have been subordinated to the problem of preventing breaches in the east-bank dikes of the Yangtze north of Tungting Lake. This supposition is supported by the comment of an American priest arriving in Hong Kong that "the Tungting Lake area would be lucky to get one percent of its annual production." 31/ Below the

* This represents the deliberate flooding of about 92,000 hectares in an effort to protect 600,000 hectares further downstream. The capacity of this detention basin is 5.5 billion cubic meters, 2 billion cubic meters of which were used in the 5 days, 22-27 July. 28/

Tungting Lake area the Yangtze appears to be completely out of control. The Communists are expending their greatest efforts and devoting the most news coverage to the attempt to save the city of Wuhan. Frequent news reports place the Yangtze flooding on a scale that equals, and perhaps surpasses, the flood of 1931. 32/

The Huai River Basin was not subject to the June series of storms that inundated the Yangtze valley. In the early part of July, however, heavy rains began falling north of the Tsingling Shan,* and the Huai River began to rise. 33/ These heavy rainfalls continued through the first week of August, and by 11 August 5 flood crests had passed Pengu City (Anhwei Province). 34/ In the first week of August, water levels reached 26.41 meters at Chengyangkwan (Western Anhwei Province). 35/ The Chinese Communists have claimed that the flood prevention works along the Huai have prevented severe damage. Reservoirs and water-detention basins were claimed to have absorbed 20 billion cubic meters of water. The water level of Hungtse Lake on the Lower Huai, it is claimed, has been kept well below the high watermark of 1931, although the amount of water stored reached 10 billion cubic meters. 36/ As late as 11 August, Peiping claimed that the main Huai dike remained intact. 37/ Peiping admitted, however, that "inevitable dike breaches" have occurred (17 August), but there was a specific claim that no dike breach occurred along the Piho River, a major tributary of the Huai. 38/ Since the middle of August the Huai has been falling, and there is little apparent danger of new flood crests. 39/

Reports of crop replanting 40/ and flooding in southeast Honan 41/ indicate that the Huai River Basin suffered flood damage. Careful assessment of the available material indicates, however, that efforts in flood prevention in the Huai Basin have been effective. It is doubtful that the severity of the flooding along the Huai approaches the magnitude of the flood of 1931.

The same rains that caused flooding along the Huai also resulted in high water along the Yellow River. 42/ Although the Chinese Communists announced that the flood crests in the Yellow River in Shantung Province were above 29 meters for 9 days and were expected to remain at this level for the next 15 days, official news releases have paid comparatively little attention to flood threats from this

* The mountain range that is the watershed between the Yangtze and the Huai and Yellow Rivers.

source. 43/ The major crises reported were threatened dike breaches in Shantung in the middle of August. 44/ This danger was apparently averted, and some pressure on the Yellow River system was relieved by the opening of a detention basin in western Shantung. As the Yellow River is extremely unstable, there are many areas where the dikes are 10 to 15 kilometers apart. In nonflood years the area between the dikes is normally farmed. With the river up, crops will obviously not be taken from within the diked area this year. Aside from this more or less normal loss and the use of a detention basin, which probably involved the flooding of some crops, the damage along the Yellow River appears to be no more than nominal.

By 18 August the flood situation along the Yangtze, the Huai, and the Yellow Rivers appeared stabilized. As of 30 August, both the Yangtze and the Yellow Rivers were still at flood stage. As late as 23 August, rain along the headwaters of the Yangtze caused a new crest to approach the middle reaches of the river. 45/

IV. Effects of Floods on 1954 Crop Production.

The present assessment of crop acreage inundated and resultant crop production lost must be on a tentative basis.* There are several factors over and above the relatively unsatisfactory data now available which will ultimately determine the magnitude of the flood losses. The first factor of importance is the still existing flood stage along the Yellow River. The Yellow is extremely unstable, and a dike breach is a possibility even in the absence of further increases in the water level. Second, the magnitude of the flood damage will be increased if the surface water in flooded areas prevents the planting of winter crops. Whether this happens will depend largely on the rate of fall of the river which caused the original flooding, and this -- in turn -- is affected by additional rain over the drainage basin of the river. The water level in the Yangtze fell for a week, 18 to 25 August, and still went down less than a third of a meter. 47/ On 25 August it stood more than a meter above the 1931 record height. A third factor of importance is the extent of the storm damage away from the areas actually flooded. The actual effect of these three factors cannot now be

* The American Consul General in Hong Kong thinks it is doubtful whether the Chinese Communists are more than roughly aware of the extent of the damages (13 August). 46/

determined. At present, only estimates that will delineate the broad outlines of the actual flood damage can be made.

Background information useful in this evaluation includes data on those areas which appear to have suffered from the severest floods. The provinces damaged by 1954 floods in Communist China are described in Table 2.

Table 2

Provinces Damaged by 1954 Floods in Communist China 48/

Thousand Hectares

Province	Land Area	Cultivated Land a/
East China		
Kiangsu	10,882	5,632
Anhwei	14,472	4,955
Chekiang	9,643	2,532
Central-South		
Honan	18,459	6,942
Hupeh	19,261	3,749
Hunan	21,706	2,803
Kiangsi	18,117	2,558
Total	112,540	29,171

a. Land under cultivation in 1947.

Another factor relevant to the final estimate of crop losses through flood damage is the average production of food per hectare. This was secured by averaging 7 summer crop yields* for the 7 provinces. Average food production for these summer crops was

* Rice, corn, millet, kaoliang, soya beans, peanuts, and sweet potatoes. The sweet potatoes were placed on a grain-equivalent basis by multiplying by 0.3. A weighted average was used.

approximately 1.5 tons per hectare in the 1931-49 period. There is very little reason to believe that this average yield is not representative of the present one.

It is possible to utilize a range of independent estimates to indicate upper and lower limits. On 8 August in the Jen Min Jih Pao appeared an official statement claiming that "unaffected by Yangtze (and) Hwai /Huai/ floods (are) areas (that) make up 94 percent of (the) country's cultivated land." 49/ At the other extreme, Armed Forces Far East in Tokyo has estimated that 17 percent of Communist China's cultivated land has been affected. 50/ The total cultivated acreage in Communist China is approximately 95 million hectares. 51/ A range of estimates of hectares flooded is therefore established as between the 6 million hectares admitted by the Chinese Communists and the 16 million hectares estimated by Armed Forces Far East. Armed Forces Far East has likewise estimated the crop loss for the year as being 27 million tons. Application of the Communist figure on hectares to the average yield of summer crops would predicate a crop loss of 9 million tons.

By careful assessment of the available material the following preliminary estimate of the hectares of cropland flooded appears the most realistic at this time: the Yangtze Basin, 6 to 8 million hectares; the Huai Basin, 2 million hectares; the Yellow River Basin, negligible.

These estimates are based on the conclusion that the 1954 Yangtze flood is of approximately the same magnitude and severity as the 1931 Yangtze flood and on reports that the Chinese Communists have not been able to control the Yangtze flood in the Tungting Lake area and from this point downriver to the sea.* The assessment of the area flooded in the Huai Basin is based on the conclusion that the government has succeeded in protecting the greater part of the area east of the Grand Canal in Northern Anhwei and Kiangsu. It is also probable that the area north and east of Fou-Yang in northern Anhwei has escaped flooding on the scale of the 1931 floods. In general, it is estimated that the flooding in the Huai Basin is approximately 40 percent as severe as it was in 1931.

* Protection of certain urban areas may be an exception to this generalized statement.

On the basis of 1.5 tons of production per hectare the estimated crop loss would be 12 to 15 million tons. This loss is approximately 10 percent of Communist China's food crop production.*

As the upper North China plain and Manchuria appear on the way to a much better crop production year than was the case in 1953, the total 1954 food production in Communist China will probably be 7 to 10 million tons (from 5 to 7 percent) below that of 1953. Such a loss in China represents a major disaster.

* The best crop production year under the Communists was 1952. In that year, food crop production, as reported by the Hong Kong Consul General, was 139,104,000 tons. 52/

APPENDIX

SOURCES

Evaluations, following the classification entry and designated "Eval.," have the following significance:

Source of Information	Information
Doc. - Documentary	1 - Confirmed by other sources
A - Completely reliable	2 - Probably true
B - Usually reliable	3 - Possibly true
C - Fairly reliable	4 - Doubtful
D - Not usually reliable	5 - Probably false
E - Not reliable	6 - Cannot be judged
F - Cannot be judged	

"Documentary" refers to original documents of foreign governments and organizations; copies or translations of such documents by a staff officer; or information extracted from such documents by a staff officer, all of which may carry the field evaluation "Documentary."

Evaluations not otherwise designated are those appearing on the cited document; those designated "RR" are by the author of this report. No "RR" evaluation is given when the author agrees with the evaluation on the cited document.

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2. Ibid.
3. American Consul General, Hong Kong Despatch No. 1282, 19 Jan 1954. C. Eval. RR 2.
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8. Ibid.
9. Ibid., 20 Apr 1954, p. A-28. C. Eval. RR 2.
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25X1A8a [redacted]
12. [redacted]
13. [redacted]
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15. Ibid., 22 Jul 1954, p. AAA-22. U (for official use only). Eval. RR 2.
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25X1A8a
17. [redacted]
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19. Ibid., 23 Jul 1954, pp. AAA-39-40. U. Eval. RR 2.
20. Ibid.
21. Ibid., 30 Jun 1954, p. AAA-15. U (for official use only). Eval. RR 2.
22. CIA FDD, China Abstracts, 6 Jul 1954, p. A-14. C. Eval. RR 2.
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24. American Consul General, Hong Kong Telegram No. 322, 31 Aug 1954. C. Eval. RR 2.
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25. [redacted]
26. Ibid., 18 Aug 1954, p. AAA-38. U (for official use only). Eval. RR 2.
27. Ibid., 3 Aug 1954, p. AAA-20. U (for official use only). Eval. RR 2.
28. American Consul General, Hong Kong Despatch No. 2289, 1 May 1952. U. Eval. RR 2.

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30. Ibid., 9 Aug 1954, p. AAA-26. U (for official use only). Eval. RR 2.

31. American Consul General, Hong Kong Telegram No. 322, op. cit.

32. "China Floods Seen Near Record Worst," Christian Science Monitor, 9 Aug 1954. U. Eval. RR 2. "Japanese Legislators Fly Over Yangtze Flood Area," Washington Post and Times Herald, 8 Aug 1954. U. Eval. RR 2.

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33. [redacted]

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35. Ibid., 18 Aug 1954, p. AAA-37. U (for official use only). Eval. RR 2.

36. Ibid.

37. Ibid., 11 Aug 1954, p. AAA-25. U (for official use only). Eval. RR 2.

38. Ibid., 17 Aug 1954, p. AAA-37. U (for official use only). Eval. RR 2.

39. Ibid., 18 Aug 1954, p. AAA-37. U (for official use only). Eval. RR 2.

40. Ibid., 12 Aug 1954, p. AAA-24. U (for official use only). Eval. RR 2.

41. American Consul General, Hong Kong Telegram No. 322, op. cit.

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42. [redacted]

43. Ibid., 18 Aug 1954, p. AAA-38. U (for official use only). Eval. RR 2.

44. Ibid., 13 Aug 1954, p. AAA-25. U (for official use only). Eval. RR 2.

45. Ibid., 24 Aug 1954, p. AAA-27. U (for official use only). Eval. RR 2.

46. American Consul General, Hong Kong Telegram No. 322, op. cit.

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48. NIS 39, Section 61, Figure 61-17. C. Eval. RR 1.

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50. Army, FECOM, Telecon Item No. 7614, 13 Aug 1954.
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