NIAKHAR DSS

SENÉGAL

INSTITUT DE RECHERCHE POUR LE DÉVELOPPEMENT
IRD

LOCATION OF NIKAHAR DSS SITE, SENEGAL: Monitored Population 29,000

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1. NIAKHAR DSS SITE DESCRIPTION

1.1 Physical Geography of the Niakhar DSS Area

The study zone of Niakhar is located in Senegal, at N 14º30' and W 16º30. It is located in the Department of Fatick, Region of Fatick (Sine-Saloum), 135 km East of Dakar. The Niakhar study zone is about 15 km long by 15 km wide and covers 230 square km. The climate is continental sudan-sahelian, with temperatures ranging from 24°C in December-January to 30°C in May-June. For thirty years the region has suffered from drought. Rainfall decreased from 808 mm per year for the period 1921-67 to 520 mm for 1968-87 and to 463 mm for 1988-98.

1.2 Population Characteristics of the Niakhar DSS Area

From 1962 to 1966, 65 villages were surveyed annually. The study zone was then reduced to eight villages until 1983, when it was extended to include 22 villages, forming the current study zone, comprising 30 villages. Hence, eight villages have been under demographic monitoring for 37 years and 30 villages for 16 years. The Niakhar area has a population of 30,215 inhabitants as of 1st January 2000, and a high population density with about 131 inhabitants per km². Demographic monitoring covers 30 villages of varying size (60 in Darou and 3150 in Toucar). The area is rural but the three largest villages are more "urbanised" with health facilities, weekly market, daily buses to Dakar and several shops. The Sereer ethnic group comprises 96.5% of the population. Other ethnic groups represented are Wolof (1.4%), Toucouleur (1.1%) and Laobe (0.6%), with 0.5% are Peuhl, Moorish, Soce and Diola making up the remainder. Islam is the most declared religion (74.5%), christians are represented by 22.4% of the population (19.9% are Catholic, 2.6% Protestant). And traditional religion is declared by only 2.6% although traditional practices are very prevalent and observed in each family. The dominant language used is Sereer but many people speak Wolof.

The population lives traditionally on one food crop (millet), one cash crop (groundnuts) and cattle raising. To cope with the agricultural crisis in Sahel and the demographic pressure (85 person per km² in 1966, 131 persons per km² in 2000), new activities arose: predominantly meat production and temporary migration to urban centres. Formal education is very low: 59% of men and 80% of women between 15 and 24 years have no school education. The first school opened in 1951, and there are now nine public and two private schools.

The residential unit is the compound which consists of one or more households together with some members of the extended patrilineal family. Traditional houses are huts (one for each ever-married woman and additional huts for unmarried adult). Modern constructions, made of concrete and corrugated iron, tend to replace traditional houses (43% of households have at least one corrugated iron roof). The availability of bore holes and drinking fountains increased over the past several decades: 60% of the households now have access to tap water. The use of latrines is more recent: only 22% of the households have access to sanitation. There is no electricity in the study area. Paved roads are 15 to 30 km away from the villages, yet several daily bus or taxi services to Dakar are offered.

There are three health dispensaries within the study zone (the first opened in 1953, the last in 1983) and two outside it, providing basic services to the study population. These include curative care, immunization, prenatal care, delivery, oral rehydration therapy and malnutrition management. The Expanded Programme on Immunization started between 1982 and 1984. At the Department level, the proportion of fully immunized children among the 12 to 23 months old attained was 33%, and
only 23% in January 2000. At the Regional level, this coverage reached 61% in 1990 and decreased to 51% in 1991. Measles and pertussis vaccine trials allowed a significant increase in immunization coverage within the study zone between 1987 and 1997.

Outbreaks of cholera occurred in 1985, 1987 and 1996, and a large meningococcal meningitis outbreak hit the population in 1998. Roughly half of the under 5 mortality is due to diarrhoeal diseases, ARI and malnutrition, and a quarter to malaria.

2. NIAKHAR DSS PROCEDURES

2.1 Introduction to the Niakhar DSS Site

The original objective of the Niakhar DSS site, in 1962, was to obtain reliable demographic and epidemiological data on a rural African population. Current objectives are to obtain a long-term assessment of demographic indicators, a basis for bio-medical and social sciences research, and to maintain epidemiological monitoring. The Niakhar DSS has institutional affiliation with the Institut de Recherche pour le Développement (IRD, formerly ORSTOM).

There have been four DSS periods. From 1962 to 1966, 65 villages had yearly surveys; from 1967 to 1983, 8 villages had yearly surveys; from 1984 to 1986, 30 villages had yearly surveys; from 1987 to 1997, 30 villages had weekly surveys; and since 1997, 30 villages had quarterly surveys. Surveys are now conducted in February, May, August and November every year. Between successive rounds, collected data are entered, checked and used for updating the database. Migration data is probably the most difficult event to collect, as it depends on the rule of residence used by the registry system. In/out migrations are considered after six months of presence/absence. Exceptions to this general rule concern temporary work migrants, who are resident if they come back in the village for at least one month in the year; absent workers, who have their family (wife and children) in the village; and absent scholars who are considered resident within their family. Verbal autopsies were completed for all deaths registered until 1997, and for those up to 55 years of age thereafter.

The DSS routinely measures information on pregnancies, births, abortions (spontaneous), stillbirths, weaning, migrations, changes of marital status, immunisations, and cases of measles and whooping cough. Economic variables are measured by specific surveys on education, household equipment and breeding and agricultural activities. Specific studies have been conducted on fertility, health seeking behaviour, malaria, STD-HIV, anthropometric measures, and maternal mortality.

There are 5 fieldworkers, 3 supervisors, 3 data entry clerks, and 2 computer scientists. The Niakhar DSS system is geographically distributed between Niakhar and Dakar. Five fieldworkers visit the compounds, while two supervisors collect the completed questionnaires and bring them to the office in Niakhar on a daily basis where they are checked. Questionnaires are then sent to Dakar for coding, data entry, updating, tabulation and analysis. Main consumers of the Niakhar DSS data are researchers. However, results from demographic and epidemiological monitoring are regularly feedback to the local authorities, and the Health Ministry is immediately alerted in case of a potential disease outbreak.
2.2 Niakhar DSS Data Collection and Processing

2.2.1 Field Procedures

a) Initial Census

The initial census was conducted in 1962 for 8 villages and in 1983 for a further 22 villages. It consisted of identification of the resident population and an abridged birth history for women (number of life births and deaths of children).

b) Regular Update Rounds

Data are currently collected on a quarterly basis. The local team involved in the data collection consists of five fieldworkers, two supervisors and one head of station. They visit each compound every four months. Complete lists of people resident in the household and compound are produced each year. In this list is reported information on absence (date and reason), pregnancy if not terminated, spouses etc. Specific spaces are provided to record information on the events occurring since the last visit. Spaces for three visits are available. Fieldworkers use these lists to ask questions about pregnancy, birth, stillbirth, death, migration, weaning, change in marital status, vaccination, measles and whooping cough. In order to obtain accurate answers, concerned persons are interviewed personally; if they are absent or too young, a well informed relative is interviewed. Verbal autopsies were conducted for all deaths until 1997, and since then, only for those under 55 years. When a death occurs, the fieldworker interviews relatives of the deceased and completes a questionnaire with the identification of the person, the history and symptoms of the illness. The questionnaire is then read by two physicians who each attribute a diagnosis. Where the two physicians disagree, a group of physicians gather to reach agreement on a diagnosis. The WHO/ICD-9 is used for coding the most likely underlying cause of death.

c) Field Supervision and Quality Assurance

After each day of data collection the supervision team does consistency controls and registration of information. To make sure that all compounds were actually visited, some of them are re-visited at random.

2.2.2 Data Management

In Dakar, lists of people resident are checked and some information is coded.

An application program is used to enter, check and save data in permanent files which are processed to calculate all relevant statistics on the population. A menu is presented to choose between data entry, data checking, files updating, browsing through files, or production of statistics.

Errors that appear in the data processing step are corrected where possible; where not, the questionnaires are returned to the field.
Depending on the needs of epidemiologists and demographers, file extractions are done to present data according to a specific format for analysis. Reports on demographic and epidemiological data are produced for the local and national authorities. An analysis report is produced every 3 years.

3. NIAKHAR DSS BASIC OUTPUTS

On 1st January 2000, the population of the Niakhar study area was 30,215 inhabitants. The population is very young with 65% under 15 years (16.7% 0 to 4 years, and 29.0% 5 to 14 years). Children less than one year represent 3.9% and the elderly 5.1%. The age dependency ratio is 1.04, and the M:F sex ratio is 0.98:1.

In 1997, the average household size was 10.4 persons and the average compound size was 15.8 persons. Although unusual in this society, 6.1% of households had a women as head. Demographic indicators for three periods, 1984-88, 1989-93, and 1994-98, are presented in the table below.

<table>
<thead>
<tr>
<th>Demographic indicators during the period</th>
<th>1984-88</th>
<th>1989-93</th>
<th>1994-98</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Fertility Rate</td>
<td>7.9</td>
<td>7.7</td>
<td>7.0</td>
</tr>
<tr>
<td>Neonatal Mortality Rate per 1000 life births</td>
<td>57</td>
<td>38</td>
<td>31</td>
</tr>
<tr>
<td>Infant Mortality Rate</td>
<td>122</td>
<td>86</td>
<td>79</td>
</tr>
<tr>
<td>Under Five Mortality Rate</td>
<td>282</td>
<td>196</td>
<td>200</td>
</tr>
<tr>
<td>Annual Birth Rate</td>
<td>47</td>
<td>46</td>
<td>41</td>
</tr>
<tr>
<td>Annual Death Rate</td>
<td>17</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>Annual Out Migration Rate</td>
<td>59</td>
<td>51</td>
<td>47</td>
</tr>
<tr>
<td>Annual In Migration Rate</td>
<td>40</td>
<td>37</td>
<td>36</td>
</tr>
<tr>
<td>Natural Annual Population Growth Rate</td>
<td>3.22</td>
<td>2.98</td>
<td>2.61</td>
</tr>
<tr>
<td>Real Annual Population Growth Rate</td>
<td>1.28</td>
<td>1.64</td>
<td>1.51</td>
</tr>
<tr>
<td>Maternal Mortality Ratio (maternal deaths per 100,000 life birth) <strong>1984-97</strong></td>
<td>516 (ICD-9 definition); 575 (ICD-10 definition)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 1. Population pyramid of person-years observed in the Niakhar DSS site, 1995-1998.
Table 1. Age and Sex Specific Mortality in the Niakhar DSS Site, 1995-1998.

** Omitted in WEB version **

Table 2. Historical all cause mortality rates by age and sex

** Omitted in WEB version **


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\[^{1}\] For a complete reference list, see http://www.ird.sn/act-rech/ur7/niakhar/biblio.htm