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## **A communication on health and development in the Kainji Lake area of Nigeria**

E. O. ADEKOLU-JOHN

### **Summary**

A study of the health care delivery facilities in the Kainji Lake area of Nigeria (an artificial lake created in 1968) showed that hospitals, a health centre, maternal and child health centres, public health units, dispensaries and leper institutions, controlled by various organizations, are available. Dispensaries and leper settlements/clinics form the most numerous health providers in the rural areas. Analysis of 1973 data from eight dispensaries around Lake Kainji showed that malaria, gastroenteritis, chest and skin infections, venereal diseases and schistosomiasis constitute the major health problems. Observations of the environmental sanitation in the study area by the author support the idea that the diseases emanate particularly from the low standard of environmental health. A suggestion is made for the establishment of a central organization charged with the responsibilities for health planning and development. The evaluation of the impact of the dispensaries as health providers is needed for future health planning. A health care delivery system supported by operational research should be initiated at the village level.

*Key words:* community medicine; Nigeria; artificial lakes; disease patterns.

### **Introduction**

Several health workers have reported on aspects of the health problems of Kainji Lake area since the creation of the lake in 1968. These reports (which are classified or restricted WHO documents) are on control of simulium in River Niger and its tributaries, human helminthic infections in preselected villages around the lake and general observation on status of onchocerciasis, trypanosomiasis, malaria, schistosomiasis, cholera, cerebrospinal meningitis and small-

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pox. This paper examines the various health facilities, relates the major health problems to the environment in Kainji Lake area and proposes a rationale for health planning.

### **General features of the lake area**

The Kainji Lake is situated between latitudes 9° 50' and 10° 57' North, and longitudes 4° 25' and 4° 45' East. The general characteristics of the lake have been presented by Adeniji (1975), the detailed geology of the lake basin by Nedeco and Balfour Beatty (1961), and the climate at different stations by Imevbore (1970).

There are local streams and rivers which empty into the lake. On the west side the rivers include: Doro, Temo, Menai, Minni, Swashi and Kpan while River Malendo is the most important river on the eastern side. Below the dam, River Oli flows from the Republic of Benin into River Niger on the western side while River Kontagora empties on the eastern side.

Three types of villages could be distinguished: the *resettlement villages*, the *host villages*, and the *fishing villages*. The two towns (New Bussa and Yelwa) are resettlement towns.

The resettlement villages (139) and towns (2) housed 44,000 people displaced by the formation of Lake Kainji. 92.2% of the resettlement villages were houses built with cement and roofed with asbestos sheets that were provided for the people through building compensation scheme of the Resettlement Committee. The rest 7.8% were houses built by the people from cash compensation scheme (Olagunju, 1972).

The host villages are those not displaced by the lake. The villagers accepted the resettlement of the displaced people close to their farmland. The number of these host villages is continuously changing as there is a tendency among some people to leave an established village to set up new ones close to or far away from the original settlement villages.

The fishing villages are located close to the bank of the lake and are occupied by fishermen from all parts of the country and Republic of Benin. The population in the host and resettlement villages are indigenes and are classified into Bussawas, Hausawas, Kamberis, Larawas, Shangawas and Fulani tribes. The people practise both farming and fishing.

Access to most villages around the lake area are through footpaths, tracks or the lake itself. Along the western side one road was constructed from Wawa to Rofia to replace the one inundated by the lake. No road was made along the eastern side during the formation of the lake, but there are some roads and tracks, which are impassable during the rainy seasons.

Politically, the area around Kainji Lake is divided among three emirates (an emirate is a defined political area, usually headed by a traditional Fulani chief who wields political and cultural power among the people). The Borgu

emirate lies on the western side, the Yauri is on the upper two thirds of the eastern side and the Kontagora emirate lies on the remaining portion of the eastern side of the lake. Prior to 1967, these emirates were under the Northern Regional Government. With the creation of more States in 1967 and 1976 respectively, these emirates now come under three different states with headquarters located far from the area.

## Method

A visit to all health institutions located close to the Kainji Lake area was made by the author from February to May 1974, to determine the number, categories and sponsoring organizations of the health facilities. The data on diseases reported in the dispensaries visited were collected for the year 1973. Each dispensary is headed by a dispensary assistant who attends to all cases reporting in the dispensary. Each disease is diagnosed purely from symptomatic presentation by the patients reporting in the dispensary as there are no laboratory and radiological facilities for conducting further investigations. Only eight out of the eleven dispensaries kept consistent disease reports throughout the months of 1973. The dispensary at Rofia was still being built and not opened to utilization. The dispensaries at Sabonpeggi and Auna had no consistent collection of data because of the difficulties experienced by the local authorities to post dispensary assistants to these locations. The dispensary data so collected were later analysed to bring out the common diseases. An assessment of the state of environmental health facilities and level of sanitation in villages close to the lake area was also made through personal observation of the author. The utilization of the lake as a transport system was also taken into consideration.

## Results

### *Health care delivery facilities*

Table 1 shows the categories, number and sponsoring organizations of the health care delivery facilities around Lake Kainji for 1976. Altogether there are 47 health institutions of which leper settlements/clinics and dispensaries constitute 38.3% and 27.7% respectively. On a divisional basis the largest proportion of each category of health facility is located in Borgu division except for the health centre, located in Yauri division. It is noteworthy that the only health care facilities in the Kontagora divisional area are two dispensaries and one leper institution. The differential divisional distribution of the health facilities is reflected in Fig. 1. Further analysis showed that the local authority sponsored the largest proportion (70.2%) of the health facilities, with the majority being dispensaries and leper institutions.

### *Dispensary reports*

Table 2 shows the distribution for 1973 for commonly reported diseases from eight dispensaries located around the lake. More cases are reported in the towns of New Bussa and Yelwa. The commonest diseases are malaria, gastroenteritis, chest infections, venereal diseases, skin infections and schistosomiasis. Diseases like trachoma and yaws are localized to New Bussa with few cases of

Table 1. Health care facilities, divisional locations and sponsoring organizations in areas close to the lake

| Type of health institution and divisional location | No.       | NEPA       | KW         | SOK        | NG       | KLRI       | MISS       | LA          | Total     | % Health Unit/Division | % total    |
|--|-----------|------------|------------|------------|----------|------------|------------|-------------|-----------|------------------------|------------|
| <b>Hospitals:</b>                                  |           |            |            |            |          |            |            |             |           |                        |            |
| Borgu .....  | 2         | 1          | 1          |            |          |            |            |             |           | 4.3                    |            |
| Yauri .....  | 1         |            |            | 1          |          |            |            |             | 3         | 2.1                    | 6.4        |
| Kontagora .....                                    |           |            |            |            |          |            |            |             |           |                        |            |
| <b>Health Centre:</b>                              |           |            |            |            |          |            |            |             |           |                        |            |
| Borgu .....  |           |            |            |            |          |            |            |             |           |                        |            |
| Yauri .....  | 1         |            |            | 1          |          |            |            |             | 1         | 2.1                    | 2.1        |
| Kontagora .....                                    |           |            |            |            |          |            |            |             |           |                        |            |
| <b>Maternal and Child Health Centres:</b>          |           |            |            |            |          |            |            |             |           |                        |            |
| Borgu .....  | 5         | 1          |            |            |          |            | 2          | 2           | 6         | 10.6                   |            |
| Yauri .....  | 1         |            |            | 1          |          |            |            |             | 6         | 2.1                    | 12.7       |
| Kontagora .....                                    |           |            |            |            |          |            |            |             |           |                        |            |
| <b>Public Health Units:</b>                        |           |            |            |            |          |            |            |             |           |                        |            |
| Borgu .....  | 4         | 1          | 1          |            |          | 1          |            | 1           | 6         | 8.5                    |            |
| Yauri .....  | 2         |            |            | 1          |          |            |            | 1           | 6         | 4.3                    | 12.8       |
| Kontagora .....                                    |           |            |            |            |          |            |            |             |           |                        |            |
| <b>Dispensaries:</b>                               |           |            |            |            |          |            |            |             |           |                        |            |
| Borgu .....  | 7         |            |            |            |          |            | 1          | 6           | 13        | 14.9                   |            |
| Yauri .....  | 4         |            |            |            |          |            |            | 4           | 13        | 8.5                    | 27.7       |
| Kontagora .....                                    | 2         |            |            |            |          |            |            | 2           | 6         | 4.3                    |            |
| <b>Leper Settlements/Clinics:</b>                  |           |            |            |            |          |            |            |             |           |                        |            |
| Borgu .....  | 12        |            |            |            |          |            | 1          | 11          | 23        | 25.5                   |            |
| Yauri .....  | 5         |            |            |            |          |            |            | 5           | 18        | 10.6                   | 38.3       |
| Kontagora .....                                    | 1         |            |            |            |          |            |            | 1           | 6         | 2.1                    |            |
| <b>Total .....</b>                                 | <b>47</b> | <b>3</b>   | <b>2</b>   | <b>4</b>   | <b>0</b> | <b>1</b>   | <b>4</b>   | <b>33</b>   | <b>47</b> |                        |            |
| <b>Total % (approximate) .....</b>                 |           | <b>6.4</b> | <b>4.3</b> | <b>8.5</b> | <b>0</b> | <b>2.1</b> | <b>8.5</b> | <b>70.2</b> |           | <b>100</b>             | <b>100</b> |

*Abbreviations:* NEPA = National Electric Power Authority, KW = Kwara State, SOK = Sokoto State, NG = Niger State, KLRI = Kainji Lake Research Institute, MISS = Missionaries, LA = Local Authority

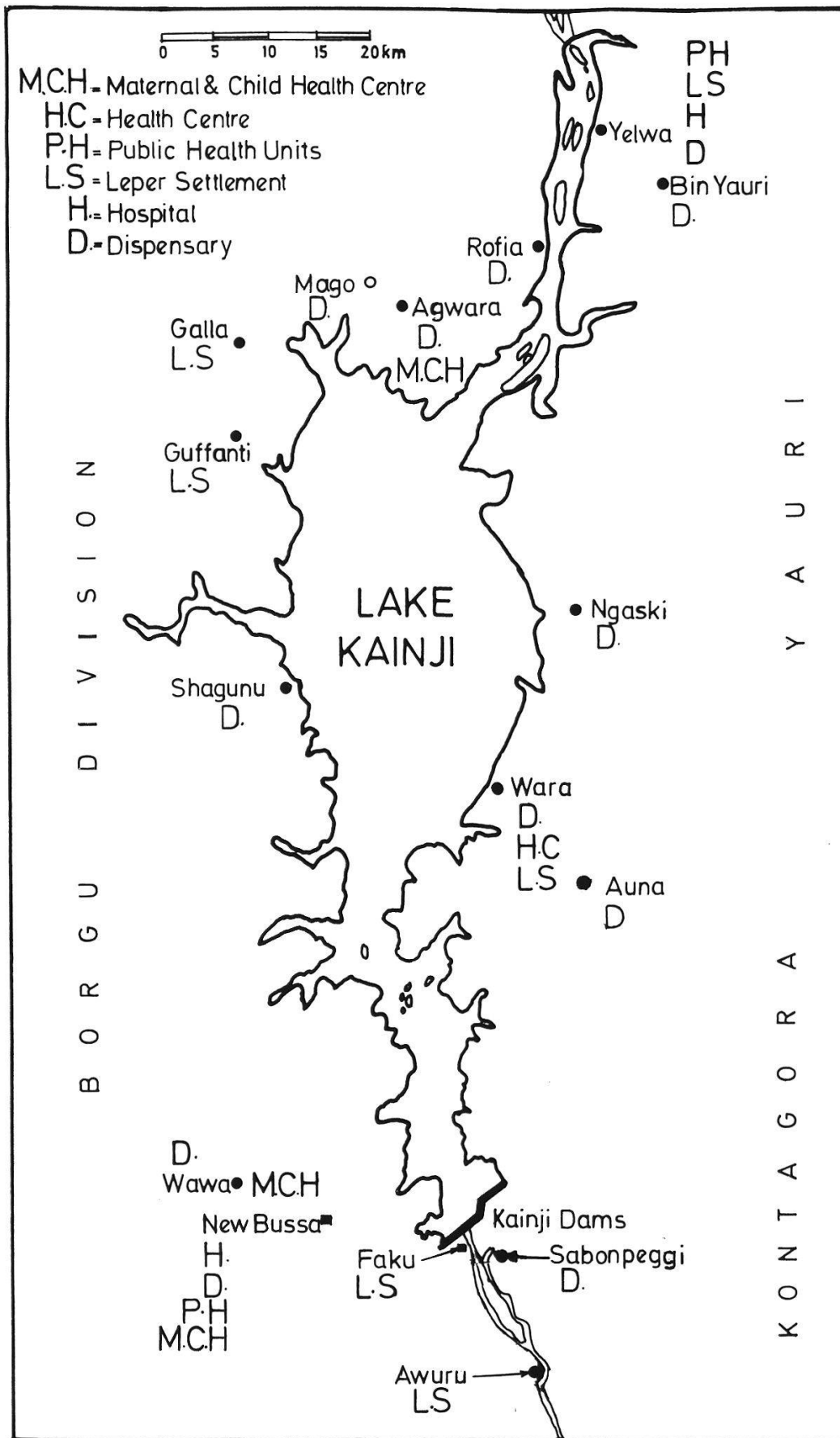


Fig. 1. Health care delivery facilities in Kainji Lake area, 1976.

Table 2. Dispensary reports in eight villages for 1973

| Diseases         | Location of dispensaries |        |        |       |        |       |       |           | Total  |
|------------------|--------------------------|--------|--------|-------|--------|-------|-------|-----------|--------|
|                  | New Bussa                | Yelwa  | Ngaski | Wawa  | Agwara | Wara  | Mago  | Bin Yauri |        |
| Malaria          | 8,763                    | 6,489  | 2,009  | 1,387 | 1,360  | 982   | 412   | 423       | 21,825 |
| Gastroenteritis  | 5,099                    | 4,339  | 1,770  | 963   | 597    | 426   | 545   | 124       | 13,863 |
| Chest infections | 4,865                    | 1,959  | 1,182  | 680   | 701    | 353   | 409   | 116       | 10,265 |
| Gonorrhoea       | 1,002                    | 306    | 210    | 435   | 87     | 64    | 125   | -         | 2,229  |
| Skin diseases    | 1,272                    | 214    | 9      | 29    | 204    | 105   | 6     | -         | 1,839  |
| Schistosomiasis  | 372                      | 282    | 13     | 1     | 11     | 44    | 3     | -         | 726    |
| Ascariis         | 511                      | 11     | -      | 19    | 82     | -     | 7     | -         | 630    |
| Mumps            | 516                      | 15     | -      | 18    | 40     | 32    | -     | -         | 621    |
| Guineaworm       | 126                      | 50     | -      | -     | 7      | -     | 4     | 15        | 202    |
| Trachoma         | 124                      | -      | -      | -     | -      | -     | -     | -         | 124    |
| Yaws             | 85                       | -      | -      | 8     | -      | -     | 1     | -         | 94     |
| Others           | 1                        | 22     | -      | -     | 1      | 4     | -     | -         | 28     |
| Total            | 22,736                   | 13,687 | 5,193  | 3,540 | 3,090  | 2,010 | 1,512 | 678       | 52,446 |





Fig. 2. A typical traditional house, in fishing, host or cash compensation villages.

yaws in Wawa and Mago while guineaworm infestations are found in all locations except Ngaski, Wawa and Wara.

#### *Environment and environmental health facilities*

*Housing.* Fig. 2 shows a typical traditional house, found in either fishing, host or cash compensation villages. The walls are built either from mud, mixture of grass and mud or grass. Usually the roof is made from grass. There may or may not be windows. A group of houses is enclosed in a compound. Personal observations indicated that these houses are cool particularly during the hot months of January to early May and are highly ventilated.

Fig. 3 shows an urban or semi-urban type of housing found in most resettlement villages and designed by the architect for the resettlement authority as part of the building compensation scheme. Unlike in the traditional houses, the walls are built from sand-cement blocks and the roofs made from asbestos. These roofs are screwed to the walls leaving no room for air entry. There are windows, some of which are located close to the top of the roof. In urban areas (Yelwa and New Bussa) these houses are grouped into compounds separated by intervening walls made from concrete. Personal inspections revealed that these houses are poorly ventilated, humid and hot, particularly during the warmer



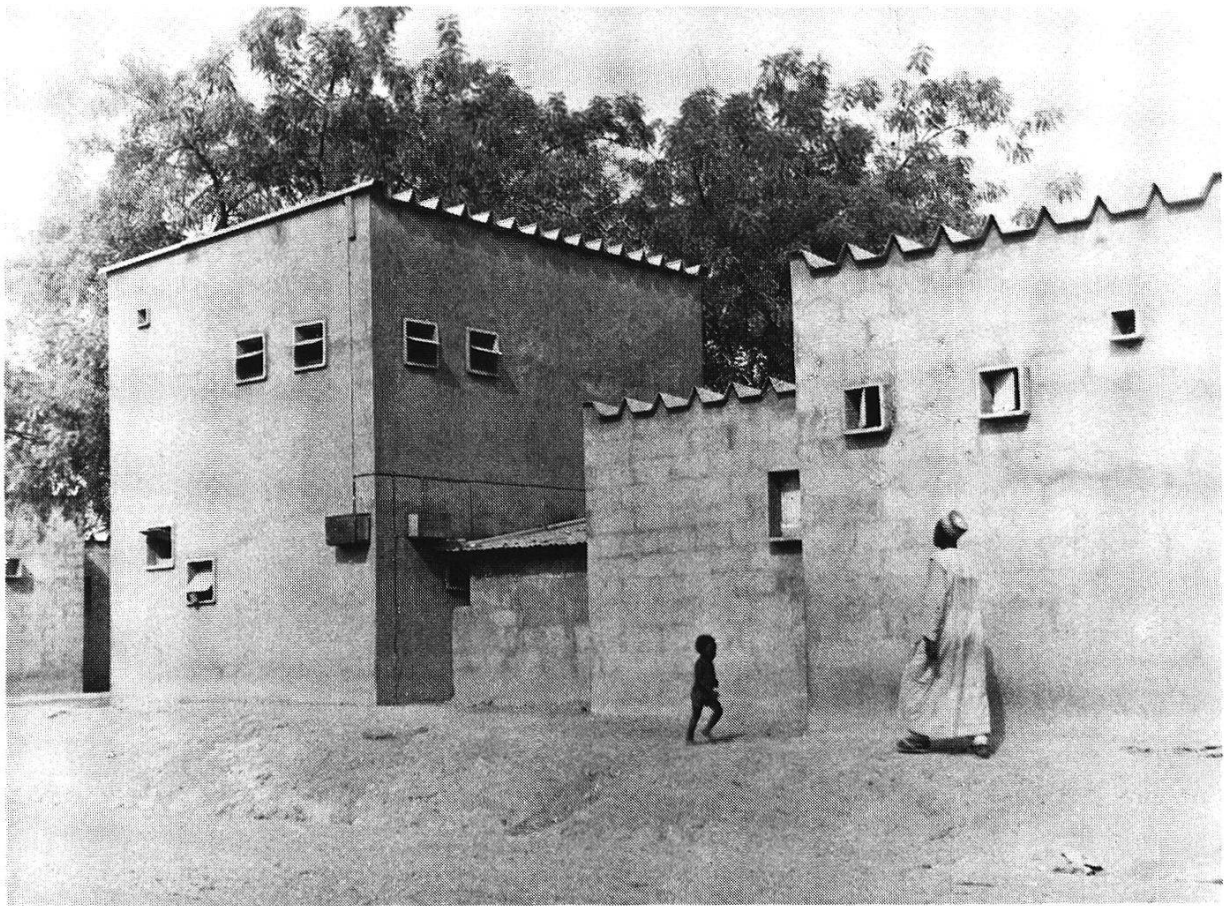


Fig. 3. A typical urban or semi-urban housing from the Building compensation scheme.

months of the year. In some villages they were deserted while in others the owners modified them by constructing larger windows.

*Water supply.* Yelwa and New Bussa towns are supplied with pipe borne water. In the villages people depend on wells, streams, water holes, spring and the lake for water supply. In some villages like Wawa, Agwara and Bin Yauri, earth dams are built across flood plains to form water reservoir during the rainy season for domestic use in the dry season.

*Waste disposal.* Facilities for disposal of solid wastes are few in most areas. In all the villages the facilities are not available. In Yelwa, incinerators and pit latrines are built in many places in the town. In New Bussa, there is only one incinerator but there are a few refuse collecting points. In each compound of resettlement houses in New Bussa there is aqua privy type of latrines. In general, there is indiscriminate disposal of waste products.

*Slaughter houses/slabs.* A slaughter house exists in Yelwa and New Bussa. In the villages, slaughter slabs are available but are few in number. Slaughtering of animals is in principle supervised by the official of the Veterinary Division of the Ministry of Agriculture and Natural Resources but, in practice, this supervision is limited to the big towns.

## Discussion

The Kainji Lake area, unlike the Volta Lake area in Ghana, was neither defined by act of parliament nor created under separate authority for developmental purposes. Early investigations into the resource potential of the River Niger prior to impoundment were therefore limited to hydroelectricity production, development of national and international navigation, possibility for expansion of agriculture and fishery production. It did not cover the provision of health facilities to the people affected by the creation of Lake Kainji. Consequently, between 1962 and 1970 (the period of physical resettlement), no additional health facilities were provided to take care of the increase in demand that could arise from this creation. Although a 110 bed hospital was built at New Bussa during construction of the dam, it was meant to serve the dam labour force. Presently, it has been taken over by the National Electric Power Authority for its staff and people of New Bussa district. The absence of an authority charged with the development of the Kainji Lake area has kept health planning and development to the State Governments, local authorities and private organizations whose interests are around Lake Kainji. This has resulted in uneven distribution of health facilities.

Besides the health facilities provided by the National Electric Power Authority (3), Missionaries (4), and Kainji Lake Research Institute (1) for specific objectives, the remaining 39 health facilities are provided by the State and local authorities (Table 1). It is usual occurrence that political considerations override all health and related issues in the provision of social and health facilities. The differential distribution of health facilities close to Kainji Lake should therefore be viewed as the relative political importance which respective State Governments and local authorities attach to different towns and villages close to Lake Kainji rather than being indicative of the health requirements of the region.

Although there are more health facilities located in the Borgu division, the location of these facilities, just as in other divisions, is such that they are not accessible to the majority of people, because of the distances from most villages to them.

Out of three hospitals in the area, the location of two hospitals at New Bussa, delivering identical services to the people in this town and leaving the health care of the rural areas to dispensaries, could have been avoided if health planning had been under a central organization. The provision of two well located health centres in the rural areas in place of the second hospital in New Bussa (which started operating in 1975) could have improved the quality of care of the people in general. In as much as the dispensaries continue to serve as the major health provider, with the attendant problems of inadequate support coupled with inaccessibility of the dispensaries for many villagers due to lack of good roads, so will the quality of health care to the people in the rural areas of Kainji Lake be at its lowest ebb. To improve the quality of health care, an evalu-

ation of the dispensaries as health providers is desirable in any future health planning in the region.

Dispensary reports (Table 2) show that malaria, gastroenteritis, chest and skin infections, gonorrhoea and schistosomiasis constitute major health problems. Further interpretation of these data should be made cautiously in view of the fact that some diseases reported in dispensaries might be from other villages where no facilities are available for treatment. For instance, personal observation and reports by Abolarin (1972) revealed that guineaworm was common in Ngaski and Wawa, but the dispensary data (Table 2) report presence of this disease in Yelwa and New Bussa which are close to these villages. This is because Yelwa and New Bussa provide facilities for the treatment of this disease. In view of the distortion in the disease pattern between what is reported and what exists there is urgent need for field surveys to establish the true pattern. Presently, the transmission of guineaworm infestations still goes on in Wawa, Ngaski and Bin Yauri where the people rely on localized ponds during the dry months of the year for their uses as compared to New Bussa and Yelwa with pipeborne water where the transmission of the disease stopped. Furthermore, the frequency of the diseases mentioned in Table 2 corresponds to the low standard of environmental health generally observed round Kainji Lake.

The climate of Kainji Lake region, described by Imevbore (1970), fits the hot dry climate of tropical lands as classified by Oluwande (1970). Here the daily and yearly ranges of temperature are high, humidity is low and the wind is strong and laden with dust. In this situation, sun and prevailing winds are the two important meteorological factors in the orientation of buildings. Oluwande (1970) contends that houses oriented along the north-south direction have walls exposed to the sun in the morning which consequently remain heated in the afternoon. In addition, such buildings will not benefit from the breeze coming from the southwest or the northeast. The houses in the building compensation scheme (Fig. 3) are not in a definite orientation. To this is coupled the non-porosity to air of the cement walls and the presence of few windows only. The houses that lie along the north-south direction will be hotter, poorly ventilated and, consequently, the level of carbon dioxide in the air will be higher than in those that lie along the east-west direction. The round houses found in the host and cash compensation houses (Fig. 2), beside being cool and ventilated, receive minimum trouble from the strong dusty wind of this region.

Eliseeva (1964) says that the presence of 0.1% carbon dioxide in the air is harmful to respiratory action and certain cerebral activities. It would be necessary to appreciate the impact of the resettlement houses on the health of the Kainji Lake area people using the level of carbon dioxide as an index.

The available environmental sanitation facilities in the region are meagre. In a survey conducted by the author and the officials from the Ministry of Health, Sokoto, on environmental sanitation facilities along the eastern side of the lake in 1975 (which covered 92 resettlement and 4 non-resettlement vil-



lages) no wells were available to the resettlement villages and those found in the non-resettlement villages were dried up. There were no waste disposal facilities. Only 12 villages of the resettlement could be considered clean to average standard but none among the non-resettlement villages.

The lack of comprehensive informations on the health problems around Kainji Lake before it was formed and difficulties involved in setting up a regular research into the public health problems around the lake after it was formed have made it difficult to appreciate the changes the lake has had on the health problems of the areas surrounding it. Presently, all that has been done on health studies are surveys to establish basic health figures on specific diseases to act as baseline for comparison in later years. However, the available reports on surveys conducted on schistosomiasis at lakeside communities (Yelwa, Shagunu, Rofia and Jinjima) and communities located at reasonable distance from the lake shore (Karabande and Dogongari) found *Schistosoma haematobium* and *S. mansoni* in all the communities examined, but at New Bussa (a town located about 15 kilometers away from the lake and with basic amenities like pipeborne water and aqua privy type of latrines) the prevalence and intensity of schistosomiasis were lower than in the lakeside communities. More particularly, no infection was found in children below the age of 3 years. Surveys conducted on human trypanosomiasis have not reported any case since the lake formation.

Personal observations have shown that, so far, the lake (136.8 km in length and 24 km in width) has been underutilized as a national and international waterway. The establishment of port health stations on the River Niger as it enters Nigeria from the Republic of Niger should receive attention in view of the trend among other countries bordering the river to develop it for navigation.

The present distribution, location and organization of health and environmental facilities fall far short of meeting the needs of the communities. There is a strong need for the establishment of an authority charged with responsibilities for health planning and development for the River Niger basin. In circumstances where most villages are inaccessible by road most of the year, a health care delivery system based on operational research in the communities should be initiated at the village level.

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