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THE FOOD CONSUMPTION OF THE NATIVE INHABITANTS OF JAVA AND MADURA

by

Dr. A. M. P. A. SCHELTEMA

Report A. in the International Research Series of the Institute of Pacific Relations issued under the auspices of the National Council for the Netherlands and the Netherlands Indies.

NATIONAL COUNCIL
FOR THE NETHERLANDS AND THE NETHERLANDS INDIES OF
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Done into English by Dr. A. H. Hamilton, (B. A., M. D., L. M. B. D.).

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THE FOOD CONSUMPTION OF THE NATIVE INHABITANTS OF JAVA & MADURA.

CHAPTER I.

INTRODUCTION.

THE diet of the native inhabitants of the Netherlands Indies with its more than 60,000,000 population is on the face of it very diversified, owing to the highly varied local conditions of agriculture, race, religion, prosperity, development, and so forth.

In a review of the diet of the native population of the Netherlands Indies, which I published some years ago [1]) the following principal types of diet used by the natives of this country were differentiated on the base of researches done by Van der Kolff [2]) and Lekkerkerker[3]). Of course, the types may merge gradually into one another in practice.

I. *The most primitive diet acquired through simple appropriation :* all the fauna of the jungle even the things that creap, crawl or fly, is partaken of; further, certain tubers and roots growing wild and other substances of vegetable origin.

II. *In which amyliferous tubers or roots, or sago form the principal article of diet :* whether supplemented by animal products of various natures or not. The animal elements are here very much in the background.

III. *In which cereals form the principal article of food:* supplemented as far as possible by fish or meat. This type may be further subdivided into :

IIIa. Where *indigenous cereals* (various types of millet) are the principal foodstuffs : and

IIIb. Where *rice* and *maize*, supplemented as much as possible by fish and meat, are the principal foodstuffs.

IV. *In which rice and maize are the principal articles of diet :* where root-crops such as cassava (tapioca) may sometimes be the principal foodstuffs or at least be used as a most important accessory foodstuff. Animal foodstuffs are not important, with the exception of fish, mostly dried and salted.

V. *A more varied diet including amongst other things meat, potatoes and bread.* This is a dietary that, with the exception of the better situated, is but little prevalent amongst the Indonesian peoples.

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[1]) A. M. P. A. Scheltema : (in Dutch) "The diet of the native inhabitants of the Netherlands Indies" in "Koloniale Studien", Vol. 14, No. 6; Dec. 1930; pp. 367 — 394.

[2]) Dr. G. A. van der Kolff : (in Dutch) "The cultivation of sugar cane by the natives in the Netherlands Indies", Thesis Wageningen. At Nijmegen, 1925 : Chap. I., Sectt. 4 — 7.

[3]) C. Lekkerkerker : (in Dutch) "The development of the native agriculture in connection with the vegetable diet of the people of the Netherlands Indian Archipelago". In "Koloniaal Tijdschrift", 1927, pp. 529 — 628.

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The majority of these types may still be met with in the Outer Islands. Type I, however, is only found in certain small tribes such as those amongst the Papuans in the interior of New Guinea. In recent times the transition from for instance type II to type III has been observed here and there. Type IIIa is probably no longer to be found.

For the rest, we shall limit our discussion at this time to the inhabitants of Java & Madura, because no satisfactory statistical data are available about the diet of the people of the other islands.

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CHAPTER II.

A HISTORICAL REVIEW OF THE DIET OF THE NATIVE PEOPLES OF JAVA & MADURA.

According to the acknowledged expert in native affairs, Sollewijn Gelpke, at the end of the 18th Century rice was not yet generally eaten over all of Java & Madura, but the people contented themselves with a diet of root-crops and sweet potatoes [4]). In this connection we must think in the first place of sweet potatoes and root-crops which were planted on the compounds around the dwellings and of the collection of roots from the jungle, which may still happen locally in the lean months of the year and may then still have occupied a larger place in the provision of the people with foodstuffs. Other notices also make mention of this same fact. For instance it is known that the besiegers of Jacatra in 1628 ate the poisonous roots of the Gadong (Dioscorea hispida, Denst.). It is also apparent from the literature that both in West Java (the Preanger) and in a part of East Java these wild jungle roots still formed an important element in the native dietetic economy about 1830. It is also found in old despatches that even in Middle Java the eating of rice was not yet general at the beginning of the 19th century.

Thus the native head-men, in an investigation made about A.D. 1800 in a place in Middle Java, complained bitterly about the growing preference of the people for rice and laid the blame for this on the soldiers of the Netherland United East India Company, who brought with them into their villages at the expiration of their period of service the "bad" habit of eating rice. [5])

From another excerpt written in the year 1824 it appears that the common villagers in Surakarta (Central Java) in the event of crop failures or when cereals were very expensive fed themselves on maize and root crops which had to be planted. In the meantime, they ate the leaves of various sorts of plants and also roots and tubers gathered in the woods. Many of these plants had already been described by Rumphius and the majority are still well known. [6]).

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[4]) Dr. J. A. F. Sollewijn Gelpke : verified. (in Dutch). "De Indische Gids", Vol. II, Part 2, p. 202.

[5]) Dr. J. A. F. Sollewijn Gelpke : "The cultivation of rice in Italy and Java". p. 180.

[6]) J. W. Winter : "A short description of the Court of Surakarta in 1824" in "Bijdragen tot de Taal-, Land- en Volkenkunde van Nederlandsch-Indië", Vol. LIV 1902, p. 49.(In Dutch). The crops planted included Colocasia and Dioscorea varieties, Xanthosoma violaceum Schott, and Coleus tuberosus Benth. The leaves of many plants were eaten including : Hiptage benghalensis Kurz, Sphenoclea zeylanica Gaerth., Morinda citrifolia Linn., Vitis landuk Miq., Colocasia esculenta Schott, Ficus glabella Bl., Hydrocotyle sibthorpioides Lamk., Actinophora fragrans, and Pistia stratiotes Linn. The tubers and roots gathered wild included Amorphophallus campanulatus Bl., Pongamia pinnata, and Alocasia macrorrhiza Schott. For peculiarities about these plants consult the standard work of K. Heyne, entitled "The useful plants of the Netherlands Indies" (De nuttige planten van Nederlandsch-Indië) in three volumes (in Dutch — though many articles have been translated into English at Kuala Lumpur Botanical Gardens). Many details will also be found in "The Vegetables of the Dutch East dies" b y J. J. Ochse, Buitenzorg 1931, (in English).

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It may thus be taken for granted that rice was not yet the principal food for a large portion of the native population as late as the first part of the 19th century and that the ricediet has become much more important in the course of the past hundred years as a result of the great extension of the sawah system (irrigated rice fields). Against this must be set however, the enormous increase in the population as shown in the following figures:

TABLE 1. THE NATIVE POPULATION OF JAVA & MADURA IN MILLIONS.

1850	9.4	1880	19.5	1905	30.0
1860	12.5	1890	23.6	1920	34.4
1870	16.2	1900	28.4	1930	43.9

The question arises at once as to how matters have progressed in regard to supplying rice to a folk so greatly increased in numbers.

It is principally significant to obtain an answer to the question whether when considered over long periods of time the rice consumption of the people has risen or fallen off. It is obvious that definite years must not be considered in this respect, since the rice consumption naturally is closely connected with the results of the preceding harvest.

Great difficulties are encountered at once when attempting to find the answer to these questions since the older statistical data both concerning the numerical strength of the population and agriculture leave much to be desired. Since in discussing the rice consumption the most important factor is the consumption per caput, the old "Colonial Reports" (Koloniale Verslagen) could nevertheless furnish sufficient data to determine the general trend of affairs. Before they could be used, however, the figures so obtained had to be subjected to many corrections and the regions with the most incomplete data omitted. [7]). Even in the case of the older commercial statistics there were many puzzles to be solved in connection with the importation and exportation of rice.

In order to eliminate as far as possible the effect of crop variations, we worked with quinquennial averages. With the exception of a period here and there, most of these quinquennial periods include years with good and years with bad harvests.

In this manner many purely accidental factors were largely eliminated.

The following table (table 2) and graph I give a review of the results obtained.

[7]) To wit, the old Residency of Batavia with its many Charter Lands (Private Estates with Charter Rights) — including the present Residency of Batavia and the Regency of Buitenzorg; the Native States of Central Java; and Madura.

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GRAPH I

TOTAL NATIVE POPULATION OF JAVA AND MADURA

(EXCLUDING THE FORMER PROVINCES OF BATAVIA, JOGJAKARTA, SURAKARTA AND MADURA) COMPARED WITH RICE-PRODUCTION AND TOTAL RICE-CONSUMPTION. (5-YEAR PERIODS)

Logarithmic scale.

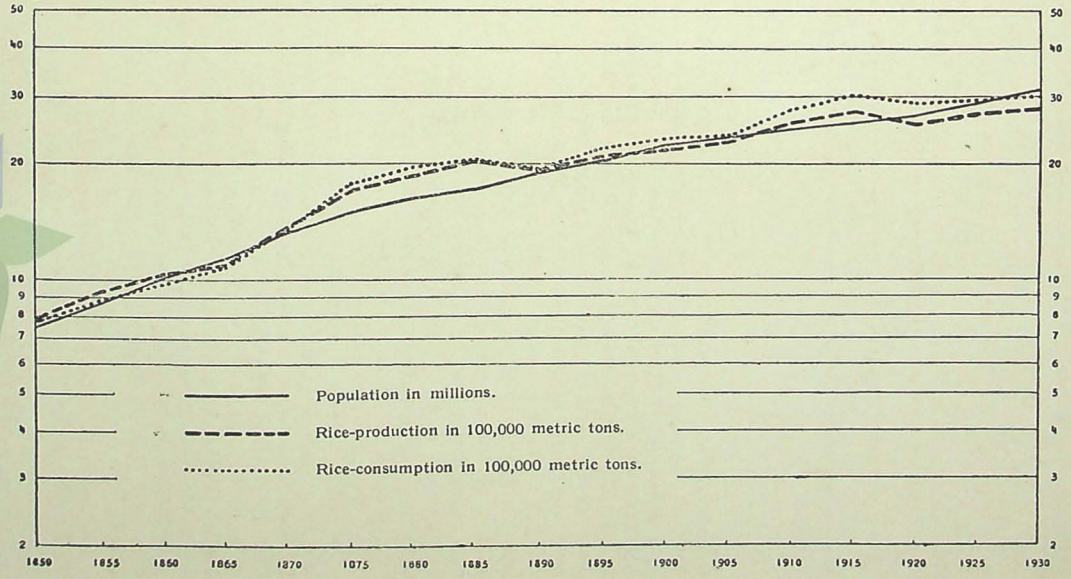

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TABLE 2. THE PRODUCTION OF RICE, THE NET IMPORT OR EXPORT OF RICE AND THE AMOUNTS FINALLY AVAILABLE FOR CONSUMPTION IN JAVA & MADURA (EXCLUDING THE OLD RESIDENCY OF BATAVIA AND MADURA, AND THE NATIVE STATES OF CENTRAL JAVA). THE EVERAGES OF QUINQUENNIAL PERIODS FROM 1850 TO 1930.

5-year period centering on: —[8])	Native Inhabitants	Amounts of husked rice in thousands of metric tons			Amounts of husked rice in kgms. per caput		
		Produced in sawahs & tegalans	(+) net import or (—) net export	Remaining available for consumption	From the domestic production	from net import (+) or net export(—)	Remaining available for consumption
1850	7,536,000	798	— 23	775	106	— 3.0	103
1855	8,725,000	925	— 43	882	106	— 4.9	101
1860	10,068,000	1,017	— 41	976	101	— 4.0	97
1865	11,289,000	1,095	— 14	1,081	97	— 1.2	96
1870	13,358,000	1,358	— 8	1,350	101	— 0.6	100
1875	14,921,000	1,703	+ 59	1,762	114	+ 4.0	118
1880	16,158,000	1,867	+ 87	1,954	115	+ 5.4	120
1885	17,082,000	2,039	+ 5	2,044	119	+ 0.3	119
1890	18,832,000	1,931	+ 9	1,940	102	+ 0.5	102
1895	20,150,000	2,104	+ 88	2,192	104	+ 4.3	108
1900	22,226,000	2,192	+ 119	2,311	98	+ 5.3	103
1905	23,549,000	2,277	+ 84	2,361	96	+ 3.6	100
1910	± 24,600,000	2,537	+ 256	2,793	103	+ 10.4	113
1915	± 25,718,000	2,725	+ 291	3,016	106	+ 11.3	117
1920	26,807,000	2,556	+ 324	2,880	95	+ 12.1	107
1925	± 29,000,000	2,717	+ 193	2,910	94	+ 7.0	101
1930	31,431,000	2,775	+ 233	3,008	88	+ 7.4	95

If we first consider the *average production of rice per caput* it will be seen that the figure rose from the middle of the 19th century continually until about 1885, then fell off till about 1905; in the subsequent two quinquennial periods the production per caput was again rather larger, after which a new decline set in, which continued during the following 15 years, so that the production in the period 1928/1932 was again similar (per caput) to that in the period 1863/1867.

Regarding the reliability of these figures it may be said that those after 1920 are undoubtedly more accurate than the older ones, which are in all probability on the low side both as to production and

[8]) For the production figures given and the net imports and net exports averages of quinquennial periods were considered of which the date mentioned in the table is the middle year; for instance where the table speaks of "1850" the years concerned were 1848, 1849, 1850, 1851, and 1852. For the population figures, however, the data for the year mentioned are used. For the years 1910, 1915 and 1925 the number of the population has been estimated.
sawah = irrigated rice fields;
egalan = non-irrigated fields.

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population. But since for calculating both series of figures quotients are made use of, the "per caput" figures will probably be more accurate than either the population or the production figures themselves.

Java as a whole with calculations based on quinquennial periods and including the importation into those Residencies that are excluded from the other parts of the calculations (as a result of which the consumption figures as calculated are slightly on the high side) still showed rice surplusses in the period from 1848 to 1872 which could be exported. About 1875 there came a change, but the net rice imports thereafter varied greatly not only where the absolute figures were concerned but also in the per caput calculations. Thus the net import in the period 1878/1882 was more than 5 kgms. per caput, but in the following quinquennial period it fell off to 0.3 kgms. Although 1883 was a bad rice year, 1884 and 1885 produced bumper crops. The following quinquennial period als oshowed great ups and downs where the importation of rice was concerned as a result of variable harvests. 1901 was a very bad year. After 1905 there began as far as the quinquennial period averages were concerned a continuous rise till the period 1918/1922, in which quinquennial period fall the years with greatly hampered marine transportation, especially 1918, the bumper crop of 1919 and the two bad years, 1920 and 1921.

If, now, the average amounts that (without deducting seed) were available for use per head of the people are passed in review, *it will be obvious at once that there is no question involved of a continuous rise or fall in the amount.*

During the period from 1848 to 1872 consumption rose and fell, after which three consecutive quinquennial periods passed in which the consumption of rice was high. There was then apparently sufficient purchasing power amongst the people for the poor crops of some of the years to be supplemented by large importations of rice. In the subsequent 20 years the averages were far lower, after which there again appears a period of revival from 1908 to 1917. Finally the consumption of rice during the past 15 years has shown a tendency to fall.

In view of the fact that (especially in East and Central Java) much maize is also eaten in addition to the rice consumed, figures relating to maize consumption must also be taken into consideration. Since 1920 data concerning the production of maize have indeed been collected on the basis of experimental reapings made by the Agricultural Advisory Service, but it was found that in the period from 1875 to 1894 production figures had also been included in the old "Koloniale Verslagen" (Colonial Reports) although the reliability of these figures leaves much to be desired; (in all probability,

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through fear of taxation, they are on the low side). Excluding the old Residency of Batavia, the Native States, and Madura, the production of husked maize in Java was as shown in table 3.

TABLE 3. PRODUCTION OF MAIZE (CORN) IN JAVA (EXCLUDING THE OLD RESIDENCY OF BATAVIA, THE NATIVE STATES, AND MADURA.

Period centering on	Years averaged	kgms. maize per caput	Period centering on	years averaged	kgms. maize per caput
1875	4	18	1905	5	?
1880	5	19	1910	5	?
1885	5	24	1915	5	?
1890	5	26	1920	5	?
1895	3	28	1925	5	52
1900	5	?	1930	5	48

Now it is remarkable that if these amounts (after deducting the net exports for the last two quinquennial periods, which is not necessary for the other periods since in those days no export of maize was as yet taking place) are added to those of the rice, the aggregate figures for the amounts of rice and maize taken together that were available in the different periods will be found to be fairly constant. The cereals (rice and maize) available in the various quinquennial periods per caput are shown in table 4.

TABLE 4. THE AGGREGATE AMOUNTS OF CEREALS (RICE AND MAIZE) AVAILABLE FOR CONSUMPTION PER CAPUT OF THE INHABITANTS IN JAVA; IN KILOGRAMS PER ANNUM.

Period centering on	cereals available	Period centering on	cereals available
1875	136	1905	?
1880	139	1910	?
1885	143	1915	?
1890	128	1920	?
1895	136	1925	151
1900	?	1930	141

Although when examining these figures the fact must not be lost sight of that a very important maize region is being left out of consideration, namely the island of Madura, they nevertheless present powerful evidence *that the people have succeeded in keeping the consumption of cereals at a fairly steady level through extending the areas of rice, and more especially those of maize, planted out, and also by the importation of rice.*

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CHAPTER III.

RECENT SHIFTS IN THE FOOD CONSUMPTION OF THE NATIVE POPULATION OF JAVA & MADURA.

In what has gone before an attempt has been made to present broadly a review of the consumption of rice and maize in Java and Madura. In more recent years fuller and more reliable statistical data have become available especially as regards the most important vegetable foodstuffs. The figures that follow for the amounts of various substances available for consumption per caput are based on comprehensive calculations, although for the sake of brevity only the results will be given here. They are based on data concerning production as contained in the agricultural statistics, and the production figures have been increased by the amounts imported from the Outer Islands and places abroad and reduced by the amounts exported to the Outer Islands or places abroad. No attention could be paid to stocks on hand either at the beginning or end of the periods concerned, nor with cereals and other products used as cattle fodder. On the other hand, the amounts reserved for seed have been deducted from the totals available whenever possible. Anyone desiring further information as to the methods used for calculation and the conversion factors made use of should consult the publication "Raming der voor het verbruik op Java en Madoera beschikbare hoeveelheden der voornaamste plantaardige voedingsmiddelen in de jaren 1921 t/m 1930" (Estimating the amounts of the most important vegetable foodstuffs available for food in Java & Madura in the years from 1921 to 1930 inclusive) by Mr. X. F. Crince le Roy in the "Korte Mededeelingen van het Central Kantoor voor de Statistiek No. 2, [which was also published in the periodical "Landbouw"] [with a summary in English].

From this table (see pag. 16) it may be concluded that :

1. The rice consumption varies from year to year depending on the bounty of the crops. Compared with the year 1913 the rice consumption in the most recent years has been lower. It should be remarked in this connection, however, that direct comparison of these figures with those handled in Chapter II concerning the "trend" of consumption is not possible, since the latter did not take into consideration the seed reserves and, moreover, did not relate to the whole of Java & Madura.

2. the significance of the cultivation of maize for the popular diet has risen since 1913. The consumption in any given year of this crop depends on the results of the harvests and on its exportation.

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TABLE 5. AMOUNTS OF THE MOST IMPORTANT VEGETABLE FOODSTUFFS AVAILABLE FOR CONSUMPTION PER CAPUT IN JAVA & MADURA IN KILOGRAMS.

	1913	Av. 1916 to 1924	1930	1931	1932	1933	1934	Av. 1924 to 1933
1. Rice (husked) . .	102	96	89	86	86	86	78	88
2. Maize (corn.) . .	29	38	45	41	40	46	37	43
Total of principal cereals (1 + 2).	*131*	*134*	*134*	*127*	*126*	*132*	*115*	*131*
3. Cassava roots (fresh)	71	134	116	127	132	125	123	130
4. Sweet Potatoes (fresh)	25	34	26	23	22	26	24	26
Total of principal root-crops (3 + 4).	*96*	*168*	*142*	*150*	*154*	*151*	*147*	*156*
Total of principal cereals and root-crops (1+2+3+4)	*227*	*302*	*276*	*277*	*280*	*283*	*262*	*287*
5. Potatoes	0.62	1.24	1.85	1.86	2.65	1.80	1.89	2.26
6. Peanut (shelled) .	3.71	3.71	3.03	2.48	2.64	2.45	2.40	2.67
7. Soya beans (husked)	4.32	3.71	4.90	5.07	4.43	4.89	4.14	4.60
Total of the principal legumes (6 + 7)	*8.03*	*7.42*	*7.93*	*7.55*	*7.07*	*7.34*	*6.54*	*7.27*
GRAND TOTAL OF VEGETABLE FOODSTUFFS . . .	236	311	286	286	290	292	270	297

3. the group of root-crops, principally consisting of cassava and sweet potatoes, has also greatly increased in significance since 1913. In the period from 1916 to 1924 inclusive the people were strongly urged to extend their plantings, especially in the years 1919 and 1920. The possibility cannot be excluded that the figures for those years are rather optimistic on that account. Cassava may be used both as the principal foodstuff and also as an accessory article largely depending on the time of year and local conditions.

By principal articles of diet (hoofdvoedingsmiddelen) are understood such foodstuffs as are used in very large quantity and further

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appear daily over a certain period of time on the menu, without being used as spices or dainties or as extra foodstuffs. Although cassava is less valuable than rice or maize in regard to its food value, it replaces rice in many parts of Central Java in the lean pre-harvest periods or in times of crop failure. During the past 25 years the cultivation of cassava has risen enormously but this increase cannot be shown statistically since statistical data concerning it do not exist prior to 1915.

From the review of the introduction of the cultivation of this product, cassava, recently published by Koch [9]), it appears that Veth could write as early as 1875 "But although it (i.e. cassava) has outstripped rice as an article of diet and because of the almost unexampled ease with which it can be raised forms a most striking contrast to rice, which requires so much care and attention, its cultivation in Java has acquired but little prominence and is apparently restricted to Bantam".

Van Swieten writing in 1876 only partly confirms this statement of Veth when he says "In some parts of Java cassava is little known or entirely absent while in others it is planted on a large scale. In any case, cassava is now of much greater significance in the diet of the people than it was half a century ago."

Little can be said about the significance of *sweet potatoes* in the people's diet. These roots are of fairly constant and uniform interest. It is probable that the consumption per caput in 1913 was about the same as it is today. No data are available, however, concerning the extent of this crop before 1913. According to the authority already mentioned in the introduction, these tubers appear formerly to have been extensively consumed. Sweet potatoes are now eaten at times as a make-weight in the diet when extra heavy labour must be done and as a delicacy on the side. They are then taken at breakfast time and in that way yield an important number of extra available calories. Sweet potatoes are not popular as a principal article of diet.

The amount of *peanuts* available to the people for consumption has decreased since 1924, while that of *soya beans* is variable but higher than it was in 1913. Peanuts and soya beans are hardly anywhere used as the principal article of diet although in particular "tempeh" (a product made from soya beans) is an important protein and fat containing side-dish in the rice diet. The planting of soya beans has increased enormously in the past few years as a result of the prohibition against importing soya from abroad.

Potatoes are only found locally in the regions of West and Central Java where they are grown principally as a secondary foodstuff.

[9]) L. Koch : "Cassava selection" (in Dutch). page 3.

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Other root-crops. In the statistics concerning native argiculture a rubric is to be found headed "other root-crops". The articles included here consist of a large number of miscellaneous root-crops of which no individual production figures are known.

Other legumes. A similar rubric in the statistical tables is devoted to "other leguminous products". These are to be regarded as an important food source for the people, but here again no individual production figures are known.

With this we have spoken of the most important native annual foodstuff crops. In addition, the *coconut products* are of very great importance. Only an estimate can be given of the amount of these products consumed in Java & Madura based on the amount of coconut oil produced by the oil mills as given in table 6.

TABLE 6. CONSUMPTION OF FACTORY-MADE COCONUT OIL IN JAVA & MADURA.

Year	In thousands of litres	Per caput of the total population in litres
1922	34,772	0.93
1923	40,929	1.08
1924	44,574	1.16
1925	65,242	1.67
1926	68,284	1.73
1927	84,448	2.11
1928	94,565	2.33
1929	96,034	2.33
1930	94,709	2.27
1931	98,832	2.34
1932	95,601	2.23
1933	115,806	2.67
1934	131,369	2.99

Since 1928 the consumption of factory-made oil has probably been on the rise. A small but unknown amount of the coconut oil is used not for human consumption but for making soap.

In addition to the amounts thus accounted for there is an unknown and variable consumption of coconut oil made by the people themselves (thus *not* in factories). The fruity flesh of the coconuts is also used in other forms as food.

Sugar. The natives of Java & Madura consume large quantities of sugar both that made in the European factories and that they make themselves [amongst other sorts, that made by native (i.e. not factory) methods from sugar cane, coconuts (in large amounts), aren and siwalan palms]. The estimated amounts of factory-made and native-made cane sugar consumed is given in table 7.

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TABLE 7. CONSUMPTION OF SUGAR IN JAVA & MADURA.

Year	Amounts in thousands of metric tons			Per caput of the total population in kgms.
	Factory-made sugar	Native-made cane sugar, "Gula mangkok" (Estimated production less exports)	Total	
1926	171	No figures available		
1927	207			
1928	240			
1929	273	43	316	7.68
1930	328	45	373	8.94
1931	280	29	309	7.31
1932	211	38	249	5.81
1933	242	33	275	6.33
1934	203	40	243	5.52

With this the data that are available concerning the most important vegetable foodstuffs have been broadly stated. Such data are, however, not available for all the animal foodstuffs such as fish either fresh, dried or salted, the meat of carabaos, cattle, goats and chickens, salted ducks' eggs, "trassi" (made from fish and from shrimps), and so forth.

As far as the consumption of fish is concerned, there are import statistics available for fish brought from abroad and from Bagan Si Api Api. These are given in table 8.

TABLE 8. IMPORTS OF DRIED AND SALTED FISH INCLUDING "TRASSI" INTO JAVA & MADURA IN THOUSANDS OF METRIC TONS.

Year	From abroad, gross weight		From Bagan Si Api Api, net weight	
	Fish	Trassi	Fish	Trassi
1928	49	3	13	14.5
1929	46	2	12	14.5
1930	46	2	11	16.0
1931	44	1	10	14.0
1932	46	—	13	14.0
1933	42	—	16	13.0
1934	48	—	16	10.5
1935	44	—	17.5	10.8

Table 9 gives an impression of the total importation into Java & Madura of salt, dried and fresh sea-fish, and also of trassi, from

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Indo-China, Siam, Bagan Si Api Api, other parts of the Outer Islands, and by the fishermen of Java & Madura themselves. [10])

TABLE 9. IMPORTS OF SALT, FRESH AND SMOKED FISH AND OF TRASSI, FROM VARIOUS PARTS OF THE OUTER ISLANDS, NEIGHBOURING FOREIGN COUNTRIES, AND BY THE LOCAL FISHERMEN.

Type and source of imports	Amount in round thousands of metric tons.
Expensive imports (fresh-water fish) . . .	6
Cheap imports (dried & salted fish). . .	40
Sardines.	4
Trassi (imported).	2
From Bagan Si Api Api (fish & shrimps) .	25
Majang fisheries (coastal fisheries)	70
Japanese reef fisheries	5
Importation from Celebes and elsewhere .	10
Total	162

In an article in the "Koloniaal Tijdschrift", C. J. Bottemanne, Chief of the Institute for Sea Fisheries, gave somewhat lower figures for the state of affairs as it is today. He estimates the returns of the coastal fisheries (majang fisheries) at the present time at not more than 50 million kilograms per year. [11])

Mr. E. J. Reyntjes, acting head of the division of Domestic Fisheries, has given certain rough data concerning the fisheries. The present day returns from the sea-water fish ponds ("tambaks"), fresh-water fish ponds, fish culture in the sawahs during and after the growing of the rice, and fish culture in the lakes, is estimated at about 29,000 tons per annum.

The total consumption of fish including trassi may thus be placed at around 162,000 + 29,000 = 191,000 tons per year or per head of the population at about 5 kgms. per caput per annum or about 14 grams per day.

The consumption of *meat* is also not sufficiently well known. There are, of course, data available concerning the amounts paid in slaughter-house taxes for the slaughter of catlle, but since this tax is sometimes evaded it is impossible in this way to reach a sufficiently reliable estimate.

From the number of hides exported in 1934 and the number of hides tanned in the tanneries in Java (estimated by the Division of Industry), it would follow that somewhere around 600,000 cattle,

[10]) From "Indisch Verslag" (Netherlands Indian Report), 1931 Part I, p. 152.
[11]) Drs. C. J. Bottemanne: "De Indische zeevisscherij" ("The Netherlands Indian Sea Fisheries"), (In Dutch) in the "Koloniaal Tijdschrift" for September 1935, p. 444.

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212,000 carabao *) and 3,000,000 rams, goats and sheep must have been slaughtered. If an average slaughtered weight of 100 kgms. for cattle, 150 kgms. for carabao and 10 kgms. for rams, goats and sheep, is assumed, the consumption of meat must have been as follows :

Meat from cattle	60,000	metric tons
Idem from carabao	31,800	„ „
Idem from sheep & goats	30,000	„ „
Total	121,800	„ „

Converted into kilograms per caput of the inhabitants, this amounts to about 2.8 kgms. per year or some 8 grams per day. **)

No details at all are available as to the extent of the consumption of chickens or of hens' or ducks' eggs. We must therefore rely principally on the results of local investigations for data concerning the animal foodstuffs.

LOCAL VARIATIONS.

The previous data all relate to Java & Madura as a whole. Local variations in the diet are, however, very extensive indeed.

In the years 1896 and 1924 investigations were made of these local variations in the diet and in addition several monographic researches have taken place. The results of the investigations in 1896 and 1924 were published in the "Landbouwatlas" (Agricultural Atlas) [12]). The investigation in 1896 was concerned with the diet scales in the prisons and was carried out by Dr. G. A. Vorderman. (This was the now world-famous investigation that went so far towards proving the avitaminotic origin of Beri-beri and confirming the discovery of the vitamins by Eijkman and Grijns in the Laboratory of Medical Sciences in Weltevreden, Batavia, the original work on which had been done by Eijkman in 1889, although he called the substances he discovered "dietetic protective substances" the name "vitamins" only being introduced by Funk in 1910). In 1924 an investigation was made into the extent to which the consumption of foreign rice had spread over other regions and into the nature of the principal article of diet in various regions, not only after the main rice harvest but also in the so-called "patjeklik" period, that is to

*) Carabao hides of bad quality are worked to "kroepoek" a food product. It is impossible to estimate the quantity consumed.

**) In all probability the quantity of meat consumed in the towns is actually larger. The consumption of meat by the native inhabitants in the cities and by the European and other non-indigenous groups can, as a result of the numerical strength of these groups, be of but little influence on the Java average.

[12]) Mededeeling van het Centraal Kantoor voor de Statistiek (Bulletin of the Central Bureau of Statistics) No. 33. Landbouwatlas van Java en Madoera (Agricultural Atlas of Java & Madura), with a summary in English. For facts concerning dietetics consult in particular maps No. 10, 11 and 12, and in Part II, pages 83 to 100, 211, and 136* to 226*.

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say the time just before the main rice harvest, a very lean period for the people, the pre-harvest period. A review is given in table 10 of the nature of the principal foodstuffs as they were in 1934 while the principal data are made clear in a couple of maps.

TABLE 10. PRINCIPAL VEGETABLE FOODSTUFFS IN VARIOUS REGIONS ([13]) OF JAVA & MADURA IN 1924.

Principal vegetable foodstuffs.	Number of Districts in:							
	West Java		Central Java (incl. the Native States)		East Java		Java & Madura	
	After the main rice crop	In the Pre-har-vest period	After the main rice crop	In the Pre-har-vest period	After the main rice crop	In the Pre-har-vest period	After the main rice crop	In the Pre-har-vest period
1. Rice.	109	97	103	32	59	14	271	143
2. Maize..	—	—	3	15	—	4	3	19
3. Cassava.. . . .	—	—	—	2	—	—	—	2
4. Rice + Maize. .	—	3	69	66	40	46	109	115
5. Rice + Cassava.	—	8	13	14	—	3	13	25
6. Maize+Cassava.	—	—	—	16	—	5	—	21
7. Maize+legumes.	—	—	—	—	—	5	—	5
8. Rice + Maize + Cassava.. . . .	—	1	17	58	11	26	28	85
9. Rice + Maize + Sweet potatoes .	—	—	1	1	1	—	2	1
10. Rice + Maize + legumes.. . . .	—	—	—	1	1	5	1	6
11. Rice + Cassava + Millet ([14]) . .	—	—	2	2	—	—	2	2
12. Maize+Cassava +Sweet potatoes	—	—	—	—	1	3	1	3
13. Maize+Cassava +legumes.. . .	—	—	—	—	—	1	—	1
14. Rice + Maize + Cassave+legumes	—	—	—	—	2	2	2	2
15. Rice + Maize + Cassava+Millet.	—	—	1	2	—	—	1	2
16. Maize+Cassava +Sweet potatoes+legumes. .	—	—	—	—	—	1	—	1

[13]) Note on the administrative divisions of Java & Madura: The islands are divided into three Provinces, East Java, West Java and Middle Java, which latter with the two Native States of Surakarta and Jogjakarta make up the *geographical* region referred to as Central Java. The provinces are each divided into several Residencies, the Residencies into several Regencies, the Regencies into several Districts, the Districts into Sub-districts, the latter into "Desas" each made up of several villages. The territorial unit used in this table is the "District", which includes, therefore, many villages, a number of Desas, and about three or four Sub-districts.

[14]) Andropogon sorghum, Brot.

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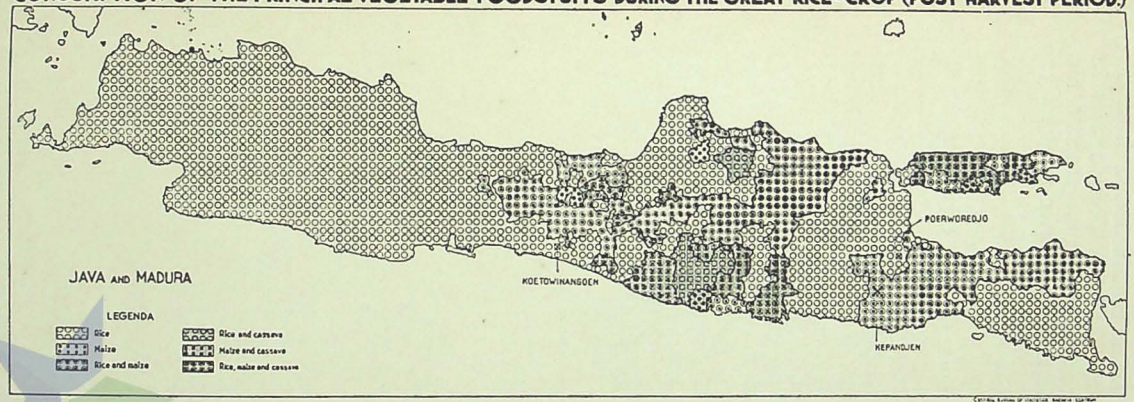
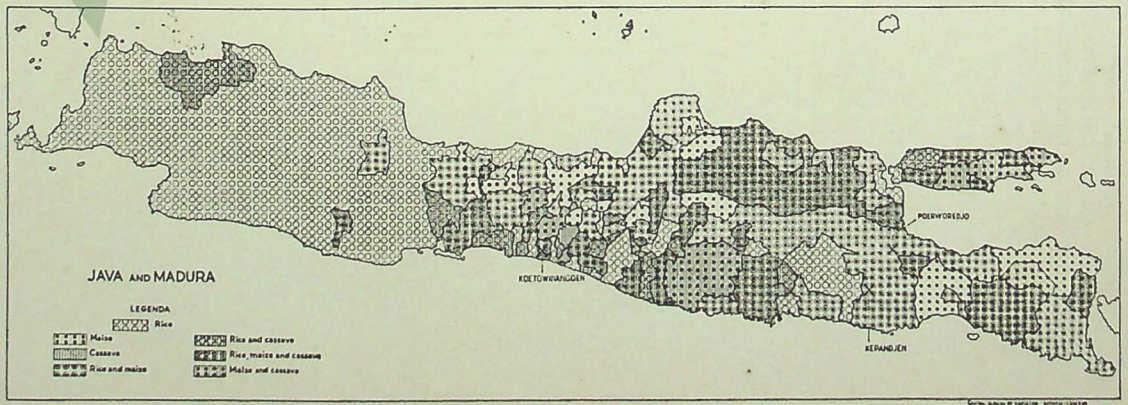
CONSUMPTION OF THE PRINCIPAL VEGETABLE FOODSTUFFS DURING THE GREAT RICE-CROP (POST-HARVEST PERIOD.)



CONSUMPTION OF THE PRINCIPAL VEGETABLE FOODSTUFFS DURING THE "PATJEKLIK" (PRE-HARVEST PERIOD.)



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Since the importation of foreign rice has become much less important in the past few years as a result of the increased production in this country, the differentiation made in the original maps of the Agricultural Atlas between domestic and foreign rice is no longer retained in the maps accompanying this article.

Broadly the principal diet of the people, at least as far as the principal *articles* of diet are concerned, may be described as follows: In West Java the eating of other products than rice is not important. In Central Java maize and cassava are much used. The southern part of Middle Java is the region where cassava and gaplek (dried cassava root) enter most prominently into the diet. In the mountainous districts and also in the south of the Residencies of Samarang, and Pekalongan much maize is consumed. In East Java there is an area to the south where "gaplek" (dried cassava roots) is the principal article of diet, sometimes even throughout the whole year; it is adjacent to the similar southern areas of Central Java. Those are regions with a very poor calcareous soil where rice growing gives but poor yields. East Java and Madura are maize country par excellence. Even in the plains there maize is mixed in very varying proportions with rice and in that way produces a most excellent food. If the rice gives out or if there is absolutely no rice at all, as may happen in some of the higher-lying districts, the people rely on a pure maize diet.

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CHAPTER IV.

LOCAL RESEARCHES.

In the investigations made in 1896 and 1924 attention was paid solely to the nature of the diet and not to its quantity. In addition to the information then acquired we also have at our disposal the results of local researches. The oldest intensive study along these lines was held during the years 1918 to 1921 inclusive in some of the Districts of the then Residency of Pasuruan in East Java. The results were published in 1923 [15]).

Since that publication had no summary in English a brief review of it is given here.

A. LOCAL INVESTIGATION IN SOME OF THE DISTRICTS OF THE RESIDENCY OF PASURUAN, EAST JAVA.

Method.

Data were compiled on a large scale concerning the most important vegetable foodstuffs. In an arbitrary number of houses in several villages, selected at random in the Districts concerned, the amounts of foodstuffs which, according to the woman of the house would be consumed on the day of the investigation, were weighed out. These compilations of data were subsequently repeated, but no notice was taken if the same houses or others were visited. The entire investigation into the use of the most important foodstuffs was extended to embrace 5,701 houses with 28,343 persons living in them; no notice being taken whether a house had been entered on the list more than once or not.

After that, between the middle of July and the middle of September 1921 a further investigation on a much smaller scale but using the same method was carried out embracing 708 families numbering 3,849 persons and including the consumption of all foodstuffs except the most unimportant.

Finally in October 1921 a third collection of data was made on a small scale covering this time the least important foodstuffs in 629 houses inhabited by 3,175 persons. This third collection of data principally covered the consumption of fresh coconuts, native vegetables, salt and coffee.

Results.

The following remarks may be made about the principal results of this investigation.

---

[15]) W. E. K. Baron van Lynden and A. M. P. A. Scheltema : "The consumption of food in some of the Districts of the Residency of Pasuruan" (In Dutch). Bulletin of Bureau of Statistics, No. 9. 1923.

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In the District of Sengguruh, a region with an important maize-growing industry, (see maps on page 23), the consumption of this and other foodstuffs was investigated during all the months of the year except December. The data were classified according to whether the family investigated owned land or not. The average rations of rice, maize and cassava were as shown in table 11, in which the figures are given calculated on a monthly basis per caput of those owning land and those not so doing.

TABLE 11. MONTHLY CONSUMPTION PER CAPUT IN KILOGRAMS IN THE SUB-DISTRICT KEPANDJEN OF THE DISTRICT SENGGURUH [16].

Product	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec. [17]	Total
	I. Owners of land.												
Rice	8.00	6.31	6.31	6.46	10.76	13.38	12.92	9.07	7.84	6.31	6.15	6.15	99.66
Maize	4.77	7.84	7.53	7.38	2.92	—	—	4.15	5.23	6.92	7.07	6.15	59.96
Total	*12.77*	*14.15*	*13.84*	*13.84*	*13.68*	*13.38*	*12.92*	*13.22*	*13.07*	*13.23*	*13.22*	*12.30*	*159.62*
Cassava	1.07	1.54	1.38	0.46	0.77	0.46	0.46	0.62	0.77	0.46	—	—	7.99
	II. Non-owners of land.												
Rice	8.00	6.00	6.00	6.31	10.15	12.15	12.46	10.15	7.84	6.15	6.15	6.15	97.51
Maize	3.69	8.00	7.53	7.23	4.15	—	—	2.92	5.53	7.07	6.92	6.15	59.19
Total	*11.69*	*14.00*	*13.53*	*13.54*	*14.30*	*12.15*	*12.46*	*13.07*	*13.37*	*13.22*	*13.07*	*12.30*	*156.70*
Cassava	0.92	0.46	0.92	0.62	0.92	?	0.62	0.62	0.46	0.31	—	—	5.85

From the figures in table 11 it follows that the consumption of rice falls off steadily from January to March inclusive and then rises to the end of June, after which a continual fall takes place again until the end of the year; this is the result of the reaping of the rice harvest. Maize supplements rice as a principal article of food, but disappears entirely from the menu during the months when rice is most plentiful in the daily diet. In this way the people of this region, where much maize is grown in addition to the rice, succeed in keeping the total consumption of *rice* + *maize* fairly constant the whole year round. Consumption of cassava is not of very great significance; greatest in the months of January, February and March, and in the other months practically uniform and quite small. The figures for those not owning land are slightly lower than those for persons who do own land, but the differences are not great.

The investigation in the District of Purworedjo was carried out only over a few months and it is therefore impossible to convert the figures obtained into per annum figures.

[16] All months calculated as if of 30 days.
"Per caput" = 0.83 "per adult".
[17] Interpolated.

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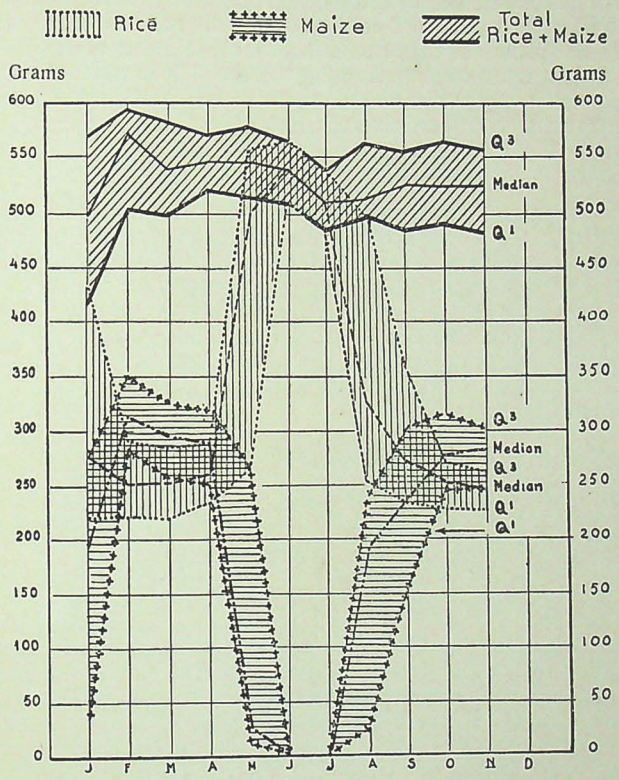
GRAPH II

VARIATION IN RICE AND MAIZE CONSUMPTION KEPANDJEN.



One quarter of the observed data are less than Q 1 (the first Quartile) and three quarters greater.
The half of the observed data are less than the Median and one half greater.
Three quarters of all observations are less than Q 3 (the upper Quartile) and only one quarter greater.

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In Sengguruh a special statistical investigation was made as to whether cassava must be regarded there as a principal article of diet or only as an accessory one. Should cassava be necessary for supplementing a deficiency in rice and maize, it might be expected that the rice and maize consumption of families that eat much cassava would be smaller than that of families that did not do so. The facts show that this was not the case or took place to a very slight extent only. In general, therefore, according to these figures cassava is used in this region only as a delicacy, usually at breakfast time, and this confirms what had been observed locally.

Variations in the consumption.

Calculations were made of the consumption of rice and maize and of rice + maize taken together and the median and quartiles worked out and it was found that for the District of Sengguruh the lowest and highest quartiles showed comparatively little differences, especially in the months just after the rice harvest, in other words in June and July. The rice + maize consumption therefore shows for half the people not only in each month separately but also for the whole year a remarkable small amount of variation, as may be seen from Graph II.

The influence of local agricultural conditions on consumption.

Agricultural and other local conditions have a great influence on consumption. It was found that the peculiarities in the variations in consumption in the Sub-district Kepandjen could be explained as follows. In the years 1919 and 1920 the maize crop from non-irrigated fields was reaped in February and March. In those months the consumption of maize reached its maximum. The consumption of rice began to rise again in May, in which month in 1919 the harvesting of the rice began in Kepandjen. The subsequent crops followed one another there in such a way that there was actually no time of want. It appeared that the month of January presented difficulties for certain families, since in that month both rice and maize stocks began to become exhausted. February, however, brought an improvement with it.

The investigation into the complete diet.

The following may be said about the investigation on a small scale of the consumption of all articles of diet :

Table 12 shows the average consumption per caput per day in the Sub-district of Kepandjen from the middle of July to the middle of September, 1921.

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TABLE 12. THE AVERAGE CONSUMPTION PER CAPUT PER DAY IN THE SUB-DISTRICT KEPANDJEN OF THE DISTRICT SENGGURUH FROM THE MIDDLE OF JULY TO THE MIDDLE OF SEPTEMBER 1921 [18])

Article of diet	Amount in grams
Rice, white	412
Maize (corn)	2
Cassava roots, fresh	20
"Tempeh kedelee" (a confection of soya beans)	60
Cow peas (a long, coarse, string-bean), Vigna sinensis	2
Native-made cane sugar	22
Factory-made sugar (1st and 2nd qualities)	2
Coconut oil	1 cc.
Bread	0 *)
Bananas	3
Manggoes	0 *)
Papaya	1
Meat (principally beef)	4
Chickens	0 *)
Fish, dried & salted ("gereh")	17
"Trassi hudang" (a dried, salted and fermented product made of shrimps)	7
Shrimps, fresh	2
Fish, fresh and steamed	8

PART II. AVERAGE CONSUMPTION OF THE LESS IMPORTANT FOODSTUFFS PER CAPUT PER DAY IN OCTOBER, 1921.

Coconuts, fresh, weighed as "wet copra"	19
Nuts, kemiri	2
Ingredients, various (mostly leaves), used in the native vegetable soup called "djanganan"	35
Idem, used in the "kuluban daun-daun" (cucumber and the young pods of various sorts of legumes)	5
Chillies	8
Onions	2
Salt	6
Coffee	5

*) Less than 1.

It will be observed here that rice forms far and away the largest portion of the diet. Through curious coincidences the consumption of maize as recorded was far less than in other years at the same season. Other articles of diet that proved to be of importance were tempeh, a confection made of soya beans, native-made cane sugar, dried and salted fish, shrimps and "trassi hudang", an evil smelling but highly nutricious product made of dried, fermented shrimps.

[18]) "Per caput" = 0.83 × "per adult". In the original publication the figures were given converted to show amounts "per adult", and the consumption of children, regardless of their ages, was taken as being 0.6 × that of an adult.

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In addition to the results of this investigation, the second investigation (listed above under table 12, part II) made in October, 1921, on a very small scale into the less important articles of diet showed that native vegetables and fresh coconut were used in quite considerable quantities.

Table 13 shows the results of the investigation made in the district of Purworedjo in the period from the middle of July to the middle of September, 1921.

TABLE 13. AVERAGE CONSUMPTION PER CAPUT PER DAY IN THE SUB-DISTRICT PURWOREDJO OF THE DISTRICT PURWOREDJO FROM THE MIDDLE OF JULY TO THE MIDDLE OF SEPTEMBER, 1921 (19).

Article of diet	Amount in grams
Rice, white	340
Maize, corn	90
Cassava roots, fresh	53
Soya beans	1
"Tempeh kedelee"	23
Peanuts, roasted	0*)
Native-made cane sugar	12
Factory-made cane sugar (1st and 2nd qualities)	7
Coconut Oil	2 cc.
Bread	0*)
Cucumber	1
Bananas	2
Manggoes	2
Chicos (sapodillas)	0*)
Citrus fruits	0*)
"Chuchur" (a cake of rice-flour and sugar)	0*)
Meat, beef	3
Fish, dried and salted	20
"Trassi ikan" and "djembret" (trassi made of fish, and small shrimps)	8
"Dadar telor" (a sort of spiced omelet)	0*)
Eggs, salted	0*)
Shrimps, fresh	1
Salt-water fish, fresh and steamed	3

PART II. AVERAGE CONSUMPTION OF THE LESS IMPORTANT ARTICLES OF DIET PER CAPUT PER DAY IN OCTOBER, 1921.

Coconuts, fresh, weighed as "wet copra"	16
Nuts, kemiri	2
Ingredients, various (mostly leaves), used in the native vegetable soup called "djanganan"	40
Idem, used in the "kuluban daun-daun" (cucumber and the young pods of various sorts of legumes)	10
Salt	4
Coffee	3

*) Less than 1.

19) "Per caput" = 0.86 × "per adult".

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From this it appears that the diet here is again rather different from that in Kepandjen. Here more use is made of maize and cassava roots. "Tempeh" and native-made cane sugar were eaten to a less extent than in Kepandjen. The data concerning fresh cononuts and native vegetables are of the same value as those from Kepandjen.

The food consumption of the various occupational groups.

In both Kepandjen and Purworedjo a further investigation was made into the variations in the consumption shown by members of various occupational groups.

The principal results of this investigation as found in Kepandjen are given in table 14.

TABLE 14. AVERAGE CONSUMPTION PER DAY PER CAPUT IN THE SUB-DISTRICT KEPANDJEN OF THE DISTRICT SENGGURUH; FROM THE MIDDLE OF JULY TO THE MIDDLE OF SEPTEMBER, 1921; IN GRAMS; CLASSIFIED ACCORDING TO OCCUPATIONS ([20]).

Foodstuff	200 peasant families	158 families of Kampong coolies ([21])	17 families of small retailers	all 421 families investigated
Rice	418	405	425	410
Tempeh	57	59	59	60
Native-made cane sugar	22	22	26	22
Coconut oil	1 cc	1 cc	1 cc	1 cc
Meat	4	1	7	4
Fish, dried and salted	15	22	10	17
Trassi hudang (product of shrimps)	7	7	7	7
Fish, salt-water, fresh	12	8	20	7

The differences will be seen to be very slight especially where the principal article of diet, rice, is concerned and in the cases of native-made cane sugar and tempeh. The consumption is practically the same.

Similar investigations were also made in the Sub-district of Purworedjo. The results are given in table 15 (See page 32).

Here, too, there is but little difference to be observed in the composition of the principal articles of diet between members of the same groups as before. From this it seems fair to conclude that the differences in prosperity between persons of different occupational

[20]) See 18).
[21]) Coolies working in the villages and not those in the sugar mills.

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classes in these villages, even though they may be great in fact, are practically not manifested in the diets of the families investigated, especially not as far as the principal foodstuffs are concerned. It is true that the small shop-keepers in Kepandjen prefer the more expensive fresh salt-water fish to the cheaper dried and salted fish, but the very slight differentiation in the native community is most clearly demonstrated by these figures. It is true that the figures for certain other groups with more limited memberships, such as the cart-drivers, were slightly higher.

TABLE 15. AVERAGE CONSUMPTION PER CAPUT PER DAY IN THE SUB-DISTRICT PURWOREDJO OF THE DISTRICT PURWOREDJO; FROM THE MIDDLE OF JULY TO THE MIDDLE OF SEPTEMBER 1921; IN GRAMS; CLASSIFIED ACCORDING TO OCCUPATIONS. (22).

Foodstuff	193 peasant families	106 families of kampong coolies (23)	26 families of sugar-mill coolies	18 families of small retailers	all 374 families investigated
Rice	340	329	361	335	340
Maize	112	74	80	?	90
Cassava	53	53	149	0	53
Tempeh (a soya bean confection)	23	25	22	?	22
Native-made cane sugar	13	13	9	?	12
Factory-made cane sugar	6	6	?	?	7
Coconut oil	2 cc	1 cc	?	?	2 cc
Meat	2	3	?	?	3
Fish, dried and salted	22	24	19	?	21
Trassi (ikan, hudang & djembret) (Trassi made of fish, shrimps or special small shrimps)	7	9	9	?	8
Fish, salt-water, fresh	3	3	8	8	3

An examination of the figures from the view-point of hygiene.

The consumption figures found give the amounts of protein, fat and carbohydrates consumed, which amounts are shown in table 16. The caloric value of the diets has also been calculated. In this connection the amounts for the first and third quartiles and the median were calculated apart and appear as such in the table.

[22]) See 19).
[23]) See 21).

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TABLE 16. THE CALORIC VALUE; AND PROTEIN, FAT AND CARBOHYDRATE CONTENTS (IN GRAMS PER CAPUT PER DAY) YIELDED BY THE DIET CONSUMED.

Constituents of the diet		Sub-district Kepandjen (24)	Sub-district Purworedjo (25)
Proteins (total, but excluding those contained in the less important articles of diet)	Q 1.	45.48	39.65
	Med.	51.79	50.40
	Q 3.	57.77	60.97
	Quartile deviation . .	6.14	10.66
Fats (without those derived from coconuts, kemiri, etc. (25a).	Q 1.	6.81	6.79
	Med.	8.88	10.58
	Q 3.	9.79	16.43
	Quartile deviation. .	1.49	4.82
Carbohydrates (without coconuts, kemiri, etc.)	Q 1.	282.95	232.11
	Med.	296.89	303.06
	Q 3.	305.36	365.41
	Quartile deviation. .	11.20	66.65
Caloric value (without coconuts, kemiri etc. (25a).	Q 1.	1,429	1,155
	Med.	1,539	1,549
	Q 3.	1,633	1,891
	Quartile deviation. .	102	368
Average figures. Complete diet (25a)	Protein..	59.10	55.64
	Fat.	21.91	20.64
	Carbohydrates.	318.30	319.58
	Calories	1,751	1,730

B. THE RECENT INVESTIGATION IN KUTAWINANGOON (MIDDLE-JAVA).

A very full report has been published about the investigations made along similar lines in 1932 and 1933 in Kutawinangoon in Middle-Java, with a summary in English running into seventy pages, (26). For the sake of brevity at this point reference is made to that work.

24) See 18). 25) See 19).

25a) The amount of fat provided by coconuts, and so forth makes up a considerable percentage of the total fats. This makes itself felt especially in the figures for fats and calories. The arithmetical average figures include these foodstuffs (see table 12, 13 and also part II) The variation in the complete diet cannot be calculated.

26) The periodical "Landbouw"; October and November 1934 Numbers 4 & 5. Also published as a separate book by the "Archipel" Press, Buitenzorg, for the Association of Advisory Agricultural Experts in the Netherland Indies. This report consists of three separate but closely interrelated parts:

I. J. J. Ochse & G. J. A. Terra: "The agricultural and economic conditions of the natives and their food consumption."
II. W. F. Donath: "The chemical constituents and food values of the native diet."
III. C. D. de Langen: "The general state of health of the inhabitants of the district under investigation, both before, during and after the collection of the data."

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For comparison with the diet of the Districts previously investigated in the Residency of Pasuruan only the average consumption per person has been included here.

TABLE 17. AVERAGE CONSUMPTION PER CAPUT PER DAY IN THE DISTRICT OF KUTAWINANGOON IN 1933; IN GRAMS.

Foodstuff	15 peasant families	5 wage-earners' families
Rice and glutinous rice	295	283
Coconuts	31	37
Coconut oil	5.5	5
Coconut sugar	4.5	2.5
Pulses (legumes)	33	43
(of which tempeh formed :)	(18)	(36)
Root-crops (tuberous plants)	52	8
Fruit	59	27
Vegetable	55	50
(of which leaf-greens formed :)	(38)	(11.5)
Trassi	0.75	0.5
Meat	3	7.5
Eggs	0.15	1.5
Fish, fresh	0.4	2
Fish, salted	0.55	1
Cane sugar	0.65	6.5
Salt	9	6

The monthly consumption of rice in Kutawinangoon was calculated by Ochse and Terra from the materials collected in the general investigation (part I) and proved to be as shown in table 18.

TABLE 18. MONTHLY CONSUMPTION OF RICE PER CAPUT IN KUTAWINANGOON IN 1933; IN KILOGRAMS. (27).

Month	15 peasant families	5 wage-earners' families
January	8.17	8.07
February	8.46	7.05
March	9.63	8.77
April	11.40	8.85
May	9.93	9.63
June	8.37	10.26
July	9.18	11.22
August	8.58	9.66
September	9.99	8.11
October	11.55	7.74
November	8.11	8.25
December	8.70	8.58
Total for the year	112.07	106.19

27) All months calculated as if of 30 days.

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Comparison of these figures with those of Kepandjen given in table 11 shows marked points of difference. In view of the fact that in Kutawinangoon the only "principal foodstuff" is rice, while in Kepandjen it is rice + maize, it would seem as if the rice stocks in Kutawinangoon decrease less quickly than in Kepandjen, in that they last the whole year round. It is not possible to supplement the rice with maize as in Kepandjen and many other areas of Middle and East Java. The total consumption of cereals in Kutawinangoon is, therefore, considerably lower than in Kepandjen. For other foodstuffs, too, such as tempeh and the foods of animal origin including meat, dried and salted fish, fresh fish and trassi, the figures for Kutawinangoon were much lower than those of Kepandjen (as recorded from the middle of July to the middle of September, 1921; see table 12), and, with the exception of tempeh, also lower than those of the Sub-district Purworedjo (also from the middle of July to the middle of September, 1921; see table 13). One striking thing, however, is that the consumption of coconuts and coconut products, such as coconut oil and coconut sugar, is so much higher in a region such as Kutawinangoon.

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CHAPTER V.

FACTORS THAT INFLUENCE THE DIET.

What are the causes of local differences that are often so great? For the whole Netherlands Indies and in particular for Java the most important factor is certainly the state of local agriculture. A very large part of the country's inhabitants still eat primarily the products of local agriculture. The close connection existing between agricultural systems and the diet in the Outer Islands has already been spoken about in the introduction. The same is true of Java. It is for this reason that the diet in a single District may show great variation from place to place, especially if the District includes a region of hills and another of plains; even the inhabitants of the villages in a single Sub-district eat neither the same amounts nor the same foodstuffs, as was clearly shown by the investigation held in Pasuruan. If there is sufficient rice available, in some parts of Java no other crops are planted out, even if financial profit could be made from doing so. The influences of the *seasons*, exerted as it is so largely upon agriculture, is particularly great in Central and East Java. In most parts of Java there is a so-called "patjeklik" or period of scarcity just before the new rice harvest. This is a typical phenomenon of diets consisting principally of cereals.

In the time of Shakespeare May was called the "hunger month" in England. It was the month before the new harvest; in those days the potato was not yet known.

The consumption of foodstuffs by those actually producing them is in certain districts more and more giving place to a diet consisting of substances brought in from elsewhere, while the products of local agriculture are being sold. Countless examples of this may be given. Thus here and there it happens that in spite of a very large production of rice per caput of the inhabitants in a given district, the people will often be found to eat the cheaper product, maize, and sell a part of the rice they grow. If the consumption is no longer dependent upon local agriculture the people are also free in their choice of what they shall eat. Consumption is also to a very great extent dictated by *custom*. It appears to be a sort of natural law that a man finds most tasty the diet to which he and his forefathers have long been accustomed. This preference for certain definite articles of diet is most peculiar. In view of the large place now being taken by cassava in the diet of the people of Java, it is curious to read how in 1852 when this crop was being introduced into one of the Regencies of East Java the Regent (himself a native Civil Servant) had to set the example and lead the way as otherwise the people would have no faith in it at all. The further east one goes in Java

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the more maize will be found to be consumed. *Convention* also plays a large part in diet, and the desire to be in fashion and do as the others are doing. Thus the people living in the cities prefer foreign rice or rice from the rice mills to the ordinary village rice, which is a far better product from a dietetic point of view. In the publication "Standards of living of the Shanghai labourers" it is remarked on page 133 that the people of Shanghai prefer first grade rice to coarse rice (with the husks not removed), but "Shanghai people like it because it tastes better and then the farmers around Shanghai in order to meet this demand, hull their rice until they are snowy" (sic!).

In this connection it is the white colour of the rice to which most attention is paid. It appears in practice that the better off a consumer is the whiter he will have his rice; the whiter, the more highly polished, the more of the pericarp removed, and therefore the poorer in an essential ingredient of a diet (the "B" vitamin series) [28]). There is also a mutual interaction between religious views and diet. For instance Muhammadans may not eat pork, an article of diet that is a great favourite with the non-Muhammadan peoples of the Netherlands Indies such as the Balinese and Chinese. Further in Java at the "sedekah's" (religious feasts) nothing but rice is ever consumed even in the "maize districts".

Occupation and diet.

More fish is eaten by the fisherfolk as a matter of course. Thus the fisherfolk from the north coast of East Java eat much fish but no maize; they eat rice almost exclusively for the cereal part of their diet. From the investigation into the diet in Pasuruan it appeared, however, as has already been reported, that in districts where there are various occupations being carried on, consumption at least of the principal vegetable articles of diet does not differ greatly.

The differences in prosperity between the various occupations are but little shown in the diet. In the investigation held by the Agricultural Advisory Service into the diet in Java in 1924 it was reported, however, that in one District in Middle Java, where many rich native merchants and manufacturers of native cigarettes live and where there is also an extensive planting of native commercial crops, much more meat and fish are eaten than in other parts of Samarang.

In Chapter VIII the influence of the economic conditions on the diet will be touched on again.

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[28]) W. F. Donath: Part II of the Kutawinangoon report see Note No. 26).

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CHAPTER VI.

THE DIETETIC VALUE OF THE NATIVE MENU IN JAVA & MADURA.

We shall not need to consider this part of the subject very deeply after the excellent publication of Professor Donath referred to above. We shall restrict ourselves to a comparison of the native menu, as it may be deduced from the rough average figures that have been given, with the data obtained by a direct method in Kutawinangoon and the District of Pasuruan, which latter data cannot, of course, hold good for the whole of Java.

If we turn our attention first to a discussion of the native diet for the whole of Java & Madura, as far as the principal articles of diet are concerned, we shall give an extension of the investigation carried out by Crince le Roy [29]). In Table 19 will be found a review of the amounts of raw protein, fat and carbohydrate and also of the calories available per caput from these foodstuffs during the years 1921 to 1934 inclusive, as furnished by rice, maize, cassava, sweet potatoes, potatoes, peanuts and soya beans.

TABLE 19. THE AMOUNTS OF PROTEINS, FATS AND CARBOHYDRATES AND ALSO THE NUMBER OF CALORIES FURNISHED BY THE MOST IMPORTANT VEGETABLE ARTICLES OF DIET AVAILABLE PER CAPUT.

Year	Proteins		Fats		Carbohydrates		Calories	
	per year in kgms.	per day in grams.	per year in kgms	per day in grams	per year in kgms	per day in grams	Thousands per year	No. per day
1921	13.60	37.3	5.22	14.3	137.61	377	666	1,825
1922	14.62	40.1	5.43	14.9	138.99	381	678	1,858
1923	13.68	37.5	5.25	14.4	134.33	368	654	1,792
1924	14.20	38.9	5.32	14.6	136.96	375	667	1,827
1925	13.21	36.2	4.93	13.5	128.24	351	623	1,707
1926	14.57	39.9	5.53	15.2	136.22	373	667	1,827
1927	14.40	39.5	5.53	15.2	140.06	384	682	1,868
1928	13.50	37.0	4.99	13.7	123.03	337	604	1,655
1929	12.83	35.2	4.69	12.8	115.01	315	565	1,548
1930	14.18	38.8	5.46	15.0	126.45	346	625	1,712
1931	13.54	37.1	5.05	13.8	124.40	341	610	1,671
1932	13.38	36.7	4.98	13.6	125.85	345	615	1,685
1933	13.83	37.9	5.23	14.3	126.69	347	622	1,704
1934	12.18	33.4	4.57	12.5	115.58	317	564	1,545
Av. 1921 to 1934		37.5		14.1		354		1,730

Each person consumes, therefore, about 38 grams of proteins, 14 grams of fats, and 354 grams of carbohydrates per day, which yield together about 1,730 calories. The course of these figures is also shown in Graph III. From this it is apparent that the carbohydrates have shown many variations. Raw proteins and fats are far more constant. The years 1929 and 1934 are striking with their poor crops.

[29]) X. F. Crince le Roy: loc. cit., pp. 15 to 28.

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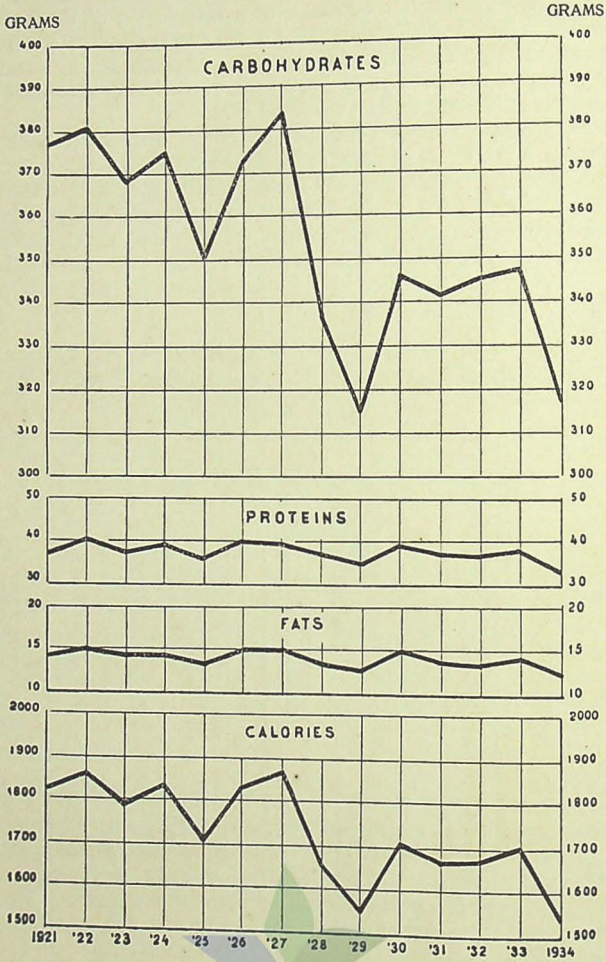
GRAPH III.

PROTEINS, FATS, CARBOHYDRATES AND CALORIES FROM PRINCIPAL VEGETABLE FOODSTUFFS AVAILABLE FOR CONSUMPTION PER CAPUT AND PER DAY.



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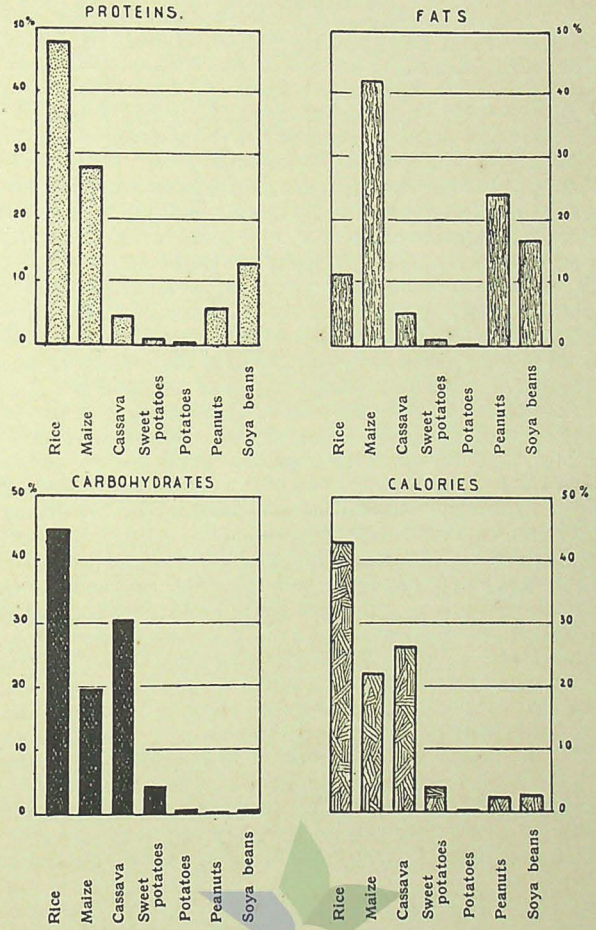
GRAPH IV.

THE PROTEIN, FAT, CARBOHYDRATE AND CALORIE CONTENT OF CONSUMED PRINCIPAL VEGETABLE FOODSTUFFS *) EXPRESSED AS PERCENTAGES OF THE TOTAL FOR JAVA AND MADURA

(14-YEAR AVERAGES.)



*) Coconut products excluded.

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Table 20 and Graph IV show the percentages of the total amounts of proteins, fats and carbohydrates and the total number of calories that were furnished by each of the foodstuffs mentioned.

TABLE 20. THE AMOUNTS OF PROTEINS, FATS AND CARBOHYDRATES AND ALSO THE NUMBER OF CALORIES FURNISHED BY THE MOST IMPORTANT VEGETABLE ARTICLES OF DIET IN PERCENTAGES OF THE TOTALS.

Constituent	Rice	Maize	Cassava	Sweet Potatoes	Potatoes	Peanuts	Soya Beans	Totals
Proteins. . . .	47.7	28.0	4.4	0.9	0.4	5.8	12.8	100
Fats.	11.2	42.1	5.0	0.9	0.1	24.0	16.7	100
Carbohydrates	44.8	19.7	30.4	4.2	0.4	0.1	0.4	100
Calories . . .	42.5	22.1	26.2	3.7	0.3	2.5	2.7	100

From this it will be seen that rice and maize are the principal suppliers of proteins amongst the foodstuffs listed; maize and peanuts the principal suppliers of fats; rice and cassava of the carbohydrates. The calories are furnished principally by rice, cassava and maize.

The amounts consumed of the most important vegetable articles of diet are tolerably accurately known. In order to approach an estimate of the *total* native diet, however, the amounts given in table 19 must be increased by an estimate of the amounts of the diet constituents furnished by articles of diet of animal origin and the other vegetable ones. This can only be done very roughly. From the monographic investigations it appears that in Kepandjen 10.8 grams of protein were furnished per caput per day by meat, dried and salted fish, fresh fisch, trassi and fresh shrimps, besides the vegetables; in Purworedjo these same items also furnished 10.8 grams per day of protein; but in Kutawinangoon only 7.2 grams of protein were taken by the 15 peasant families and 3.8 grams by the 5 wage-earners' families per day in the form of animal articles of diet and vegetables. We believe that on the basis of these data and the rough data known concerning the meat and fish consumption of the whole of Java & Madura it may be assumed that about 8 grams of protein per caput per day are consumed in the whole of Java & Madura in the form of articles of diet of animal origin and derived from the vegetable articles of diet not yet dealt with. [30]). The 15 peasants' families in Kutawinangoon got 79.4% of their fats from coconuts and coconut oil, vegetables and articles of diet of animal origin, i.e. 26.2 grams of fat (See Part I of the Kutawinangoon report by Ochse and Terra — refer Note 26); the 5 wage-earners' families got 85.7% of their fats or 25.3 grams from the same sources. Now Kutawi-

[30]) This is slightly lower than the former estimate, which was based on calculations of the total consumption of coconuts, fish and meat, namely 10 grams in total. See A. M. P. A. Scheltema: "The principal articles of diet in Java & Madura" (in Dutch) in Koloniale Studiën, 1921, page 328.

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nangoon is definitely a coconut region and the consumption of coconuts at the time of the investigation was abnormally high because as a result of the low price fetched by coconuts the people consumed more than usual themselves. In contrast, in Kepandjen only 8.6 grams of fat were obtained per caput from coconut oil, fresh coconuts, kemiri nuts, dried and salted fish, trassi and vegetables; in the Sub-district of Purworedjo the amount was 8.2 grams.

The amount of fat consumed in the whole of Java & Madura from the foodstuffs mentioned may be estimated at 14 grams per caput per day, which agrees with an estimate made along different lines in 1921. The high percentage that this amount is of the whole amount of fats contained in the menu gives rise to the fact that the total figure for the fat consumption of the whole population remains uncertain.

It is difficult to estimate the amount of carbohydrates consumed that did not originate from cassava, sweet potatoes and potatoes. It is probable that sugar yields about 15 grams per person per day. The other root-crops were not specially recorded in Kutawinangoon, while in the Districts of Pasuruan that were investigated they were not regularly consumed.

After these additions have been included, the following estimate per caput and per day for the average diet of the people of Java & Madura may be made, namely : proteins, 45.5 grams; fats, 28 grams; carbohydrates, 379 grams; yielding about 2,000 calories. Although these figures are only rough, it may be concluded from them that the average Java diet is richer in proteins and carbodydrates and also in caloric value than that of the families that were investigated in Kutawinangoon, while the diet in the regions of Pasuruan that were investigated in all probability lies above the Java average, principally as a result of the use of maize and larger amounts of animal foodstuffs. The results have been collected and epitomised in table 21.

TABLE 21. THE DIET OF THE NATIVE POPULATION OF JAVA & MADURA PER DAY IN GRAMS PER CAPUT. (AVERAGE FIGURES CALCULATED FOR THE ENTIRE YEAR).

Region	Proteins	Fats	Carbohydrates	Calories
Average of Java & Madura . .	45.5	28	379	2,000
Kutawinangoon :				
5 wage-earners' families. .	40.2	29.6	258	1,498
15 peasant families	40.2	33	285	1,640
Sub-district of :				
Kepandjen.	59.1	21.9	318.3	1,751
Purworedjo	55.6	20.6	319.6	1,730

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Comparisons made with the above figures are not altogether accurate since the age make-up and average body weight of the inhabitants in the districts investigated may differ from the average for the whole of Java & Madura. Complete data are available of the body weights of the families investigated in Kutawinangoon, but not of those investigated in Kepandjen and Purworedjo. The possibility exists that the people there are taller and heavier than in Kutawinangoon.

In the five wage-earners' families in Kutawinangoon the 12 males older than 15 years of age averaged 45.9 kgms. and the 14 females 41.5 kgms.; in the 15 peasant families the 29 males above 15 years averaged 44.7 kgms, and the 23 women 42 kgms. According to information given me in 1921 by the Civil Medical Service, the average body weight of the adult native of Java should lie between 50 and 55 kgms.

The age make-up is as follows :

TABLE 22. AGE MAKE-UP OF THE PERSONS INVESTIGATED IN VARIOUS PARTS OF JAVA & MADURA COMPARED WITH THE AVERAGE.

Region	Group. I Children in arms	Group II Other non-adults	Sum of Groups I + II	Group III Adults
Whole Java & Madura (According to the Census of 1930). .	5.5%	35.4%	40.9%	58.9%
Kutawinangoon :				
The 5 wage-earners' families	14.0%	40.4%	35.4%	55.0%
15 peasant families	9.3%	30.2%		60.5%
Sub-district :				
Kepandjen.			32.8%	64.6%
Purworedjo.				68.2%

From this table it will be seen that the number of adults in Kepandjen and Purworedjo was larger than the average for the whole of Java & Madura, while that in the wage-earners' families in Kutawinangoon was on the low side. If use is made, therefore, of the per caput figures the figures obtained for Kepandjen and Purworedjo are slightly too favourable, while those for the peasant families in Kutawinangoon are slightly too low.

For the difficulties met with in comparing the various diets the reader is referred again to the publication of Donath [31]).

[31]) Refer to note 26. Prof. Donath: Part II Kutawinangoon Report. loc. cit., page 287.

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CHAPTER VII.

THE COST OF FOOD.

An index number has been published by the Central Bureau of Statistics since 1926 concerning the cost of food for the native population. The first intention was to publish not only an index number for the diet, but also one for the whole cost of living. Lack of data necessitated the giving up of this latter idea later. This index number has been given for the period from 1920 to 1924 in a publication of the Central Bureau of Statistics [32]). The following is taken from the summary in English appended to the above publication concerning the compilation of the index number as far as the food is concerned.

"*Method adopted in this bulletin.*

"The index-numbers for the cost of living of the native population of Java and Madura presented in this report are based as far as possible on the aggregate expenditure method and represent the ratios between the total aggregate cost of definite quantities of a number of commodities at a given date and the price of the same quantities of each commodity at some other date selected as base or standard; each of these ratios is then multiplied by 100.

"*Weights.*

"The articles have been "weighted" as far as possible with the all Java average daily consumption figures calculated per 1000 of the native population for the principal vegetable foodstuffs: rice, cassava, sweet potatoes and soybeans during the period 1916 up to and including 1924; for buffalo beef the average consumption for the years 1920/1923, for dried fish 1919/1924, for coconuts the years 1916/1919 (no newer data available).

"For coconut oil the figure was derived from the report on special food investigations in some districts in the Residency of Pasuruan (viz Bulletin No. 9 of this Bureau).

"The consumption of hens' eggs was estimated".

The "weights" used represent the average ration of the native population for the whole of Java & Madura, and for 1000 persoons are as follows per day : (See table 23).

The prices utilised are those of the table of bazaar prices ("Pasarprijzen"). The prices noted monthly on the 15th of the month in about 120 selected "pasars" (Bazaars) scattered over the whole of

[32]) Mededeelingen van het Centraal Kantoor voor de Statistiek No. 31 : "Kosten van levensonderhoud der Inlandsche bevolking op Java en Madoera" (Cost of living of the native population on Java and Madura) 1920/1924. Weltevreden 1926.

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TABLE 23. AVERAGE RATION FOR 1000 PERSONS PER DAY; FOR THE NATIVE POPULATION OF THE WHOLE OF JAVA & MADURA.

Rice	263.7 kgms.
Maize	103.1 „
Cassava	367.5 „
Sweet Potatoes	93.3 „
Peanuts	9.9 „
Soya beans	9.9 „
Meat (Carabao beef)	4.9 „
Fish, dried	5.4 „
Eggs, hens'	15 „
Coconuts	130
Coconut oil	1.2 „
Salt	14 bricks

Java & Madura were used for compiling the data needed for computing the index numbers. [33]). These prices are multiplied by the "weights" given in table 23 and these sums of money added together and divided by the sum required in 1913.

The "weights" have not been further revised since 1926, although they differ slightly from the figures for the average consumption, for instance from 1924 to 1933, which have been touched on here above. A computation with the weights of the vegetable articles of diet based on the average consumption from 1924 to 1933 proved to give results for the index number differing from those published by a few tenths of a point only. The quarterly figures for the index numbers of the costs of feeding for the native population in Java & Madura in the period from 1920 to 1935 inclusive are given in table 24 which may be compared with Graph V. (See page 47).

In addition to these data for the whole of Java & Madura there are a few local statistics available that have been compiled by the direct method, for instance those from the District of Kutawinangoon (See note 26 for full reference), while in connection with the diet investigation in Pasuruan the costs of the average diet were also calculated. For the five wage-earners' families in Kutawinangoon the cost of food per head in the period between April 1933 and March 1934 inclusive averaged 2.8 guilder-cents and for the 15 peasant families for the same period of time 2.75 guilder-cents. Of this latter sum a value of 1.35 cents came from their own production while goods were purchassed to the value of 1.4 cents (see report referred to in note 26). Converted to a standard person of 50 kgms. body weight these figures became 4.2 cents and 5.6 cents, and per 1000 calories basal metabolism 3.4 cents and 2.75 cents.

[33]) Published in English in "The Netherlands Indies; A Review of the Country, its Economics and Commerce" issued by the Department of Economic Affairs of the Netherlands Indies. More complete data will be found (in Dutch) in the "Economisch Weekblad van Nederlandsch-Indië".

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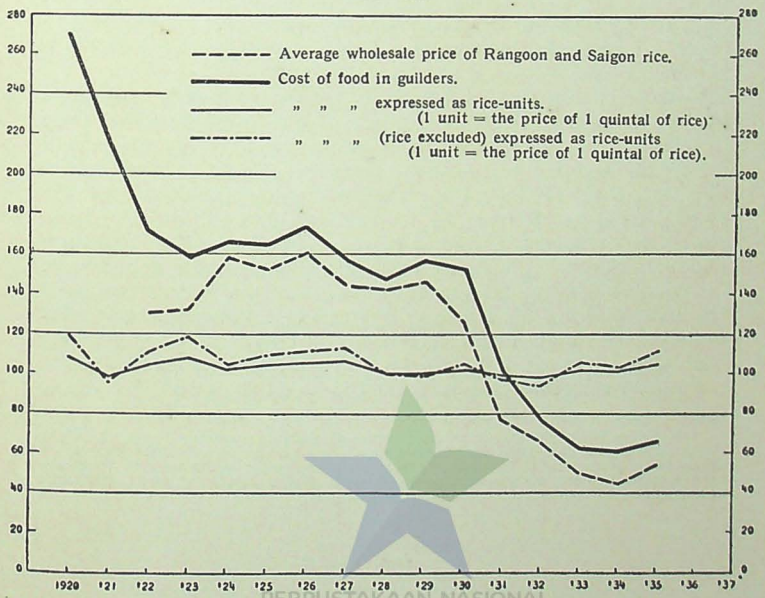
TABLE 24. INDEX NUMBERS FOR THE COST OF FOOD FOR THE NATIVE POPULATION IN JAVA & MADURA (BASED ON THE AVERAGE BAZAAR PRICES IN JAVA & MADURA WITH 1913 = 100)

Year	1st quarter	2nd quarter	3rd quarter	4th quater	yearly average
1920.	272	265	270	275	270
1921.	240	204	208	212	216
1922.	196	170	160	161	172
1923.	161	157	151	164	158
1924.	172	159	164	172	166
1925.	164	155	162	178	165
1926.	189	165	168	172	174
1927.	166	158	156	153	158
1928.	150	145	147	150	148
1929.	155	153	156	165	157
1930.	168	154	149	138	152
1931.	120	102	96	92	102
1932.	84	78	72	69	76
1933.	65	65	60	57	62
1934.	58	60	60	65	61
1935.	68	64	62	65	64

GRAPH V.

INDEX NUMBERS FOR THE COST OF FOOD OF THE NATIVE POPULATION AND THE AVERAGE WHOLESALE PRICE OF RANGOON AND SAIGON RICE IN JAVA AND MADURA
1913 = 100



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For the families as they were met with this averaged, therefore, for the wage-earners 7 × 2.8 cents = 19.6 cents ([34]); for the peasants 5.3 × 2.75 cents = 14.58 cents.

For the Sub-districts Kepandjen and Purworedjo the data for the costs of the menu taken from the original publications have been supplemented by data from later years. In this way index numbers were computed. The results of these computations are given in tables 25 and 26. (See page 50 and 51).

From these tables it will be seen that in September 1935 the costs of this ration per adult in Kepandjen amounted to 5.15 guilder-cents and in Purworedjo to 4.47 guilder-cents, which computed per caput per day comes to 4.27 and 3.84 guilder-cents respectively. For families of the same composition as those we met with in 1921, the costs of food per day would have been 86 cents in Kepandjen and 56 cents in Purworedjo in 1921 against 23½ cents and 15½ cents respectively in September 1935.

Graph VI (see p. 49) gives a comparison of the course taken by the index numbers for the cost of food in the whole of Java & Madura with the calculated index numbers for the cost of feeding in the parts of Pasuruan that were investigated, from which it may be seen that the coincidence of the two courses is quite satisfactory and further that the cost of the diet has fallen off enormously. It should be remarked that the rural residents in the nature of things only have to buy a part of the foodstuffs they eat, so that the actual cash expenditures to which they are put are even smaller than the sums here mentioned.

How much the cost of feeding for the native peoples in Java & Madura is dependent on the prices of rice is apparent in many directions. The actual sums of money which had to be devoted according to the composition of the index number for the costs of the rice diet in the years 1913 and from 1920 to 1934 amounted to an average of 55% of the total costs for foodstuffs. This figure is very high. No entirely comparable figures are available from other countries, however. Perhaps the figure most nearly comparable is the "cost of living" index number regularly compiled by the Secretariate of the Labour Office for Bombay. For this calculation for the "mass units" of the various foodstuffs it is not the consumptions in Bombay itself that are taken, but those for all India, which are calculated in a similar manner to that used for the index figure of the cost of

[34]) As has been remarked in the publication on Kutawinangoon, (on page 129 of the Dutch text) the families of the wage-earners were larger than normal. In this connection it should be remarked that it has appeared from the investigation in Pasuruan that the per-caput consumption falls off in large families, especially where the consumption of foodstuffs of animal origin is concerned, and in the poorer families.

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Graph VI.

INDEX NUMBERS OF "COST OF FOOD" OF THE NATIVE POPULATION

1921=100.

15 TH SEPTEMBER OF EACH YEAR

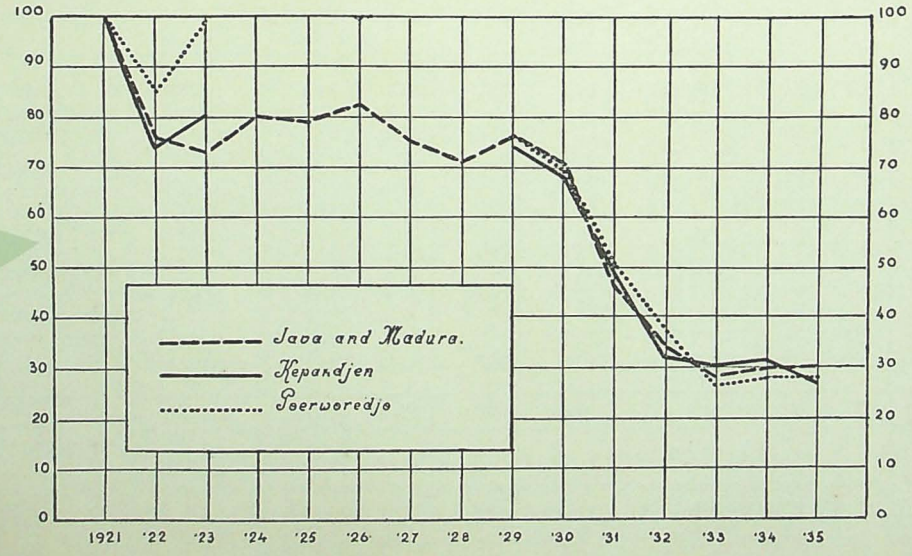

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TABLE 25. COST OF FOOD PER 100 ADULTS PER DAY IN THE SUB-DISTRICT KEPANDJEN.

Foodstuff	Consumption per 100 adults per day : in kgms.	July 15 to Sep. 15, 1921	September 15.								
			1922	1923	1929	1930	1931	1932	1933	1934	1935
Rice, Java No. 1 . .	49.656	ƒ 13.47	ƒ 8.04	ƒ 9.65	ƒ 9.65	ƒ 9.65	ƒ 6.43	ƒ 4.02	ƒ 3.62	ƒ 4.02	ƒ 3.62
Maize	0.185	„ 0.03	„ 0.02	„ 0.01[5]	„ 0.02[5]	„ 0.02	„ 0.01	„ 0.01	„ 0.00[5]	„ 0.01	„ 0.01
Cassava, fresh roots No. 1	2.409	„ 0.04	„ 0.04	„ 0.02	„ 0.03	„ 0.08	„ 0.02	„ 0.02	„ 0.01	„ 0.01	„ 0.02
Tempeh kedelee (soya product)	7.200	„ 1.51	„ 1.86	„ 1.40	„ 1.51	„ 1.28	„ 0.58	„ 0.47	„ 0.47	„ 0.64	„ 0.52
Gulah tebu (native sugar) No. 1 . . .	2.640	„ 0.47	„ 0.26	„ 0.64	„ 0.43	„ 0.43	„ 0.43	„ 0.21	„ 0.09	„ 0.17	„ 0.13
Coconut oil.	0.11 litre	„ 0.08	„ 0.04	„ 0.05	„ 0.05	„ 0.06	„ 0.04	„ 0.02	„ 0.02	„ 0.01	„ 0.01
Beef, No. 1.	0.460	„ 0.71	„ 0.63	„ 0.60	„ 0.45	„ 0.37	„ 0.37	„ 0.26	„ 0.30	„ 0.15	„ 0.19
Trassi hudang,[1] No. 1.	0.800	„ 0.71	„ 0.91	„ 0.78	„ 0.39	„ 0.32	„ 0.32	„ 0.26	„ 0.26	„ 0.16	„ 0.16
Gereh (fish, dried & salted) No. 1 . . .	2.030	„ 1.64	„ 1.97	„ 1.81	„ 1.32	„ 0.49	„ 0.99	„ 0.66	„ 0.82	„ 0.66	„ 0.49
Total per 100 adults.		ƒ 18.66	ƒ 13.77	ƒ 14.96[5]	ƒ 13.85[5]	ƒ 12.70	ƒ 9.19	ƒ 5.93	ƒ 5.59[5]	ƒ 5.83	ƒ 5.15
Per family of 4.6 adults ([35])		„ 0.86	„ 0.63[5]	„ 0.69	„ 0.63[5]	„ 0.58[5]	„ 0.42[5]	„ 0.27[5]	„ 0.25[5]	„ 0.27	„ 0.23[5]
Index number. . . .		100	74	80	74	68	49	32	30	31	27

[35]) Children being reckoned at 0.6 adults.

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TABLE 26. COST OF FOOD PER 100 ADULTS PER DAY IN THE SUB-DISTRICT PURWOREDJO.

Foodstuff	Consumption per 100 adults per day: in kgms.	July 15 to Sep. 15, 1921	September 15.								
			1922	1923	1929	1930	1931	1932	1933	1934	1935
Rice, Java No. 1 . .	39.527	ƒ 10.24	ƒ 6.40	ƒ 6.72	ƒ 7.04	ƒ 5.76	ƒ 4.80	ƒ 3.84	ƒ 2.40	ƒ 2.56	ƒ 2.56
Maize	10.499	„ 2.21	„ 2.12	„ 1.55	„ 1.55	„ 2.16	„ 0.77	„ 0.62	„ 0.31	„ 0.62	„ 0.62
Cassava, fresh roots No. 1.	6.176	„ 0.11	„ 0.06	„ 0.12[5]	„ 0.15	„ 0.35	„ 0.07	„ 0.06	„ 0.02[5]	„ 0.35[5]	„ 0.05
Tempeh kedelee (soya product). . .	2.620	„ 0.84	„ 0.84	„ 1.09	„ 0.63	„ 0.59	„ 0.34	„ 0.21	„ 0.25	„ 0.21	„ 0.19
Coconut oil	0.22 litre	„ 0.15	„ 0.08	„ 0.18	„ 0.14	„ 0.11	„ 0.05	„ 0.04	„ 0.03	„ 0.02	„ 0.03
Soya beans	0.150	„ 0.03	„ 0.03	„ 0.04	„ 0.03	„ 0.02	„ 0.01	„ 0.01	„ 0.01	„ 0.01	„ 0.00[5]
Gulah tebu No. 1 (Native sugar). . .	1.360	„ 0.44	„ 0.27[5]	„ 0.44	„ 0.22	„ 0.22	„ 0.09	„ 0.05[5]	„ 0.04	„ 0.09	„ 0.07
Sugar, factory No. 1.	0.170	„ 0.05[5]	„ 0.04	„ 0.08	„ 0.03	„ 0.02	„ 0.02	„ 0.01	„ 0.01	„ 0.01	„ 0.01[5]
Idem No. 2.	0.590	„ 0.09[5]	„ 0.13	„ 0.24	„ 0.09[5]	„ 0.05	„ 0.04	„ 0.04	„ 0.04	„ 0.04	„ 0.04
Beef	0.370	„ 0.60	„ 0.60	„ 0.75	„ 0.30	„ 0.30	„ 0.30	„ 0.21	„ 0.18	„ 0.18	„ 0.12
Gereh (fish, dried and salted) No. 1 . . .	2.370	„ 0.88	„ 1.54	„ 3.84	„ 1.34	„ 0.77	„ 0.77	„ 0.61	„ 0.58	„ 0.38	„ 0.50
Trassi djembret (from small shrimps) . .	0.710	„ 0.17	„ 0.38	„ 0.80	„ 0.57[5]	„ 0.69	„ 0.69	„ 0.23	„ 0.20	„ 0.23	„ 0.23
Idem from fish . . .	0.180	„ 0.22[5]	„ 0.07	„ 0.06	„ 0.04	„ 0.06	„ 0.06	„ 0.02	„ 0.02	„ 0.03	„ 0.04
Total per 100 adults.		ƒ 16.04[5]	ƒ 13.56[5]	ƒ 15.91[5]	ƒ 12.14	ƒ 11.10	ƒ 8.01	ƒ 5.95[5]	ƒ 4.09[5]	ƒ 4.41[5]	ƒ 4.47
Per family of 3.5 adults ([36]).		„ 0.56	„ 0.47[5]	„ 0.55[5]	„ 0.42[5]	„ 0.39	„ 0.28	„ 0.21	„ 0.14[5]	„ 0.15[5]	„ 0.15[5]
Index number		100	85	99	76	69	50	37	26	28	28

„ See note (35).

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feeding in Java & Madura, namely from production, imports and exports. From the Bombay figures it will be seen that the cost of the rice diet amounts to 23% of the total feeding costs (total cereals being 39%). A few other figures may be cited for comparison from other rice-consuming countries derived from budget investigations, while at the same time it has also been calculated for Kutawinangoon, Kepandjen and Purworedjo what percentage of the diet costs were devoted to rice. Such figures are available for Bombay and Rangoon, although in the latter city only the Burmans have been considered, and in each case only as far as the urban labourers are concerned. Figures are also available from Shanghai concerning the urban labourers, in which connection it should be remarked that in Shanghai rice is the principal article of diet for the people.

From Siam a few figures are available from the rural districts, and for Japan also data are to be found concerning the peasants, which show figures as high as the Java averages. The newest Japanese investigations deal only with salaried persons and wage earners.

These figures have all been collected together in table 27. (See page 54 en 55).

From this it follows, although the figures are not entirely comparable because of differences in the methods of compilation, that the figures for Java share with those of North-East Siam and the Japanese peasants the distinction of being the highest. Comparison with a poor European country such as Ireland shows that there, according to the budget investigation of 1922, the percentage expenditure on food amounts to only 20% for cereals and 7.9% for green vegetables; with 45.2% for total vegetable food and 54.8% for total non-vegetable food.

Another method of regarding this state of affairs is that by which the total cost of food excluding rice, according to the "basket" system used for compiling the index number, is expressed as a factor of the cash-equivalent of one quintal of rice according to the average annual price of rice for the year in question that has been used for computing the index number. If, then, index numbers are calculated from the figures obtained for the quantities of rice consumed, these will be found to show a fairly constant level.

This is caused by :-

a. the large share taken by the rice part of the diet in the "foodstuffs" basket; and

b. the prices of many other foodstuffs being directly or indirectly dependent on that of rice;

and so the rice prices in broad outline correspond to the general level of prices of the other foodstuffs, although, of course, other

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influences also operate on them such as the price of maize on the world market, the demand for oils and fats where peanuts and soya beans are concerned, and so forth, [41]). That the cost of food in Java & Madura stands in close relationship to the wholesale prices of foreign rice in Batavia will appear from the accompanying *Graph V (see p. 47)*. In this connection it may be remarked that the importation of foreign rice in the period under consideration in general amounted to no more than a few percent of the total consumed and that, moreover, the importation has been subjected to licensing since March 1933. The index number for food has also showed a divergent course in the year 1933 and 1934.

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[41]) When considered over shorter periods of time there is sometimes just a negative correlation to be remarked between the prices of rice and other foodstuffs. If the rice crop is poor the prices especially of cassava, sweet potatoes and maize are apt to rise in the first months of the following year. See Bulletin of the Central Bureau of Statistics No. 88 : "Prijzen, indexcijfers en wisselkoersen 1913 tot 1929," pp. XX — XXIV. In Dutch. (Prices, price-indexes and exchange rates in Java, 1913 to 1929).

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TABLE 27. THE COSTS OF THE RICE PORTION OF THE DIET IN RELATION
JAVA & MADURA, COMPARED WITH

Country or city	Group of the population	Number of observations	Nature of the data
Java & Madura			
Java & Madura (whole country)	Natives		Total sums for the compilation of the index number of "cost of food" (by the aggregate expenditure method)
Sub-district of Kepandjen (in District Sengguruh East Java)	Rural population groups.		Local investigation of food consumption computed with local prices.
Sub-district of Purworedjo (in District Purworedjo, East Java)	Idem		Idem
Sub-district of Kutawinangoon.	Peasants. Wage-earners	15 families 5 „	Budget investigation.
India			
Bombay	Working class		According to the total sum for the compilation of index number of "cost of living" (All India consumption)—aggregate expenditure method.
Bombay	Working class	2473 families	Working class family-budgets.
Bombay	Working class	1469 „	Working class budgets.
Burma			
Rangoon	Burmans	992 families	Working class budgets.
Siam			
Central Siam North Siam North East Siam South Siam	Rural population	3314 persons 3322 „ 2333 „ 2072 „	Budget investigations.
Japan			
11 largest cities	Salaried workers	Households 1575	Budget investigations.
12 leading industrial centres 5 mining districts 6 principal cities	Wage-earners	3210	idem
9 prefectures	Farmers	670	idem
Principal cities	Salaried persons	538	idem
	Wage-earners	1068	idem
China			
Shanghai	Cotton mill and other workers	230 families	Budget investigations.
Shanghai	Laborers	305 families	idem

") 38% of the families bought rice.
") 47% " " " " "
") 53% " " " " "
") 43% " " " " "

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TO THE TOTAL COSTS FOR FEEDING THE NATIVE INHABITANTS OF CERTAIN OTHER COUNTRIES AND CITIES.

Year	Percentage of total cost of feeding spent on rice	Source
1913 and 1920/1934	55	Central Bureau of Statistics, Batavia Centrum.
Average of 1921/1923 and 1929/1935	56	Idem (see Table 25)
Idem	68	Idem (see Table 26)
1933	47 43	Publication about Kutawinangoon (refer Note 26 for full details).
1934	23 (total cereals : 39 %)	Labour Gazette Bombay 1933/'34 — 1934/'35 (For the compilation of the index number, see Labour Gazette Bombay 1929).
1921/1922	31	Report on an Enquiry into working class budgetsin Bombay, page 65/67.
1932/1933	21,5	Report on an Enquiry into working class family budgets in Bombay City 1935, page 42/43.
1926 and 1927	30	Report on an Enquiry into the Standard and cost of living of the working classes in Rangoon, page 101.
1930/1931	30 (37) 50 (38) 71 (39) 45 (40) (only disbursements in cash)	Carle C. Zimmerman Ph. D., Siam Rural Economic Survey, page 113 — 120.
1926/1927	% of foods excl. drinks and tobacco: 35,4	International Labour Review, vol. XXIII, March 1931, page 394 and 397.
Idem	% of foods excl. drinks and tobacco: 44,0	T. Matsuda : The family Budget Enquiry in Japan 1926/1927.
Idem	% of foods excl. drinks and tobacco: 57,2	XIX Session de l'Institut International de Statistique Tokio 1930, page 28/29 and 36/37.
1932/1933	% of foods excl. drinks and tobacco: 28,6	The Ministry of Labour Gazette London, May 1935, page 175.
Idem	% of foods excl. drinks and tobacco: 33,8	Labour Gazette Bombay, June 1935, page 787/788.
1927/1928	44,6 (+ 8,6 % other cereals)	Simon Yang and L. K. Tao : A Study of The Standard of Living of Working families in Shanghai, Social Research Publications Monograph No. III, page 50.
1929/1930	44,4 % rice and rice products + 8,9 % other cereals and products	Standards of living of Shanghai laborers, Bureau of Social Affairs The City of Government of greater Shanghai 1934, page 111.

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CHAPTER VIII.

INFLUENCE OF ECONOMIC CONDITIONS ON THE DIET OF THE PEOPLE.

CONCLUSIONS.

In the above considerations it was practically only possible to take into consideration the amounts of foodstuff available for the native population in its entirety.

The distribution of this supply of foodstuff amongst the various groups of the population can only be determined with exactitude by budget investigations.

The figures in table 28 give some idea of the relative importance of the various groups of the population. They are taken from the reports of the Census of 1930 in the Netherlands Indies.

Such data are, however, only available for certain definite groups of wage-earners, principally living in the cities; they are not available for the great mass of the rural population.

TABLE 28. NUMBER OF PERSONS ENGAGED IN VARIOUS OCCUPATIONS IN JAVA & MADURA; ACCORDING TO THE CENSUS OF 1930.

Occupational groups	Number of persons in millions		
	Men	Women	Total
I. The production of raw materials	7.2	2.2	9.4
Including: *Ordinary native agriculture*	*6.0*	*1.8*	*7.8*
Growing sugar cane (other than native-grown cane)	*0.4*	*0.1*	*0.5*
All other non native agriculture	*0.2*	*0.2*	*0.4*
Cattle breeding	*0.2*	*0.02*	*0.2*
Fishing	*0.1*	*0.02*	*0.1*
II. Industry	0.5	1.1	1.6
III. Transportation	0.2	—	0.2
IV. Commerce	0.3	0.6	0.9
V. Liberal professions	0.07	0.035	0.1
VI. In public office	0.4	—	0.4
VII. Other occupations	1.—	0.8	1.8
Total number of workers	9.7	4.7	14.4

The question arises now as to what influence the economic world crisis has had on the distribution of the available supplies of foodstuffs.

Java is amongst those countries in which as a result of economic conditions the income of the people has decreased greatly.

The present Treasurer General, L. Götzen, has published in "Koloniale Studiën" for October 1933 a study of the aggregate income of the native and non-indigenous population groups [42]).

[42]) L. Götzen: "Volksinkomen en belasting" (in Dutch) "The aggregate income of the people and taxation". Loc. cit. p. 449.

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TABLE 29. AGGREGATE INCOME OF THE NATIVE POPULATION OF JAVA & MADURA: ESTIMATED BY L. GÖTZEN. (LOC. CIT. SUP.)

Year	Millions of guilders
1926	1,816
1927	1,797
1928	1,741
1929	1,712
1930	1,643
1931	1,188
1932	858

If these sums are converted on the basis of the index numbers for food, fuel and light for the native population into "Tani-guilders" (a tani being a native peasant) with the purchasing power of a guilder in 1913, the picture becomes at once far less sombre; in other words, the actual income has fallen off far less than the nominal. This is shown in table 30.

TABLE 30. AGGREGATE INCOME OF THE NATIVE POPULATION OF JAVA & MADURA CONVERTED INTO "TANI-GUILDERS". (see text above).

Year	Millions of "tani-guilders"
1926	1,014
1927	1,123
1928	1,176
1929	1,084
1930	1,081
1931	1,121
1932	1,072

Although the index numbers used in this conversion do not include the *entire* cost of living, the other costs, such as those for clothes, have also shown great decreases, probably entirely corresponding to those of the foodstuffs, so that the index number of the "cost of living" is closely approximated by that for the cost of food, fuel and light.

In general, therefore, it may safely be said that the actual income of the people as a whole has fallen off markedly less than the nominal income expressed in terms of cash.

No sufficient estimates are available for the years subsequent to 1932; in all probability the nominal popular income has fallen away still further. In 1934 a poor rice crop has been added to this and an intense restriction of the sugar industry. The index numbers, however, have also fallen off very markedly since 1932.

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In estimating the national income all income enjoyed in natura is converted into terms of cash, thus also the comparatively large portion of the agricultural production that either is consumed by the producer himself or is paid out in natura as wages or as shares in share-tenancy (metayage).

Concerning the production of food crops it may be remarked that this has been extended as a result of the sugar restriction and the commercial policies that have been followed in regard to rice and soya beans. As a result of the crisis wages in cash have been avoided as far as possible in the native agriculture and payments in kind have increased. In any given year it is the weather conditions that are determinative for the extent of the production of food crops, especially of rice and maize, rather than the prices of the commodities. This is true to a far less extent of the legumes such as peanuts and soya beans, which react far more to price fluctuations.

Thus for the provision of food for those who either produce food crops themselves or receive their wages in kind the level of prices is only of interest in so far as they are compelled to buy (or acquire by barter) other articles of food, or clothing, or must pay off debts or taxes. The barter rate for these other articles is, however, quite favourable while the incidence of land taxes has been materially reduced by the crisis remissions. Arrears in the repayment of loans to the General Peoples' Credit Bank (Algemeene Volkscredietbank) have been reduced since 1933, especially in 1935.

But whereas the conditions of the rural population have been stabilised in so far as they are directly concerned with the production of food crops, the production of market crops is still suffering from the low prices.

The value of the exports of native-grown agricultural products from Java & Madura for the past few years is given in table 31.

TABLE 31. EXPORT VALUE OF NATIVE-GROWN EXPORT CROPS FROM JAVA & MADURA IN MILLIONS OF GUILDERS.

Year	Value
1926	76
1927	81
1928	135
1929	104
1930	70
1931	56
1932	49
1933	38
1934	31

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The values given in table 31 are the export values; the actual producers receive considerably less than these amounts, (43). It is obvious that there has been a decline since 1928 which has not been compensated for by the increased purchasing power of the guilder.

Now in the case of some of these export products there is also the possibility of larger domestic sales. For instance more copra is now being sold locally than was formerly the case. The reader is referred for information about the degree to which this country is supplying its own requirements in agricultural products to a special study on this subject 44).

Persons who have been planting crops for export to a large extent and neglecting to plant food crops in addition have probably suffered an actual falling off of income. Where the crops grown were edible, such as copra and soya beans, this may have led in some cases to an improvement in the diet when the very low prices have given rise to greater consumption by the producers, as was observed by Ochse and Terra in Kutawinangoon. Except for those from Kutawinangoon, there are no data available as to the extent to which this process has taken place. There is, of course, no question of this having taken place in the case of kapok or tobacco.

Amongst those who have been hardest hit by the crisis are the employees of the sugar industry and those who formerly let their ground to the sugar mills. The total amount paid out in wages in the sugar industry has fallen off lamentably as a result of the poor prices obtainable for sugar and the sugar restriction measures; this is shown in table 32.

TABLE 32. SUMS PAID FOR WAGES, PURCHASES AND HIRING LAND FROM THE NATIVES (45) BY THE SUGAR INDUSTRY.

Year	Millions of guilders
1928	133.0
1929	128.6
1930	117.3
1931	88.5
1932	49.9
1933	23.6
1934	11.9
1935	11.0
1936 estimate	16.5

43) Götzen allowed for the profit of the middlemen, for transportation costs, and so forth an average of 25%. This is, of course, a very rough estimate.

44) A. M. P. A. Scheltema and P. van Emst: "How the Netherlands Indies is providing for its requirements in agricultural products (in English). In "The Netherlands Indies", 1935, Vol. III, Nos. 5, 6 & 10.

45) Including indemnification for the return of land hired on contracts that had not yet expired.

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Although it is true that the purchasing power represented by the total sum paid in wages up to 1932 fell off far less than the figures would seem to indicate, the cash income of the people in certain districts fell off enormously through the complete disappearance of the sugar industry from their midst. One fortunate feature of this is that the number of persons dependent for their livelihood the whole year round on their earnings from the sugar industry was comparatively small. The majority of the labourers employed in the sugar industry for growing the cane and in the factories were only seasonal hands, who did other work in the other seasons of the year. The planting of cane on a larger scale in 1936 will therefore give much relief.

The compass of this article does not permit entering into details of the other sources of income, while the data in general are only very rough or only available for the whole of the Netherlands Indies. This is the case, for instance, of the sums paid out by the Government to the native Civil Servants and minor employees.

The aggregate total of the wages paid out to natives by the sugar industry, the tobacco growing industry, rubber, tea, coffee and cinchona estates, the oil industry, shipping companies, gas companies, electricity companies, mining enterprises, railways and tramways, the Government, other non-native sources of employment, the local self-governing resorts and sums paid to persons in the temporary service of the Government, to household servants, for ground rent by the sugar and other agricultural estates, in pensions and gratifications, and the profits and wages of native commerce and cottage industry has been estimated by Götzen at the amounts shown in table 33.

TABLE 33. AGGREGATE WAGES AND SALARIES PAID TO NATIVES AND THE PROFITS OF NATIVE COMMERCE AND INDUSTRY, ETC.

Year	Millions of guilders
1926	585
1927	617
1928	660
1929	661
1930	627
1931	528
1932	389

Although these figures are only rough, the decreases in 1931 and 1932 were probably largely compensated for by the increased purchasing power of the guilder.

Considered as a whole, this group of wage-earners probably did not have a very much lower actual income up to the end of 1932.

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Some of the elements involved in the estimation, however, make this conclusion somewhat uncertain.

For the rest, these totals do not refer to the same people; those no longer receiving an income in cash from the sugar or other source were forced to fall back on the native community and in many cases went to strengthen the group of so-called "kampong coolies" (casual labourers working around the villages), persons in the villages living from hand to mouth doing odd jobs as they may appear.

That group of "other occupations" in the Census of 1930 consisted to the number of 1.4 millions of persons following "insufficiently described occupations"; (this included also a large group of persons with two or more occupations where it was impossible to say which was their principal means of livelihood). It is probable that this group has increased since 1930 as a result of the reduced opportunity for working.

Again, it is probably principally this group whose state of nutrition has fallen off in the past few years. The reduced importation of trassi points to a simplification of the popular diet. Trassi was imported from abroad and from the Outer Islands and the reduction has taken place particularly during 1934 and 1935. It is a highly appreciated though not essential ingredient of the native diet for which, however, no substitute of similar value exists. It should be pointed out that simplifications of the diet need not always imply deterioration in its nutritive qualities regarded from a hygienic point of view; for instance it is cheaper to eat rice mixed with maize than rice alone, but certainly not worse from a nutritional viewpoint. Real symptoms of a deterioration in the diet of some groups of the people are furnished by reports that locally now and then the emergency foodstuffs are being eaten, such as cassava refuse and the pith of banana stems, which were formerly eaten principally in the more remote districts. Other unfavourable phenomena are the higher death rate in 1934, and the fact that the workers are becoming exhausted more rapidly, which was observed amongst those set to preparing the soil again for the planting of sugar cane in 1935.

But Java has fortunately been spared from famines such as appear in India and China, and the difficulties have remained within limits thanks to the large degree of autarky in the matter of foodstuffs.

The Government has instituted a close observation of the supply of foodstuffs ever since the beginning of the world crisis, so that if necessary measures may be taken immediately for instance for instituting relief works, distributing rice gratis and in general for carrying out an efficient rice and soya bean policy.

Further, on the initiative of Lady de Jonge, wife of the Governor General, an organisation has been founded known as the ASIB

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(Algemeen Steun comité voor Inheemsche Behoeftigen — General Relief Committee for Indigent Natives), in order to take care of the needs of the very poorest groups of the population.

With regard to the prospects of the food supplies in the immediate future it should be remarked that the gradual re-expansion of the sugar industry will again bring larger sums of money into circulation amongst the natives in the form of wages, while in the past few months the price level of certain export products has again shown some improvement.

The influence of the increasing industrialisation of Java is favourable, although it is not yet an important factor in the improvement of the income of the native population.

Everything tends to point to the fact that except for the constantly increasing number of mouths to be fed, the most serious difficulties in regard to the food supply of Java's teeming millions have been overcome [46]).

Batavia, January 1936.

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[46]) For further information concerning the feeding of the masses (especially from a hygienic point of view) see the historical reviews:

Prof. Dr. W. F. Donath and Dr. A. G. van Veen: "Onderzoekingen betreffende de volksvoeding in Nederlandsch-Indië gedurende de periode 1850 — 1910". (In Dutch): and

Dr. A. G. van Veen: "De studie der volksvoeding in Nederlandsch-Indië in de periode 1911 — 1935": both in the "Feestbundel 1936" of the "Geneeskundig Tijdschrift voor Nederlandsch-Indië".

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