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WEANING PRACTICES IN THE SAHEL: A PASTORAL AND AGRICULTURAL COMMUNITY IN UPPER VOLTA

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I. INTRODUCTION

The extremely vulnerable age period in a young child's life called the weaning period (when the child is aged about 4 months up to about 30 months) is characterized in most Third World societies by high levels of malnutrition and malnutrition-related disease, and by very high levels of mortality. Such malnutrition may result from food scarcity, from the technological problems of preparing hygienic foods which can be tolerated by the young child's digestive system, and from inappropriate weaning and feeding practices which often are determined by ancient tradition.

All of these problems are particularly severe in the West African Sahel. Years of drought have altered normal food use patterns, heavily affecting for example the availability of cow's milk as a principal protein food in this region of extensive pastoralism. The Sahel is one of the world's poorest areas, and technologies for the family processing of weaning foods in homes and villages are limited. And the common practice of feeding the child solely on breast milk during the first year of life and usually until the child is old enough to walk, at which time the child is weaned abruptly and placed on solid foods, a practice which arose as a response by Sahelian women to very difficult environmental and social pressures, can nevertheless produce trauma, severe illness, and possibly the death of the young child.

Save the Children Federation, which has operated a community development project since 1976 in about two dozen villages in the Dori area of Upper Volta about 170 miles northeast of the capital Ouagadougou, requested that HOVIPREP provide technical assistance to examine the extent of the weaning age problem in Dori, and to make recommendations for the possible incorporation of a weaning

food component in the Save the Children project.

II. SCOPE OF WORK

At the request of Save the Children, consulting services were provided by a social scientist and a food technologist.

Scope of Work for the social scientist was as follows:

(A) To identify the social, cultural and economic constraints to child feeding in the Dori project area;

(B) To evaluate the constraints and to outline alternative strategies for dealing with the problem of weaning period malnutrition;

(C) To develop a preliminary assessment of the feasability and costs of an appropriate weaning food project in the Dori area.

Scope of Work for the food technologist was as follows:

(A) To examine samples of foods currently available in the Dori area, including cereals, vegetables and legumes; to make a nutritional analysis of these foods; and to recommend optimal nutritional mixtures of these foods;

(B) To calculate the nutritional value of "doughnut holes" composed of millet, groundnuts and cowpeas which are made and sold in the Dori area as a popular snack food (these are round balls made in the manner of a doughnut).

Anthropologist Hans Guggenheim, Director of the Wunderman Foundation, visited the Dori area for about one week. Peter Pellett, Professor of Nutrition at the University of Massachusetts and a food technologist, examined food samples and food mixtures from Dori, including millet (flour), okra/gombo (flour), cowpeas (whole), and groundnuts (in the form of peanut sticks). Robert W. Morgan, HOVIPREP Project Coordinator, prepared this report from the materials submitted

by Drs. Guggenheim and Pellett and from Save the Children documents including reports by Anne Rapoza, Health and Nutrition Coordinator, and Susan Corbett, Economic and Women in Development Coordinator.

III. THE DORI PROJECT AREA

Upper Volta is a landlocked country of 105,869 square miles, with a mid-1983 population estimated at 6.8 million, lying entirely within the east-west zone of grassland savannah extending across West Africa and known as the West African Sahel. The country, particularly in the north, is characterized by three to five months of rainfall/per year, often erratic (rainfall and vegetation are somewhat more extensive in the south). 97 percent of the population is rural and 50 percent of the country's land is devoted to pastoralism. Per capita GNP in 1981 was (U.S.) $237, close to the lowest in the world (the average for Africa was $783; the lowest country figure in the Western Hemisphere was $297 for Haiti). Illiteracy is about 93 percent.

The town of Dori is the capital of the Department of the Sahel, the political division in northeast Upper Volta. The Save the Children project is centered in about 12 villages, partly around Dori and partly around Gangaol about 20 miles to the south on the road to Ouagadougou. According to the 1975 census, the ethnic composition of the Department of the Sahel was 95 percent Peul/Rimaibe, a combination of representatives of two of the principal ethnic groups in Africa and two of the most important groups in the Sahel. The Peul, who are more generally known as Fulani, are traditional cattle-keeping pastorialists and may number more than 10 million persons throughout West and Central Africa today. The Rimaibe are one of the numerous agricultural tribes of the Voltaic group extending across the western Sahel. The two groups have lived in

a symbiotic relationship in the Dori area for such a long period that they are now listed as a single ethnic division. A large part of the Fulani have moved into agriculture.

When Save the Children initiated its project in 1976, the drought over the previous six years had reduced herds by about one half and cereal production (mostly millet) to near zero. Malnutrition and mortality in the population were high. The situation is less severe now, partly as a result of improved rainfall and partly as a result of project efforts. In 1977, for example, rainfall was insufficient for the millet but adequate for pasturage. It is now estimated that in 4 out of 10 years rainfall is sufficient for normal crop production. One of the project activities has been to promote income-generation so that added supplies of millet can be purchased outside the area. Another project activity has been to set up a "cereal bank" so that millet supplies are available during the dry season. Malnutrition and morbidity among children have declined. Nevertheless there is a continuing shortage of millet every year, rainfall continues to be erratic and to some extent inadequate in most years, and the population lives in uncertainty and apprehension. One of the principal Save the Children activities has been to promote various forms of community organization in order to better handle scarce and fluctuating food supplies.

On the lighter side, our consultant has given us the following description of Dori as viewed through the eyes of a visiting foreigner:

"Dori is a typical banco-architecture Sahelian town (rectangular buildings with highly decorated mud walls and cornices), with its usual all-purpose trading stores that sell sardines, gas, batteries, pencils, paper and beer at high prices. The wide streets are pleasant and well-designed for camels, goats, and an occasional land-rover. The large spacious homes of the different representatives

of voluntary agencies are usually furnished with the symbols of western comfort: a refrigerator (not working), a typewriter (barely functional), a few odd chairs, mosquito nets, huge beds in dark cavernous rooms, and a yard with big trees where one can doze at high noon."

IV. THE FULANI AND THE VOLTAIC PEOPLES

The Fulani comprise one of the largest ethnic groups in Africa, extending in population clusters virtually the entire length of the Sahel from Senegal to northern Cameroon and beyond. They may number more than ten million persons, a more precise estimate being difficult because the Fulani are found in more than a dozen countries and a large proportion are pastoral nomads who elude government bureaucracies and the census taker. Fulani groups have many different names, some of the most common being Peul, Ful, and Fulbe.

The Fulani have always fascinated African scholars because of their many curious ambivalences. Though sharing a common language, they may vary greatly in appearance, from the stocky physique typical among West Africans to elegantly thin men and women with straight hair and copper complexion. Although many and perhaps the majority are simple herders, the Fulani have developed distinctive cultures in Sahelian towns, the men being noted for exotic and sometimes outlandish costumes and hair styles, the women being favored as concubines by wealthy Africans from other tribes. So distinctive have the two cultures become that the terms "Cow Fulani" and "Town Fulani" are common in the anthropological literature.

What is perhaps the most interesting and the most important ambivalence involves religion. Although most Fulani practice traditional religions or are

indifferent Moslems (for all of Upper Volta the 1975 census lists 75 percent of the population as practicing traditional religions, 20 percent as Moslems, most of the remainder as Roman Catholics), it has been a series of reforming Moslems leading jihads (holy wars) who have produced the eastward spread of the Fulani across the Sahel from Senegal. Although many Fulani men today abhor schooling (they say the average Fulani man would rather buy his son a cow than send him to school), it was an elderly Moslem scholar who led the conquest of northern Nigeria and laid down many of the political and religious patterns of the area today. The President of Nigeria is a Fulani, as is the Sultan of Sokoto.

The Voltaic agriculturalists are among the oldest civilizations on earth, having farmed in the area for perhaps 5,000 years. A number of important crops are believed to have been domesticated in the Sahel, including pearl millet, sorghum, the Bambara groundnut (named after a Sahelian tribe noted for its carved wood "gazelles" now prized in the art world), the cowpea, Guinea yam, okra, egusi, watermelon, fluted pumpkin, calabash, tamarind, sesame, kola, shea-butter tree, and cotton (Egyptian cotton came originally from tropical Africa). All of these crops have become widely diffused in the world. Fonio, or "hungry rice", has not spread but is still widely cultivated in the Sahel.

The Peul/Rimaibe are thus representative of ancient pastoral and agricultural traditions in the Sahel, and in the Dori area further represent a fusing of these cultures. A study of the Dori project thus has applicability for persons concerned with the nutrition problem generally in this troubled region of the world.

V. WEANING PRACTICES IN THE DORI AREA

Weaning practices observed in the town of Dori and one of the project villages

visited, N'diomga (see map), were consistent with those reported by other observers in Upper Volta, the Dori region, and other areas of the Sahel. These consist of a series of acts designed to "sever" the child from the mother as abruptly as possible by administering a deliberately traumatic shock. This shock varies in kind; it can be the use of an evil-tasting salve on the breast, a dose of hot water with or without the addition of boiled herbs and administered while holding the child's nose, and/or leaving the child with the grandmother or another woman of the household. Michael Latham summarizes the effect on the child:

"A young African child up to this time has an unusually close relationship with his mother. He has ridden on his mother's back when she went to draw water or to till the field, he has slept in the same bed, he has had access to the breast more or less on demand. The sudden divorce from intimacy is a severe psychological blow which may cause the child to lose his appetite, and may thereby be a factor in causing kwashiorkor. In more than one tribal tongue, the local word for kwashiorkor is 'displaced person.' The child has been displaced by the fetus."

Probably it is not the psychological shock and the loss of appetite alone that cause kwashiorkor, but also the lack of essential nutrients in the diet the child is now offered. Yet Latham's observation is important because it clearly indicates a widespread cultural pattern. In order to better understand this, we must look at other cultural systems where somewhat similar characteristics appear. These are the initiation ceremonies widespread in Africa, in which young boys and girls are abruptly and painfully removed from the security of the child's familial situation and initiated into their adult roles. These rites of passage, as they are called, include terrifying dance rituals, painful circumcision or scarification, whippings and beatings, and so forth.

Displacing the child from the mother to a caretaker such as the grandmother can perhaps best be understood as an early initiation rite. These practices have been viewed by anthropologists as a means for establishing adult authority in the tribe, and as a means for teaching adult authority to the new generation.

If this is true, then adherance to such weaning practices is a major cultural value, not some idiosyncratic notion which could easily be removed by "education. Cultures are not that simple. What we are dealing with are deeply rooted norms, and resistance to change in weaning patterns is more than individual ignorance and obstinacy on the part of mothers. It is a cultural mechanism basic to the identity of the adult and the cohesiveness of the group.

VI. DEVELOPMENT OF WOMEN'S ASSOCIATIONS, IN CITY, TOWN, AND VILLAGE

An intervention based on an improved weaning food combined with an education program is more likely to succeed and to have a longer-lasting impact beyond the individuals involved if it takes advantage of available village structures rather than focusing on individual mothers alone.

An influential association in Ouagadougou is the "Association des Veuves," elder women who command respect and are sometimes involved in enrepreneurial activities of various kinds. These woman can play the role of "influentials" who can motivate a change in behavior which younger mothers would not dare to risk on their own for fear of disapproval. Similar types of women's associations are important in weaning food projects in many countries, as for example in Indonesia, and one might recommend that Save the Children explore the possibility of developing women's groups in project towns and villages in Upper Volta. Similar women's groups exist in Mali in the neighboring Sahel, for instance, and a branch of the "Association des Veuves" does exist in Dori, although it has not been especially active. A starting point for such an initiative in the Dori project area might be to make contact with the responsible members of the Ouagadougou group

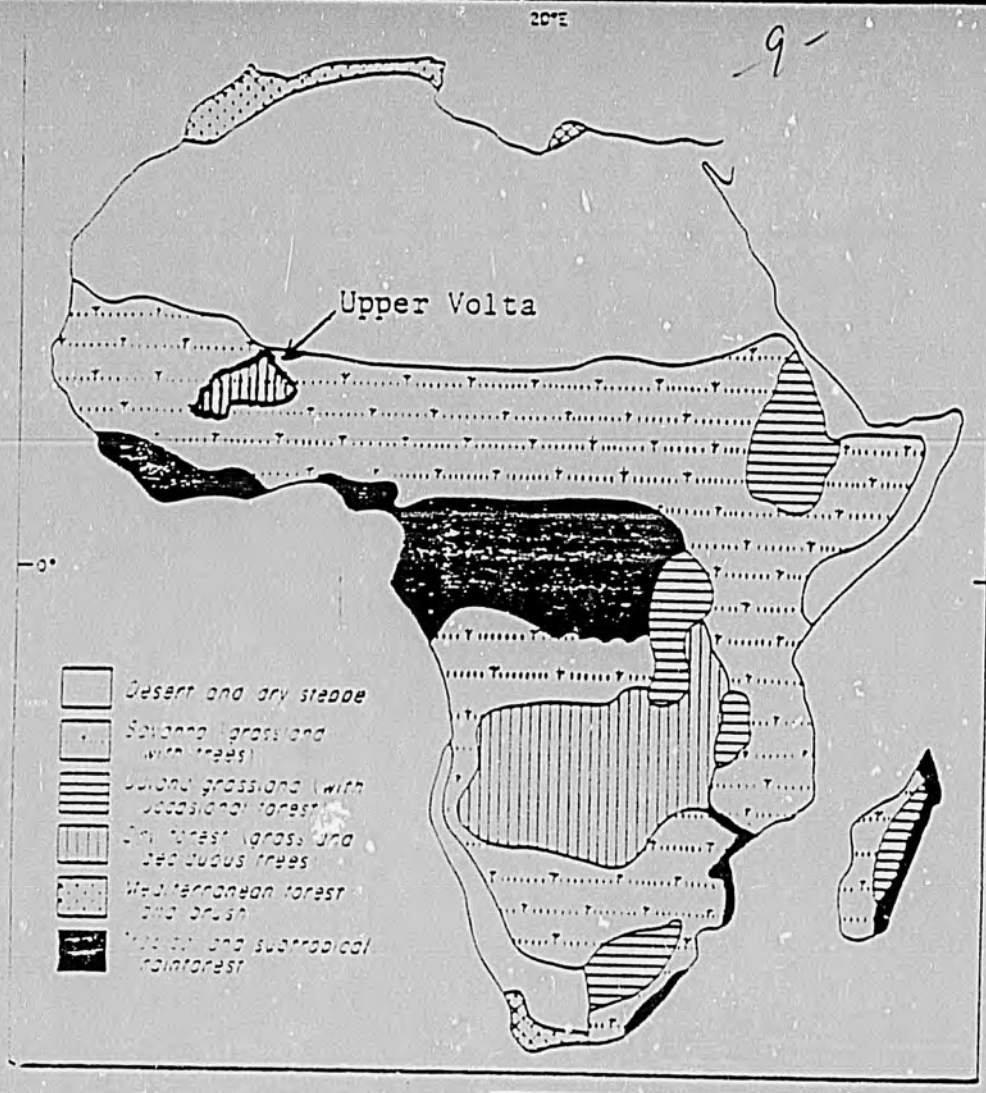


FIGURE 1 -- Major Vegetation Zones in Africa

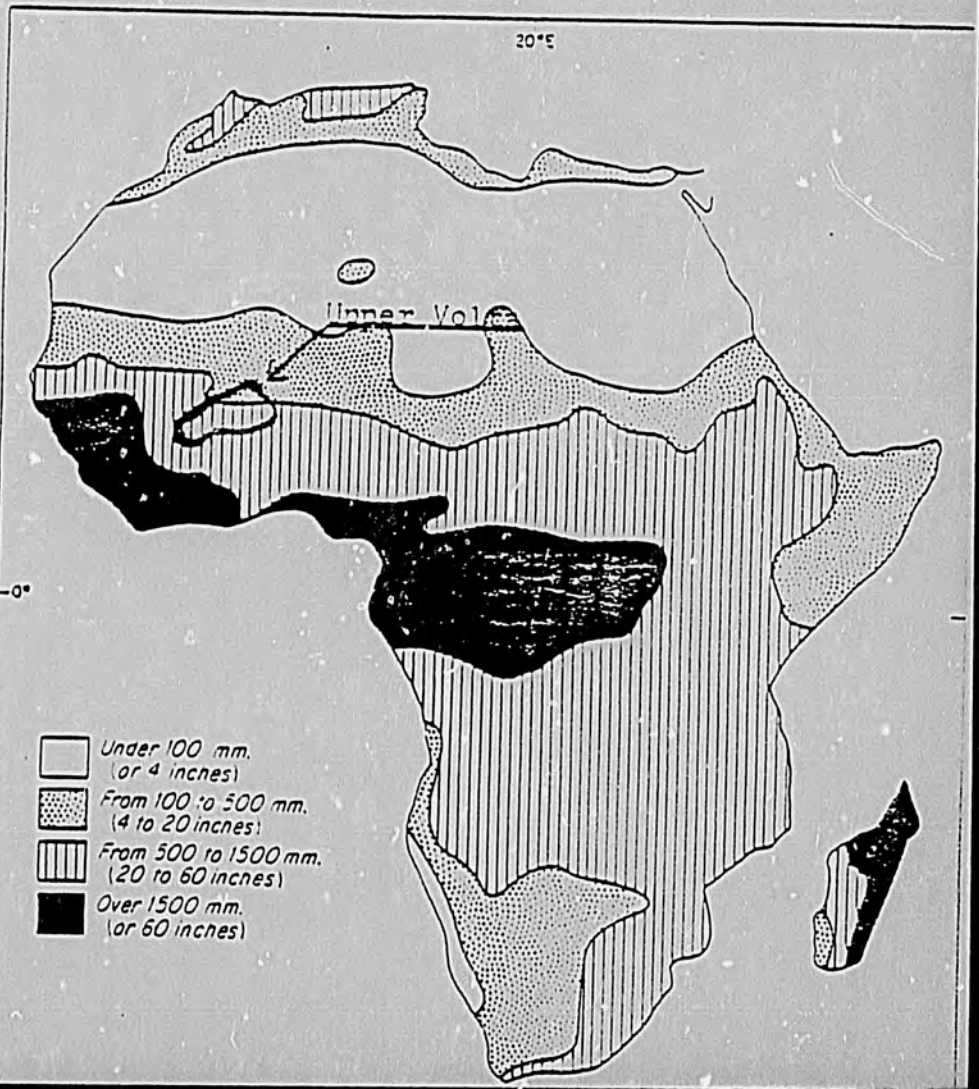
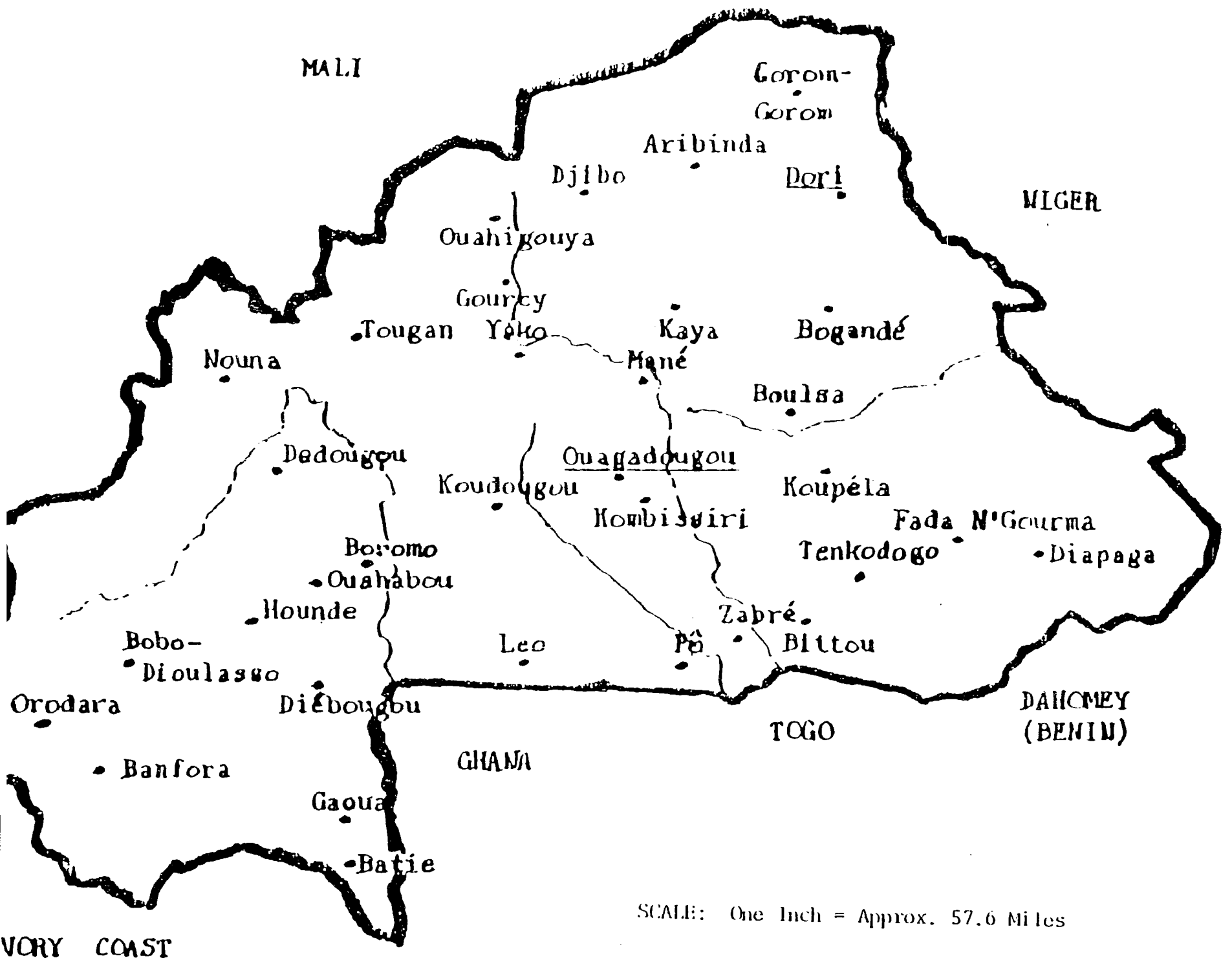


FIGURE 2 -- Mean Annual Rainfall in Africa

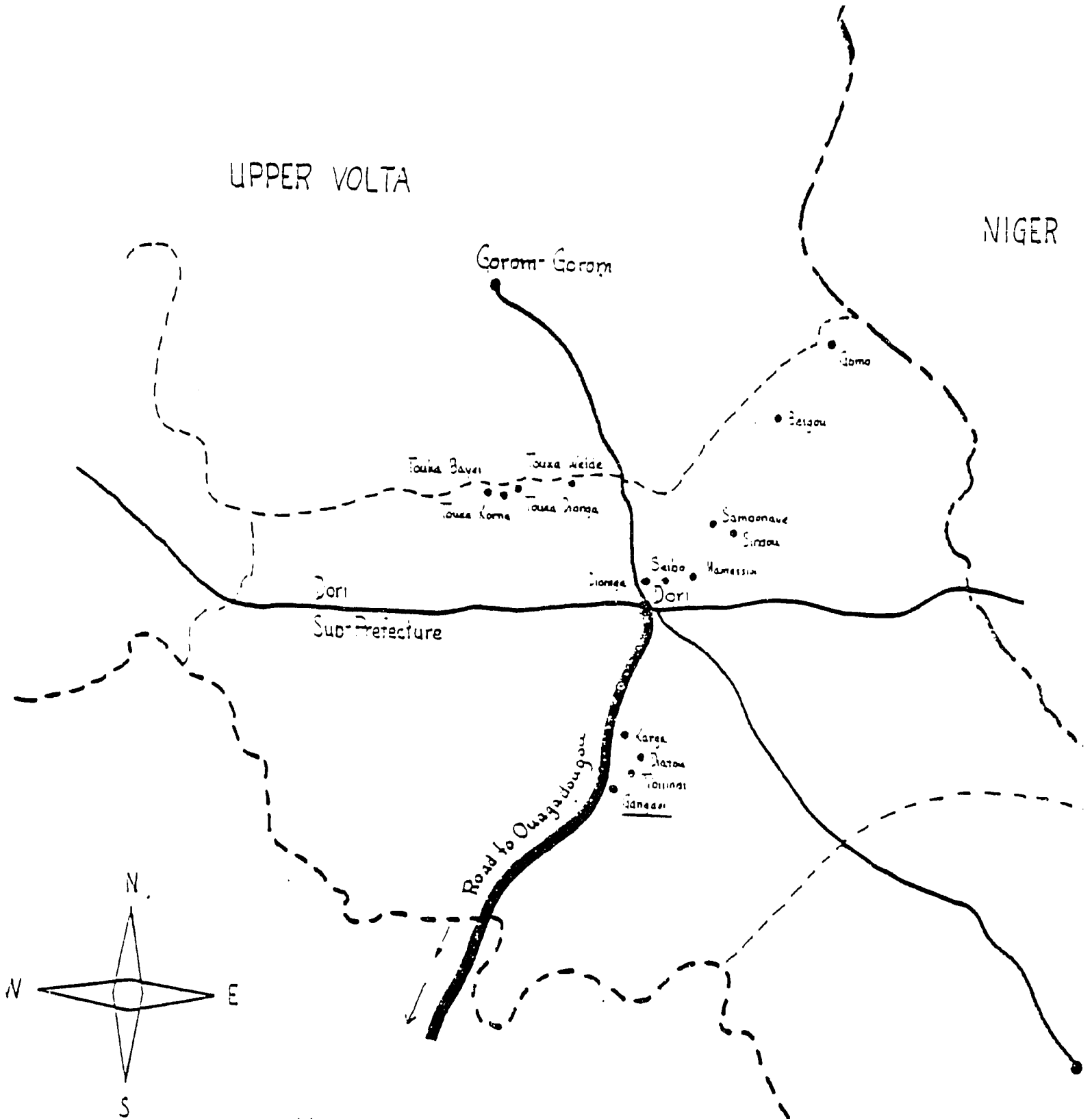
(Source: G. P. Murdock)



SCALE: One Inch = Approx. 57.6 Miles

FIGURE 5 -- Map of Upper Volta, Showing Dori in Relation to Capital, Ouagadougou

FIGURE 1 -- Map of Project Areas Around Dori and Gangaol



Villages in the Dori Project
Dori Sub-Prefecture

and a carefully worked-out strategy might then be discussed and perfected with association members at the regional and village level.

During the season when most women are in the fields, weaning-age children left in the village with caretakers suffer most. One or two individuals per village could be trained to make sure that all such children are given proper attention and are fed at regular intervals. Such women might be given some compensation, along with necessary instructions on how and how often to prepare a porridge.

Such an activity should be readily accepted by all - because it would make life more convenient, help children and provide a small profit and employment for a few individuals. It would also be of great help to women farmers in allowing them to produce more in their fields and with fewer pressures.

A further activity to assist women should take account of the fact that women in the area are considered to hold inferior fields and are also considered to be less efficient producers. Their fields are more liable to be attacked by insects since the women use fewer or no insecticides. Over 40 strains of pests in the area menace millet and peanuts, but less resistant strains are still favored because they need less water.

In order to give women a better chance, they should be given better incentives and special help. Such assistance should concentrate on problems of transportation (women's fields are often at a greater distance from the village)

and of child-care. Weaning issues could profit from an attempt to deal with these larger issues of food-raising and child-caring.

VII. DEVELOPMENT OF ALTERNATIVE WEANING FOODS

Because of the decline in the availability of cow's milk, and the absence of traditional food supplements for children prior to the age of abrupt weaning, Save the Children requested assistance in the identification of new food mixtures made up from available vegetable sources in the area, and analysis of the nutrient content of these mixes.

N'diomga Village, as seen from the air.

(1) Millet and Groundnut Mixtures. Since these are combinations of a cereal and a legume and hence have the potential for a good amino acid balance, a number of such mixtures were analyzed ranging from a millet:groundnut ratio of 90:10 to a ratio of 50:50. In none of these mixtures did millet and groundnut complement each other very well. The protein level of groundnut, however, is high, and if some of the mixtures are found to be palatable and acceptable to small children, they could be used to supply good quantities of utilizable protein despite relatively poor scores.

TABLE 1 -- Scores and Utilizable Protein (per 100 g.) Millet: Groundnut Mixture

Ratio (Millet: Groundnut)	Lysine [a]	Sulphur Amino Acids	Threonine	Protein (g.)	Utilizable Protein (g
90:10	50	77	80	15.4	7.7
80:20 [b]	54	71	74	17.3	9.3
70:30 [b]	56	66	70	21.0	11.8
60:40 [b]	57	63	68	24.9	14.2
50:50	58	61	66	28.7	16.7

[a] Lysine was the limiting amino acid throughout.

[b] Mixtures arbitrarily selected as suitable based on utilizable protein.

(2) Millet and Cowpea Mixtures. These too are combinations of a cereal and a legume. Cowpea has much lower protein than groundnut, but complements millet much better, and hence mixtures with a lower proportion of the legume have nutrient values comparable to the nutrient values of the groundnut mixtures analyzed above. This is important because lower legume concentrations are likely to be more easily digested by the young child.

TABLE 2 -- Scores and Utilizable Protein (per 100 g.) Millet: Cowpea Mixtures

Ratio (Millet: Cowpea)	Lysine	Sulphur Amino Acids	Threonine	Protein (g.)	Utilizable Protein (g.)
90:10	59[a]	83	91	11.1	6.5
80:20	71[a]	79	93	12.6	8.9
75:25[b]	76[a]	77[a]	93	13.4	10.2
70:30[b]	80	75[a]	94	14.1	11.3

[a] Limiting amino acid.

[b] Mixtures arbitrarily selected as suitable based on adequate score and final level of utilizable protein.

(3) Millet with Groundnut or Cowpea and Soured Milk. Milk when available improves all mixtures dramatically! Quantities shown in Table 3 below are for dried skim milk (36% protein). Quantities should be adjusted pro rata for liquid milks according to protein content, for example ten times the quantity for liquid whole milk (3.5% protein) or three times the quantity for a yoghurt equivalent at 12% protein. Field workers should not overlook the fact that canned dried milks of commercial or subsidized origin may be available in towns like Dori, though not at the village level.

TABLE 3 -- Scores and Utilizable Protein (per 100 g.) Mixtures with Milk (DSM)

Ratio (Millet: Groundnut:Milk)	Lysine	Sulphur Amino Acids	Threonine	Protein (g.)	Utilizable Protein (g.
90:5:5	65 [a]	86	85	12.8	8.3
80:10:10 [b]	78 [a]	84	84	16.0	12.5
80:15:5 [b]	65 [a]	77	79	16.6	10.8
Ratio (Millet: Cowpea:Milk)					
80:10:10 [b]	90 [a]	91 [a]	94	13.8	12.4
80:15:5 [b]	81 [a]	85	93	13.1	10.6

[a] Limiting amino acid.

[b] Mixtures arbitrarily selected as suitable based on adequate score and final level of utilizable protein.

(4) Millet/Cowpea Mix with Okra/Gombo: The addition of dried okra/gombo to the millet/cowpea mixture does not add greatly to nutritional value, but has other things to recommend it. The gombo can replace some cowpea nad improve acceptability to the child. The 70:20:10 mixture, for example (millet:cowpea: gombo), has one of the lower cowpea contents of any of the mixtures deemed acceptable (see Table 4), and as stated above, the lower the bean content the more acceptable the taste and digestibility of the mixture. The only other acceptable mixtures containing this low a bean content are those which also contain milk. (NOTE: the term "cowpea" applies to a family of beans first domesticated and widely grown throughout the Sahel, including the widely known black-eyed bean and more than two dozen other varieties in different colors including white, red, and brown).

TABLE 4 --Scores and Utilizable Protein (per 100 g.)Millet/Cowpea with Okra/Gombo

Ratio (Millet: Cowpea:Gombo)	Lysine	Sulphur Amino Acids	Threonine	Protein (g.)	Utilizable Protein (g.)
75:15:10	68[a]	77	91	12.4	8.4
75:10:15	63[a]	77	89	11.8	7.4
70:15:15	69[a]	75	90	12.6	8.7
70:20:10[b]	73[a]	75[a]	91	13.1	9.5

[a] Limiting amino acid.

[b] Arbitrarily selected as suitable mixture, based on adequate score, utilizable protein, and other considerations (see text).

(5) Millet/Groundnut/Cowpea Mixtures. Some of these combinations involving 30 percent or less of legume might also be acceptable to the child, and figures are given in Table 5. A 60:10:30 mixture (millet:groundnut: cowpea) has a high level of utilizable protein; because the legume content is also high, this mixture would have to be field tested for taste and tolerance.

Other data for the four foods analyzed are given in Tables 6 and 7 below.

TABLE 5 -- Scores and Utilizable Protien (per 100 g.), Millet/Groundnut/Cowpea

Ratio (Millet: Groundnut:Cowpea)	Lysine	Sulphur Amino Acids	Threonine	Protein (g.)	Utilizable Protein (g.
60:10:30[b]	77	69[a]	85	17.9	12.4
70:5:25[b]	75	73[a]	88	15.3	11.1
70:10:20	62[a]	69	76	18.8	11.6
70:15:15[b]	66[a]	70	79	17.6	11.6
75:20:5	58[a]	70	75	18.1	10.5
75:15:10	62[a]	71	79	16.8	10.4
75:10:15[b]	66[a]	73	83	15.7	10.4
80:10:10	61[a]	74	82	14.9	9.1
80:5:15	66[a]	76	87	13.8	9.1
85:5:10	60[a]	78	86	13.0	7.8

[a] Limiting amino acid.

[b] Arbitrarily selected as suitable mixture based on adequate score, final level of utilizable protein, and other factors (see discussion in Section VIII, "The Doughnut Proposal."

TABLE 6 -- Protein Content and Amino Acid Composition of Analyzed Foods

Protein Content	Millet (Flour)	Okra/Gombo (Flour)	Groundnut (Peanut Sticks)	Cowpeas (Whole)
Nitrogen (G. / 100g.)	1.53	2.36	7.67	3.95
Protein = N x 6.25 (g. / 100 g.)	9.56	14.75	47.94	24.69
Moisture (g. / 100 g.)	11.82	11.07	6.84	9.33
Amino Acid Composition				
Aspartic Acid	481	832	714	735
Threonine	224	198	154	244
Serine	282	212	291	306
Glutanic Acid	1156	1084	1209	1067
Proline	366	284	269	227
Glycine	190	208	344	240
Alanine	487	263	241	264
½ - Cystine	74	51	64	58
Valine	336	249	250	306
Methionine	123	66	58	79
Isoleucine	265	194	207	264
Leucine	666	304	406	482
Tyrosine	208	142	264	215
Phenylalanine	315	190	321	349
Lysine	151	240	208	382
Histidine	125	124	167	147
Ammonia	195	254	175	179

TABLE 6 continued

Protein Content	Millet (Flour)	Okra/Gombo (Flour)	Groundnut (Peanut Sticks)	Cowpeas (Whole)
Arginine	180	191	873	382
Total N Recovery (mg)	974	829	1047	930
Tryptophan (separate hydrolysis)	100	50	64	70

TABLE 7 -- Protein Quality Scores for Analyzed Foods

	Millet	Okra	Groundnut	Cowpea
Histidine	1.17	1.17	1.57	1.39
Isoleucine	1.06	0.78	0.83	1.06
Leucine	1.51	0.69	0.92	1.09
Lysine	0.44[b]	0.71	0.61	1.12
Total Sulphur Amino Acids (SAA)[b]	0.90 (1.23)	0.53[b] (0.73)	0.55[b] (0.76)	0.62[b] (0.86)
Total Anon	1.38	0.87	1.54	1.48
Threonine	0.90	0.79	0.62	0.98
Tryptophan	1.66	0.83	1.07	1.17
Valine	1.08	0.80	0.81	0.99

a
Low scores may be partially due to the presence of a higher than normal non-protein nitrogen. Scores would increase by about 20 percent if okra data were expressed in relation to total amino acids rather than to total N.

b
Limiting amino acid.

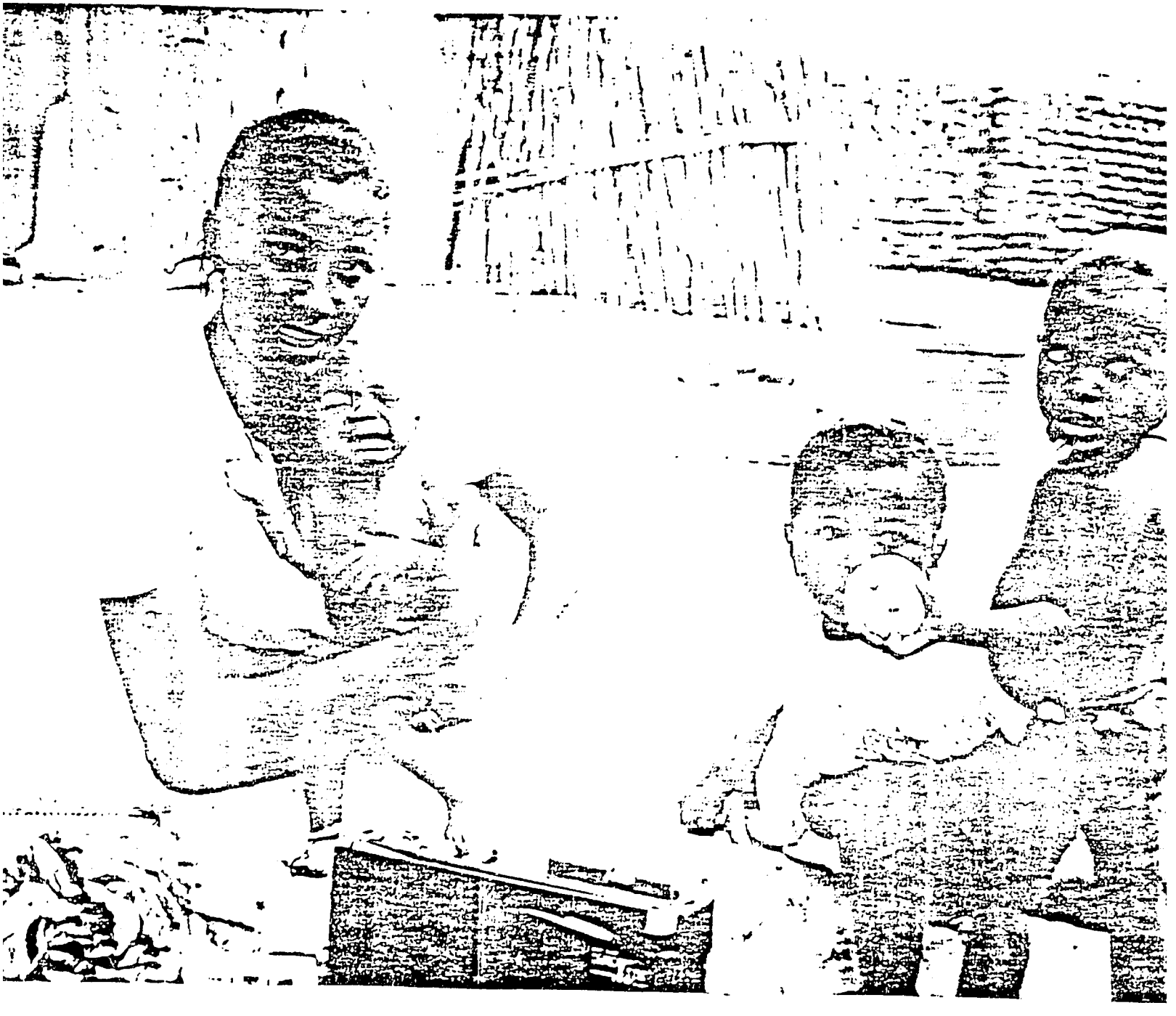
c
Values in brackets for SAA are using the probable 1983 scoring pattern, which will change from 220 mg./g.N to 160 mg./g/N, thus increasing all SAA scores by a factor of about 35 percent.

(6) Quantities of Various Mixtures Required at Different Age and Weight Levels. Approximate daily protein and energy requirements for children at different age levels, -- at 6, 12, 18, and 24 months, -- are given in Table 8. Protein requirements are in the form of utilizable protein, and calculations are made on a dry weight basis. Comparison of the material in Tables 1-5 with Table 8 can indicate how 100 g. quantities (dry weight) of various mixtures will meet children's protein needs. When ingredients are mixed with water or cooked, volumes and weights will be considerably greater and many mixtures may not be acceptable because of bulk. It is difficult to estimate these altered values. No calculations have been made concerning needs of nutrients other than protein.

TABLE 8 -- Daily Protein and Energy Requirements at Different age/weight Levels

Age (Months)	Weight (kg.)	Utilizable Protein (g.)	Kcal
6	7.4	12.6	815
12	9.9	13.4	1020
18	11.3	14.0	1150
24	12.5	15.0	1250

Source: FAO/WHO 1973.



Adiza, Save the Children social worker, with nine-month-old child from N'diomga village, her daughter Bintu, aged 16 months, and another child aged 12 months.

VIII. THE DOUGHNUT PROPOSAL

As another strategy for providing a supplementary weaning food in addition to mother's milk, the following proposal is not designed to solve all weaning age nutritional problems, but rather is a pragmatic approach to take advantage of available resources, including market mechanisms and locally accepted food preferences.

This proposal if implemented would have the strong support of certain key project principals, namely the women of the villages. The doughnut intervention if fully implemented can provide significant benefits for the village child during a period of high nutritional risk.

Details of the proposal briefly are as follows:

Most of the people of Dori and surrounding villages love to eat locally prepared doughnuts, or more accurately "doughnut holes" -- round fried balls made in the manner of a doughnut. In this case, they are made of fried millet flour. When possible, the people like these mixed with ground peanuts and sugar (if available).

Such doughnuts are given to children by mothers who carry the infants on their backs. This keeps these children from crying and has obvious nutritional benefits. The doughnuts are produced by women in Dori and are an example of penny capitalism. They are not at present available in the villages, but would be most welcome.

The doughnuts could be nutritionally improved if they were composed of recipes reflecting the above analysis, plus sugar, and oil. They could also be soaked in milk, when available, or boiled in water with herbs to make them softer for very young infants. Some local herbs are thought by mothers to be beneficial.

Various nutritional values for different combinations of millet, groundnut and cowpea are given in Table 5. The protein value alone would not change greatly by frying. Protein-calorie value would of course be affected in view of the calories in frying oil. Because of the high protein level of the groundnut, some of the triple mixes may be more valuable nutritionally and would have better taste than the double mixes.

In the event that a women's group becomes active in making and selling doughnuts, it is likely that such an activity would have to arise through the vehicle of some initial credit, possibly extended via the Save the Children project. This is considered sound practice in capitalist economies and is the model followed in the development of grain banks in Upper Volta. Because of the present shortage of peanuts and cowpeas in Dori as well as in the villages, Save the Children could assist by importing these ingredients and selling them to women's groups at the same prices as locally grown products. This would mean that Save the Children would absorb the transportation costs from the south. Women would be encouraged through the Save the Children agriculture Sector Chief to plant cowpeas and peanuts for the following year. The women could be given seed, credit, and encouragement.

Very poor mothers in the community might be provided doughnuts at a reduced cost, or free. These doughnuts might be purchased by Save the Children from the Widow's Association, a step which would help to establish the Association in business, which would also help the "at risk" mothers. The Widow's Association would then have an interest in seeing that every family with a weaning age child is supplied with doughnuts on a daily basis.

Through the efforts of the women's groups and Save the Children staff such as health assistants, the vital component of a nutritional surveillance system could be initiated. How ambitious such a surveillance system might be would have to be worked out. The continuous monitoring of children who enter and remain in the feeding project, the recruiting of increasing numbers of children to the project, and (where measuring instruments such as scales or armbands are available) the periodic weighing or measuring of these children and the recording of these measurements in order to monitor the impact of the project, are of the utmost importance.

IX. SOME GENERAL OBSERVATIONS

The same marketing strategy outlined above might be used to introduce and promote the sale of pre-ground and mixed flours. Small hand grinders might be provided for groups of women, as a technical assistance input. Where feasible, it should be noted, small mechanical grinders have been found to have a more beneficial impact in similar projects in other regions of the world, and these should be considered where fuel or electricity are available.

It is not advisable to focus on a single strategy in seeking to improve the nutritional status of weaning age children. Where feasible, a number of different approaches should be instituted which together might have an impact.

The following are some general observations about the implementation of a weaning food strategy in this area.

(1) Is a Nutrition Status Survey Necessary? Such a step is usually recommended in advance of any large-scale intervention. In the Dori area, however, one is compelled to make the observation that limited financial and manpower resources might better be devoted to implementa ion of a project, which would have a built-in ongoing monitoring component. Given the climatic and agricultural picture of the previous decade, the visible food shortages, and the visible levels of morbidity and mortality in all age levels including weaning age children, one would seem justified in assuming a serious nutritional problem during the weaning period and in proceeding with an intervention based on this assumption.

(2) Focus on a Community Rather Than an Individual Approach. The pattern of "abrupt" weaning and associated trauma described earlier in this report is the result of pragmatic responses to severe environmental conditions; but this rigorous practice also represents a deeply-rooted cultural mechanism similar to the rites of passage ordeals of many African societies. These ordeals are designed to instruct young members of the group in respect for and obedience to adult authority. It is naive to think that parents will give up such important traditions in response to "education" or "nutritional instruction." This paper has made the strong recommendation, instead, for an approach to development problems generally, including the problems of weaning period malnutrition, through a group approach involving existing community groups such as mothers' groups and the Widow's Association. The latter group, as noted, is already involved in the weaning process since its members are frequently the alternate caretakers in whose hands the weaned child is placed.

(3) Focus on Income-Generating Activities. Approaches of this type fit well the Save the Children Philosophy as well as the needs of the Sahel in general, and have been recommended in this report. The Widow's Association has expressed the strong wish to take part in such activities.

(4) The Income-Generation Model Assists Targetting to Children At Greatest Risk. If Save the Children or another donor in the area or a local government agency wishes to target weaning foods to children at special risk, then an income-generating activity such as the proposed doughnut project provides a mechanism. The doughnuts or other foods prepared for sale by the mothers' groups can be provided free or at a subsidy to the "at risk" children, after purchase from the entrepreneurial group. Such activity has the dual effect of assisting the most needy children and of motivating the entrepreneurial group to help in identifying such children.

(5) Save the Children Organizational Focus. The recommendation is made that a revised organizational focus may be required by Save the Children in this project area. This might consist of a person in charge of nutrition who has a special focus on the weaning period problem, and an inter-sectoral planning committee which has responsibilities in agriculture, health, and social development. The weaning period problem has provided a focus for projects elsewhere in the world around which larger development intiatives have subsequently been created.

(6) Dori Nutritional Interventions as a Guide to Projects in Other Parts of the Sahel. Two of the oldest pastoral and agricultural ethnic groups in the Sahel are represented in the Dori Area. The problem of years-long food shortages as a result of the drought are severe, here as in other parts of the Sahel. The need to reinforce local initiatives and to put together a number of

new techniques to make better use of scarce resources is acutely felt here. Food shortages have become an annual problem. A series of weaning food interventions in the Dori area could serve as models for interventions in other parts of this troubled area of the world.

Boy selling Millet Doughnuts in Dori.

Village Elder with Children (above). Widow's Association, Ouagadougou (below).