

Change of Human Subsistence in the Sahara Oasis

-Water Supply, Farm Expansion and Habitation Movements through a Case Study of In Belbel Oasis in Algerian Sahara-

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Abstract: Water supply is limited factor for human subsistence of the Sahara oasis. This case study in a small Saharan oasis shows short term change of water supply by “foggara” and deep well influencing scales of irrigated farms and water access of inhabitants.

Key Words: Farm expansion, “foggara”, Oasis, Sahara, Water supply

1. Introduction

Human life of the Sahara oasis had been supported by two factors. The first is networks among the oases which had been prospered through the trans-Saharan trade by camel caravans. This exchange had animated not only economic aspects but also cultural influence between sub-Saharan and Mediterranean area. The second factor is the irrigated agriculture associated with date palms which provide dates and shads to cropping and dates.

The life of the Sahara must be the fusion of the nature and the culture since thousands years (Bentrouni, 2009). In last 30 - 40 years, modes of the life of the Sahara oases have changed drastically. It is important to put this rapid change of the oasis on record. This paper aims to study transformations of the oasis life focusing water supply system influencing farm expansion and habitation area movements.

2. Research site and methods

We selected In Belbel oasis as a research site (Fig. 1). Main reason of the site selection is the achievements of Kobori who started his fieldwork at In Belbel since 1977. Then he had made a large number of records and documents on the oasis comparing the underground water supply systems of arid regions (Kobori *et al.*, 1982; Kobori, 1973, 1989, 1991). This is remarkable advantage to study the oasis life.

In Belbel oasis is located at the center of Algerian Sahara and isolated from nearest oases around (approximately 100 - 150 km). Foundation of the village was about 200 years ago. The population of the oasis has doubled from 464 (1982) to 962 (2009) persons.

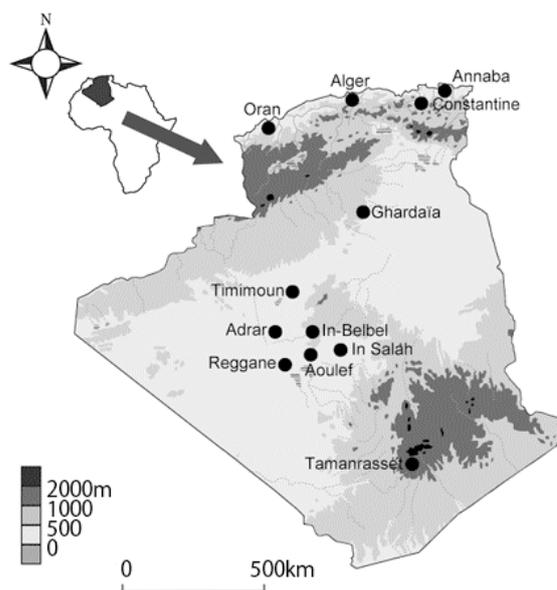


Fig. 1. Research site of Algerian Sahara

Short term historical changes during approximately 50 years can be surveyed by associated methods. The data from the documents made by Kobori, land survey, satellite image and interview to old persons permit us landscape analysis on chronological change.

3. Remarks on mode of life at In Belbel oasis and its changes.

3.1. “Foggara” water supply system

The agriculture of the Sahara oases is characterized by irrigation and association with date-palms. The irrigation system of underground water course, called “foggara” at the

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North Africa, is widely distributed in Afro-Eurasian arid land from Xinjiang region of China to Mauritania.

Water of “foggara” appearing on the ground is divided by distributors (“Qasrya”) to each section of farms. This water distribution system had been related to social and religious organization of the oasis. But deep well (approximately 150 m of depth) water supply subsidized by government for increasing agricultural production has taken place of “foggara” since mid-1980s.

3.2. Evolution of oasis agriculture

Date-palms are also well distributed in the arid land. They offer fruits and shade for crops. Since mid-1980s, associated crops with date-palm have been changed to vegetables from cereals (to cash crops from self-consumption). Nowadays, vegetables (tomato, eggplant, green leaves etc.) are raised in green houses introduced for winter culture (from October to march). According to a farmer, this culture bring him 14,000 DZD (190 \$) for 6 months.

3.3. Diets changes

Daily meal has changed for past 40 years. Before, inhabitants had mainly eaten some cereals (sorghum and wheat) and dates. They started to consume foods which are produced at the outside of the oasis (ex. wheat for cous-cous) by reason of production shortage originated from water and workforce insufficiency and an increase population.

3.4. Governmental support to the oasis life

Inhabitants of In Belbel profit national policies for isolated area. For example electricity by natural gas power station is provided to the inhabitants of In Belbel at a low rate of 50 %. Moreover, subsidy of 1,000,000 DZD (13,600 \$) per household is offering for house construction against the flood in January 2009.

3.5. Migration of oases people

Some old men of In Belbel have experiences to stay or to work outside of the oasis. They have finally returned to In Belbel. Nowadays, material purchases of the households are supported by young generation who find the employment at the out of the oasis. The migration movement is indispensable for oasis economy.

4. Chronological landscape analysis on water supply, expansion of farms and habitation area (Fig. 2).

4.1. Water supply

- Since foundation up to 1970s, water for irrigation and households depends on only one “foggara” (fg1).

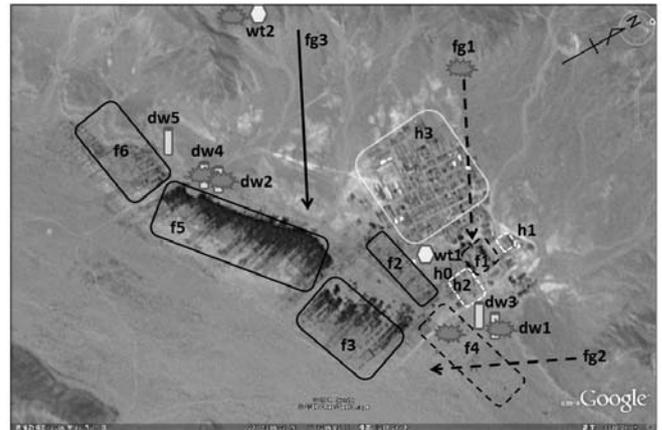


Fig. 2. Chronologic changes of landscape.

- Inhabitants had tried to dig “foggara” 2 (fg2) which had been failed in the ancient time. None of existing inhabitants doesn’t have memories of fg2.
- “foggara” 3 (fg3) was dug by subsidy of government in 1984 against water scarcity of fg1.
- 5 deep well have dug since 1984. But only one well is working presently (dw3).
- Two water tanks were constructed in 1984 and 2002, the second water tank was failed by break down of pump.
- Some owner of sections of f3 dug shallow wells for providing the water to their own sections for supplement of water insufficiency

4.2. Farm expansion

- According to an old man of 78 years old, farm 1 (f1) and farm 2 (f2) were already abandoned when he was child. In this time, habitants had cultivated in farm 3 (f3).
- Farm 4 (f4) was reclaimed in 1970s digging shallow wells. But it was abandoned by water scarcity of shallow wells.
- Farm 5 (f5) was reclaimed expecting water of fg3.
- Farm 6 was reclaimed expecting water supply of deep well 2, 4 and 5 (dw2, dw4, dw5)
- Abandoned farm 2 (f2) was retaken since with water of deep well 3 (dw3).

4.3. Habitation movement

- H0 is cave in which unknown people had inhabited before the settlement of ancestors of the existing inhabitants.
- H1 is ruins of a fort. Their periods are unknown.
- In the period of settlement, habitation area was h2, for the reason of water access (near the end point of fg1)
- Since 1920s, inhabitants started to move to h3. H3 had enlarged step by step.

5. Conclusions

Expecting water source exploitation (“foggara”, shallow wells and deep wells), farms have been reclaimed since 1970s financing by governmental projects. However 4 deep wells on 5 don't function for the reason of breaking down of pumps, water supply of the oasis is obligated by a “foggara” (fg3) and a deep well (dw3) because of lack of technical support and of follow up of the projects.

As economic values of the irrigated agriculture in the oasis declined relatively, not only reinforcing of agricultural productivities, but also alternative measures should be considered for the future of the oasis. We are discussing plan for establishing of oasis eco-museum with inhabitants of In Belbel, exhibiting life style of the oasis and its change, fauna and flora of the oasis and the Sahara.

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