Dissertation

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Traditional agricultural tehnology in Nubia : continuity and change

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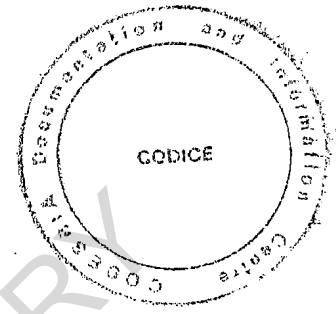
TRADITIONAL AGRICULTURAL TECHNOLOGY IN NUBIA : CONTINUITY AND CHANGE



By

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Thesis submitted in partial
fulfilment for the Degree of
Master of Arts in Folklore

Department of Folklore
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September, 1991

To My Parents.

The beloved ones :-

Amir,

Majda,

Kamil,

The Little Ones.

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Kush	Journal of the Sudan Antiquities Service.
J.E.A.	Journal of Egyptian Archaeology.
S.J.E.	Scandinavian Joint Expedition to Sudanese Nubia.
S.J.D.	Sudan Journal of Development Research.
S.N.R.	Sudan Notes and Records.

Transliteration of the Arabic Alphabet

Adopted by the Editors of Sudan Notes and Records

	at beginning of word omit, hamza (ʾ) elsewhere	ذ	dh (coll. d)	غ	gh
		ر	r	ف	f
		ز	z	ق	q (coll. g)
ب	b	س	s	ك	k
ت	t	ش	sh	ل	l
ث	th (coll. t or s)	ص	ṣ	م	m
ج	j or g	ض	ḍ	ن	n
ح	ḥ	ط	ṭ	ه	h
خ	kh	ظ	ẓ	و	w
د	d	ع	ʿ	ي	y

VOWLS			DIPHHONGS	
fatha	a, lengthened	ā	ى	-ai (as in aisle).
kasra	i, "	ī	و	-au (as in mauser).

The J of the article always remains l.

The silent (ـْ) is omitted

1. The system is not applied to well-known names, such as Khartoum, Omdurman, etc.

2. The vowel sounds of e in 'get' and o in 'hot' with the corresponding long vowels (a in 'gate' and o in 'home'), which occur only in the collquial, are expressed by e, o, ē, ō.

e.g. beled, Mohammed, bēt (or beit), hōsh.

Ei may be used as alternative to show the e.

3. In geographical names the conventional spelling used by the Sudan Government Survey Department is followed, although not always agreeing with the above transliteration.

4. At present phonetic type is not available for proper reproduction of non-Arabic African languages.

ABSTRACT

This thesis is a study of traditional agricultural technology in Nubia. It deals specifically with continuity and change in this aspect of Nubian culture. The underlying objective of the thesis is the documentation, analysis and interpretation of traditional agricultural technology in Nubia; and the search for a better understanding of the relationship between the traditional and modern agricultural technologies in Nubia; as well as a better understanding of Nubian agriculture as a socio-economic factor.

The introduction presents a definition of traditional agricultural technology and gives a literature review on the state of research on the subject. It also discusses methodology and fieldwork and includes the major hypothesis of the thesis.

Chapter One examines related aspects of the study area. These include its people, history, economy ., physical environment and climate.

Chapter Two is a historical reivew of agriculture in Nubia. It deals with the nature of evidence on this subject and the different stages of its development.

Chapter Three addresses the subject of water-lifting devices and agricultural implements; while Chapter Four deals with the agricultural systems which include the agricultural cycle, agricultural operations, the crops and the division of labour.

Chapter Five examines beliefs, practices and traditions connected with traditional agricultural technology in Nubia.

Chapters Three, Four and Five include a section which discusses continuity and change in their subject matter. The thesis then ends with a general conclusion of the whole study.

خلاصـــــــة

هذه الاطروحة دراسة للتقنية التقليدية للزراعة فى منطقة النوبة الشماليـــة وبشكل خاص منطقة المحس الواقعة بين خطى عرض ٤٢ ـ ١٩ و ٢١ شمال • تركز الدراسة على وجه الخصوص على دراسة ظاهرة الاستمرارية والتغير لهذا الجانب من الثقافـــة النوبية •

تتلخص الاهداف الرئيسية للدراسة فى تدوين وتسجيل التقنية التقليدية وتحليلها وتفسيرها والبحث فى علاقاتها بالتقنية الحديثة فى المنطقة كما تهدف الدراسة كذلك للبحث فى التقنية التقليدية كأداة تغيير ثقافى اجتماعى واقتصادى •

تتعرض مقدمة البحث لتعريف التقنية التقليدية للزراعة وتعرضُ فيها ملخـــص عام لما سبق وقدم من دراسات فى هذا المجال • كذلك تتعرض المقدمة لعرض الطـرق والوسائل المتبعة لاجراء البحث والعمل الميدانى المتصل والافتراضات الرئيسيةللاطروحة•

يبحث الفصل الاول فى تاريخ وسكان واقتصاد وبيئة منطقة الدراسة اما الفصـل الثانى فهو سرد لتاريخ الزراعة فى المنطقة النوبية منذ اقدم العصور وحتى العصـــر الحديث •

يدرس الفصل الثالث آلات رفع المياه والادوات الزراعية باعتبارهما ركيزتيـــن اساسيتين للعملية الزراعية • اما الفصل الرابع فيتعرض للنظام الزراعى والدورة الزراعية والعمليات الزراعية بالاضافة الى المحاصيل وتقسيم العمل •

الفصل الخامس يعرض العادات والتقاليد المتصلة بالزراعة التقليدية ويبحث فى اصولها ومكوناتها •

يضم كل من الفصل الثالث والرابع والخامس جزءا اساسيا تناقش فيه الاستمرارية والتغير فى مواضيعهما المطروحة وتنتهى الرسالة بخاتمة توجز نتائج البحث •

ACKNOWLEDGEMENTS

This study is a result of my own readings and fieldwork, but nothing would have materialized from these without the great help and efforts of so many of my teachers, friends and colleagues, as well as all members of my direct family. Space will not allow me to mention all these by name, so I would just like to give a heartfelt and a grateful THANK YOU FOR ALL OF YOU THERE WHO GAVE ME DIRECT OR INDIRECT HELP IN COMPLETING THIS STUDY.

Yet the writer finds it necessary to mention some names. Foremost among them is my teacher and supervisor Dr. Yousif Hasan Madani who gave me unstingtingly of his knowledge and time. Others include Dr. Ali Osman Muhammad Salih, the Director of the Mahas Archaeological and Cultural Project, whose guidance, especially in the field, made it possible for me to use my time and experience during the fieldwork in the best possible way. Also the writer is grateful to all the informants from the Mahas Region. It is also important to mention the help rendered by some acquaintances in the Mahas Region or in Khartoum who helped me and made the job easier.

The help given to me by the Mahas Rural Council in the logistics and the availability of archives was vital in making the study possible. I thank them most sincerely.

My thanks go to Abd Allah Abbas who typed the thesis; Ali Muhammad Koko of the Department of Archaeology, who helped in the final form of the diagram; Lu'ai Muhammad Khair, who drew the Figures and Aadil Hadra, who helped in typing the

table.

Very many thanks to uncle Ali and Al-Basheir Sahal for their continuous encouragement and help.

INTRODUCTION

INTRODUCTION

1. Definition and Previous Research.

Traditional Agricultural Technology : Definitions

In scientific literature, technology is generally classified into three major categories. These are : ancient technology,[1] traditional technology[2] and modern technology. However, these learned works do not give clear definitions of these terms. It is evident that some authors try to define these technologies temporarily. For Henry Hodges,[3] ancient technology is the technology of the ancient world which means to him the development of Mankind's technology from its origins to the end of the period of Roman domination in the opening years of the fifth century A.D. To others, ancient technology means all technologies acquired or invented by Man through his biological and cultural evolution to the end of the Neolithic period, 5000-3000 B.C. This is sometimes called "primitive" technology. This would imply that traditional technology is the technology acquired and invented by Man after the end of the Neolithic period to the advent of the Industrial Revolution to modern times.

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1. Hodges, H. Technology in the Ancient World, New York, 1977.
2. Hurreiz, S.H. Studies in African Applied Folklore, I.A.A.S., U. of K. Khartoum University Press, 1986, p. 101.
3. Hodges, H. Op.cit., p. V.

The above-mentioned classification of technology doesnot coincide with any of the standard systems of classification of Man's history on earth. One of these systems takes technological development as the main criterion and define Man's age according to, the three age system; which is the stone age, the Bronze age and the iron age. The other system takes historical development as the main criterion and defines Man's age into, prehistorical and historical. In this context historical includes ancient, Medieval and Modern.[1]

In the context of this thesis, traditional technology means all technologies acquired by members of societies. These technologies should be acquired by handing down from one generation to another through long and continuous periods of time. Therefore, traditional agricultura technology is such an acquired technology in the field of agriculture; which includes all different component of agricultural organizations. In essense then, agricultural technology is subsistence technology which has been defined by Otterbein as follows :

> "Subsistence technologies are the activities which people perform to exploit their environment in order to gain a livelihood".2

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1. Cleator, P.E. Archaeology in the Making, Robert Hale Limited, London 1976. P. 33.

2. Otterbein, K. Comparative Cultural Analysis, An Introduction to Anthropology, Rinherant and Winston, New York, 1972, p. 16.

State of Research

The main concern of the thesis is traditional agricultural technology in Nubia, and in the Mahas region in particular.

To give a wider scope to the case study, the intention here is to give a background summary of the state of research relevant to our topic in Nubia before embarking on the main focus which is the Mahas region.

Considering the state of scholarship concerned with this aspect, interest in the study of traditional farming technology and material culture in general started in the early twentieth century. The first school of research is composed of the work carried out by European archaeologists and British administrators of the colonial era. The studies of this group are based on methods of classification and typology. The writers profess no kind of training in the field of history or ethnology. Also they were not sufficiently acquainted with the culture they studied, especially in the field of colloquial language. Their studies therefore form a number of descriptive and taxonomic documents.*

An example from this period is W. Nicolls' essay on the Sāqia in Dongola Province. In it he defined the

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* Madani, Y.H. "Boat Building in the Sudan : Material Culture and its contribution to the understanding of Sudanese Cultural Morphology". Unpublished Ph.D. thesis, School of English, University of Leeds, 1986, pp. 18-22.

Sāgia briefly, concentrating mainly on the men employed on it and their responsibilities as well as the agricultural relations and some agricultural organizations. He also examined the question of remuneration.[1]

The second example is the essay written by H. Nicholisen about the Sāgia terminology in Dongola. In it he gives us a fair list of terms of Sāgia organization classified into ten lists; written in Arabic and transliterated and defined in English.[2]

The disadvantages of the first school's methods is clearly reflected in these writings particularly in the area of mastering the colloquial language.[3]

From a more scientific agricultural angle, the book Agriculture in the Sudan edited by J.D. Tothill in 1948 is a handbook of agriculture as practised in the (Anglo-Egyptian) Sudan.[4] The book contains a number of background chapters by different authors. As far as the Nubian region is concerned, there are several chapters throwing light on land ownership, agricultural sociology

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1. Nicholls, W. "The Sāgia in Dongola" in SNR, Vol. 1, 1918. PP. 23-27.

2. Nicholisen, H.A. "Sāgia Terminology in Dongola", in SNR, Vol. 18, pp. 314-322.

3. Abu Salim, M.I., Al-Sāgia (in Arabic), I.A.A.S., Khartoum, Khartoum University Press, 1980, pp. 260-261.

4. Tothill, J.D. Agriculture in the Sudan, Oxford University Press London, 1952.

and agricultural policy. Different chapters also discuss the agricultural types, the methods of irrigation, the types of crops, the implements in use, agricultural operations, agricultural methods and the division of labour. Although many of the authors are specialists, the book is a direct, simple and easy textbook enabling the general reader to understand the varied sorts of agriculture practised in the country.

Another example is W.D. Purves' accounts of some aspects of the Northern Province in which he discusses the Nile as the sole source of irrigation, irrigation methods, irrigation devices and their efficiency compared with the diesel engine. He suggests that an obvious improvement is the introduction of a simple, efficient and up-to-date mechanical means of raising water.* However, Purves ignores the social structure built on the traditional agricultural technology and the influence of the modern device on it.

The second school is of a varied nature. It includes literature that discusses material culture particularly Nubian agricultural technology, from a folkloristic and/or a historical-administrative point of view. Yet the aims, methods and scope of these different studies as well as their

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* Purves, W.D. "The Northern Riverain Provinces", in Hamilton, J.A. (ed), Anglo-Egyptian Sudan from Within, Fabre and Fabred Limited, London, 1935, pp. 165-171.

theoretical framework, are almost exactly the same. Their authors are all Sudanese who share a general interest in Folklore. A brief survey of the writings of those who have contributed to this school will be presented below.

The beginning of this second school in the study of material culture took place with the establishment of Sudan Research Unit in the early 1960's. The Sudan Research Unit gave great encouragement and impetus to research into Sudanese Folklore in general and material culture in particular; especially later when the folklore department was established in 1977 as one of the departments of the Institute of African and Asian Studies (previously Sudan Research Unit). The department carried out research in many areas, but we will be concerned here with the documentation by Sayyid M. 'Abd Allah. Min hayāt wa turath al nuba bimantiqat al Sikkūt.* This documentation was presented as a result of the co-operation between the Ministry of Education and the Institute of African and Asian Studies. The work is mainly descriptive and lacks analysis, and although agriculture is the basis of life in the Sikkūt region, the author provides only one section about it. He touches on the material culture of this group but does not make it his

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* 'Abd Allah, Sayyid M. Min hayāt wa turath al nuba bimantiqat al Sikkut, (in Arabic), I.A.A.S., Khartoum, 1974.

focal point of interest.

The second example which is also related to our topic is Hurreiz's paper on folklore and national development. In it, he discusses the impact of economic development in the field of traditional agriculture taking the Sikkūt Nubians as example. He describes how the introduction of modern agricultural technology has disrupted the social structure and social values in the community.[1] In sum, he assests the benefit of folklore outside the classroom and how it is useful in protecting indigenous culture and developing traditional technology against the forces that threaten its very existence.

The third example in this school is the book written by Muhammed Ibrahim Abu Salīm, entitled Al-Sāgia.[2] In it he describes Al-Sāgia as a water-lifting device, its counterparts and its history. He gives a detailed description of Nubian Sāgia, its different parts, the Nubian's ways of controlling the Nile and their technical and vernacular terms. He also discusses the Sāgia itself and how it works, the sub crafts correlated with its manufacture as well as Sāgia land and the agricultural operations.

The fourth example is the Ph.D. thesis by Ali Osman,

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1. Hurreiz, S.H. "Folklore and National Development : A Challenging Paradox" in A.A. Nasr (ed) Folklore and Development in the Sudan, Khartoum : I.A.A.S., University of Khartoum, 1985, pp. 158-180.

2. Abu Salim, M.I. op.cit., 1980.

which contains some chapters on the economy of Medieval Nubia.[1] In his thesis Osman seeks new approaches for a better understanding of the cultural history of Medieval Nubia, i.e. he expands the scope of the old schools concerned with the explanation of the mechanism of Medieval Nubian society in general, with special reference to its economic and commercial aspects, using them as agencies of cultural change and tools to explain the mechanism of Medieval Nubian society and culture change.

Since Osman considers agriculture as one of the basic Nubian economic activities, he discusses the agricultural subsistence technology, the type of crops and agricultural organization in general. As an archaeologists he deals with explanation of Nubian culture using methods of data retrieval, interpretation and explanation. Yet he does not give a lot of attention to basic description and analysis of data used in the thesis as a basis for explanation.

The fifth example is the account of Hassan Daff'alla in his book, The Nubian Exodus,[2] in which he narrates the daunting administrative problems involved in the emigration and compensation of Halfa region Nubians and the other problems connected with them. The first part of the book

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1. Osman, Ali "The Economy and Trade of Medieval Nubia", unpublished Ph.D. thesis, Christ's College, Cambridge, 1978.

2. Daff'alla, H. The Nubian Exodus, C. Hurst and Co. Ltd., London, 1975.

contains background chapters about the land and people of Nubia. In these chapters Daff'alla describes the lost Nubian country and its ecology and its main towns and villages. He also discusses some aspects of the Nubian's way of life, their traditions, customs and beliefs. The book also focuses on the Nubian land economy, basically the agricultural cycle, types of crops and operations.

This book by a Sudanese administrator is a distinctive addition to the long tradition of literary activities by administrators. And although Daff'alla's work is devoted to solving the problem of emigration, his accounts of the Nubians and their land is useful and informative.

Need for Further Research

It is clear from the foregoing account of state of research that most of the available data on traditional agriculture in the Sudan cover only parts of Nubia. And of these works only one is written by a trained folklorist. Yet even this paper is about only one region of Nubia and based on the literature rather than on data collected in the field.* Also all these papers are thematic or problem-oriented. The writer's feeling was and still is, that there is an urgent need for the development of regional folkloristic

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* Hurreiz, S.H. op.cit., pp. 158-180.

studies in the Sudan. That is to say, to develop studies in regions which are well-defined geographically, ecologically, historically and culturally. Such studies could be either interdisciplinary or single-discipline, and should aim to develop a model and general laws to be applied in other similar situations.

Regional studies can only be started when enough research has already been done on some aspects of the concerned region, either in the relevant discipline or in the general aspects such as geography, history and culture. In this respect Nubia has been luckier than most other Sudanese regions. Many historical developments led to extensive studies of its culture history and geography. Even among the few folkloristics studies, there is a large part from Nubia.

This thesis therefore is intended to start a regional study in one major aspect of folklore, which is traditional technology. Traditional agricultural technology has been chosen as subject for the present thesis, since it is evident that agriculture was one of the major practices and occupation of the Nubians. The Mahas region has been chosen as a focal point in the study of traditional agricultural technology in Nubia because this was the last Nubian area to fall under foreign rule in modern times. It was ruled by an indigenous kingdom (Koka Kingdom) until 1821 when the Mahas King surrendered to Isma'il Pasha. Even then it was

agreed by Isma'īl Pasha that the Mahas Kingdom would rule its region independently. This was the case until 1912 when the kingdom was subjugated by the condominium government.*

This being the case the Mahas region became the last reservoir of Nubian culture and it was expected that most of the earlier Nubian agricultural practices would be preserved there. This turned up to be true when the writer conducted the fieldwork for this study. Therefore, the specific scientific aims of this study are the following :

(a) The documentation, analysis and interpretation of traditional agricultural technology in Nubia.

(b) A better understanding of the relationship between traditional and modern agricultural technology.

(c) A better understanding of agriculture as a socio-economic factor.

It is proposed that this should be achieved through the investigation and testing of the following hypothesis.

The Hypothesis

Agriculture is one of the most ancient and continuous processes of the Nubian culture. It symbolizes and embodies

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* Osman, Ali. "The Post Medieval Kingdom of Kokka", in Plumly, J.J. Nubian Studies, Aris and Phillips, Warminster, Wilts, England, 1982, p. 105.

many of the Nubian cultural practices and is very closely connected with many other Nubian cultural processes; but mainly the socio-economic process. Therefore, any change in agricultural technology in Nubia would entail changes in the position of agriculture in the Nubian cultural process and in other aspects of the agricultural organization as well as the socio-economic set-up of Nubian society.

2. Methodology and Approaches.

Range of Evidence

The writer intend to use mainly folkloristic evidence and approaches. However, the topic of traditional technology is interdisciplinary in nature as it is apparent from the definitions given above. It was therefore necessary to look into other fields for more evidence to elucidate the arguments. In this regard use of archaeological, historical, ethnographical and linguistic evidence is made. All this evidence looked at from an ecological and socio-economic point of view. This means that the analytical aspects of this study are kept to the minimum possible level, while the methods of synthetic and comparative scopes are going to be explored extensively using deductive rather than inductive methods.

Approaches

Since the writer has already stressed in the hypothesis the possibility of continuing to use traditional agricultural technology in Nubia generally and the Mahas region in particular, and since

the intention is to look into this technology in the context of the historical, socio-economic and cultural development of Nubian society from early times up to the present; it is therefore appropriate to use the systems of the diachronic approach, as opposed to the synchronic approach. Yet although some of the technologies we are going to talk about have already fallen into disuse, the present-day Mahas Farmers' perception of all traditional agricultural technology is going to be considered.

3. Fieldwork.

Formation of Questions

In order to mount a proper scientific and useful field mission, the writer felt that there were a lot of preparatory steps to be fulfilled. Most important among these was to acquire sufficient and proper knowledge about the area of study, i.e. the Mahas region. So all the available literature was consulted as well as unpublished works and oral information which were gathered from members of the Mahas community in Khartoum.

Knowing the basic realities of the Mahas region as they are today was an important aspect for taking sound decisions on the logistic of fieldwork. These logistics include mainly lodging, transportation and travel to the area of study and travel within the area of the Mahas.

Another important aspect of preparation for the

fieldwork was to decide the appropriate aspects of the topic of research and proper definitions of it. This required, besides consulting the available literature, the gathering of information about the present-day Mahas people's perception of the subject matter of fieldwork. All this was very important to help in chosing appropriate methods that are useful in the field.

The third aspect of preparation for the field was to raise funds for the travel expenses, fieldwork expenses and for the purchase of the needed equipment. These funds mostly came from my family's resources except for the recorder, the tapes and battries which were provided by the Department of Folklore.

These preparatory steps helped me to decide the date and duration of the field and the methods of data collection.

Date and Duration of Field work

The major factor about the date and the duration of the fieldwork was connected with the agricultural cycle. Since the winter season is the most important season of the agricultural cycle, it was essential to go to the field at the beginning of the winter season and the end of it. Since the winter season is normally a very long one (five months) and because it was not possible for me to stay in the field all this period, it was decided to make two fieldwork trips.

Nevertheless, the importance of the date and duration

of the fieldwork in relation to the subject matter under investigation was taken into account. Probably the greatest handicap in the study of agriculture consists of the difficulty of applying methods of direct observation to all agricultural activity. Whereas a ritual or a technological process can be observed by an anthropologist in a comparatively short time, agricultural activity requires constant observation during, at least a period of one year, which is the time unit in agriculture.*

The first trip started on the 17th of November 1987. After discussions with the local government in Dalgo, it took the writer six weeks to cover the whole region of the Mahas on both east and west banks of the Nile. Back in Khartoum transcription of the recorded tapes is made, as well as reading through the notes, developing the photographs and redrawing the plans and sketches.

The first fieldwork trip was started during November with the intention of catching up with the finishing practices of the flood season and the preparation practices for the winter season. During the field trip the writer witnessed and observed all the agricultural practices of land preparation, sowing, watering, manuring and weeding.

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* De Schlippe, P. Shifting Cultivation in Africa : The Zande System of Agriculture, Routeledge and Kegan Paul, London, 1956, p. 27.

The second field trip was intended to :

(a) Cover the crop protection, harvesting, threshing winnowing and storage stages of the winter cycle.

(b) Witness and observe the starting practices of the summer season.

(c) Augment all these with comparative data and observations of the other aspect of the culture of the Mahas region.

Therefore, the second trip was planned to be conducted during March and April which coincide with the end of winter season and the beginnings of the summer season. While planning for the second season, the Department of Archaeology organized an interdisciplinary field project to the Mahas region under the direction of Dr. Ali Osman Mohammad Salih. This project was arranged to include the following disciplines: Archaeology, Sociology, Folklore, Linguistics and Ecology.

This project approached the writer to become a member of the official team and be responsible for the folklore component of the project. In this respect the writer acted as field director for folklore in the first season of the project. It was during the field season of this project, from March the 6th to April the 6th 1990, that the second season of the writer's own fieldwork was done. And it was with the association with this project that the above-mentioned

objective "C" of the second field trip, has been carried out.

Scope and Methods

The scope of the fieldwork was intended to include :-

(i) History and function of traditional agricultural technology.

(ii) Interrelationship between traditional agricultural technology and the farmer on the one hand and the society on the other hand.

(iii) Close examination of processes and agricultural tools of traditional agricultural technology.

To fulfill these objectives, the method of fieldwork chosen was direct field observation rather than collection of information through questionnaires. This direct observations was documented by notes, drawings and photographs taken simultaneously.

The second method of data collection during the fieldwork was tape recorded and interviews recorded in writing with selected informants. The key informants selected were those known to be more knowledgeable members of the farming community and of the community at large.

No major problems were encountered regarding the scope and methods of fieldwork, and there were no major shortcomings in the collected data. However, some problems are worthmentioning here for future consideration. They included the

difficulty of getting sufficient answers from the informants, although the interviews were recorded in the local dialect. Another difficulty was the perception of the Mahas people of the importance of the study. In other words, the writer, to them, was asking obvious questions about obvious matters which did not need to be recorded, let alone studied. A more important problem was the time factor. It was not possible to stay in the field for the whole agricultural season let alone a whole year, which has been described above as the agricultural unit. This difficulty was coupled with the difficulty of transportation and travel in the Mahas region, which stretches for nearly 200 kilometers along the Nile in very rough and difficult terrain.

Another important difficulty was the fact that it was not possible to examine the photographs locally. Developing and printing had to be done either in Dongola or Khartoum.

Results

During the two field trips a considerable amount of data and information were collected. These are included in fourteen of the recorded tapes which the writer transcribed, and the note books which contain field notes, plans and drawings. Beside these, photographs were taken using six 35 X 36 film rolls, black and white, colour prints and slides. Most of these photographs came out well.

CHAPTER ONE

AREA OF THE STUDY

CHAPTER ONE

AREA OF THE STUDY

1. The Region

The definition of Nubia has always been a controversial question. This is basically due to the difficulties surrounding the determination of the origin of the name "Nubia", when it first appeared in history and the geographic boundaries of its area.

However, there is general agreement among most scholars of Nubia that the name derives from the Nubian word for gold, which is Nab.[1] This is because of the importance of gold as one of Nubia's most precious commodities in history.[2]

As for the geographic definition of Nubia, it is evident, both historically and archaeologically that Nubia's boundaries always fluctuated through time. In other words, there was a time when Nubian rule and cultural influence were limited to lower and middle Nubia, then came a time when Nubia covered all northern parts of modern Sudan, while its cultural influence surpassed even those vast territories.[3]

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1. Osman, A. "Nubia from C. 3000 B.C. to 1550 B.C." For UNESCO International Commission for Scientific and Cultural History of Mankind, June 1988, p. 2.
2. Vercoutter, J. "The Gold of Kush" in Kush, Vol. VII, 1959, pp. 120-153.
3. Osman, A. op.cit., p. 2.

Adams gives a broader definition of Nubia as :

> "... the land of the Nile cataracts : that part of the Nile Valley, directly south of Egypt, which is occupied by peoples African in origin and speech but strongly influenced by Egyptian and Mediterranean culture".1

However, in modern times the term Nubia was applied to the region extending south of the first cataract to the present day Dabba town, which borders the Nubian desert to the east and Libyan desert to the west, i.e. the land that is occupied now by the Nubian speakers.

Modern Nubia is divided into five main regions; the Matukīa (Kunuz) region, the Fadīja region, the Sikkūt region, the Mahas region and Danagla region.[2]

2. Physical Environment

Environment means the conditions which surrounds the life of a person or a society. So, an adequate description of the environmental setting of any culture is very important

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1. Adams, W.Y. Nubia : Corridor to Africa, Allan Lane, London, 1977, p. 21.

2. These are tribal names and although Nile Nubians form one people and speak two dialects, i.e. the Dongolese and Mahasi, the region has been administratively divided into the above regions using their ethnic names. The part of Nubia that was occupied by Matukīa and Fadīja is now under the water of the Nubian Lake which formed as a result of the construction of the Aswan High Dam and the peoples who occupied them were transferred to Kom Ambo in Egypt and Khashm Al-Girba in the Sudan respectively.

in any attempt to understand that culture. For environment has a great impact upon all aspects of human life; these aspects which interrelate with each other and form the cultural traits of any people. Otterbein illustrates the importance of the environmental location of a culture in the following :

> "Environmental location of a culture is one of the most important factors influencing the culture. The way of life of the members of a culture can be influenced by the opportunities which its environment presents, such as abundant animal life which may lead to a well-developed hunting technology, fertile soils which permit the development of horticulture and agriculture, and grass lands which provide excellent grazing grounds for herds of animals. Or the way of life can be influenced by the limitations which the environment presents, such as scarcity of animal life, cold temperatures which prohibit the growing of crops, and dry lands which provide little or no pasturage".*

Since this thesis mainly deals with traditional agricultural technology in the Mahas region as a part of Sudanese Nubia, it is essential to place it within its environmental location and describe its geography.

The Mahas reach lies along the Nile Valley between Latitudes 19°-42' and 21° North, extending along the eastern side from Wawa village in the north to Kerma town in the

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* Otterbein, Keith. Comparative Cultural Analysis, An Introduction to Anthropology, Rinherant & Winston, New York, 1972, p. 11.

south, and on the western side by Jabal Dūshā in the north to the boundaries of Argo in the south (see Map No. I p. 202).

Administratively, the Mahas reach is divided into six regions, which equate to the administrative units or 'umūdyia These six regions are also divided into forty-two Mashīkha (village), each Mashīkha usually being composed of an undefined number of irki (hamlets). The villages are distributed unevenly on both sides of the Nile according to available arable land which allows cultivation. There are also a number of islands within the course of the river (see Map No. II P. 203).

Climate

The climate of the Sudan in general is tropical continental with variations in climatic types from arid desert in the north to equatorial in the south-west. Our area of study falls within the desert type of climate where rain is infrequent and in many years no precipitation is recorded. Temperatures are extremely high and reach a maximum in May and June. The mean daily temperature persists above 30°(.(86F°)., humidity at midday rises from about 10% in May and June to nearly 15% in August. In winter the area experiences a cool dry climate for some four months duration and the mean daily temperature is about 15-90°(608F°).*

* Barbour, K.M. The Republic of the Sudan, University of London Press, London, 1964. PP. 38-46.

There are dust and sand storms caused usually by the wind, which blows from the north, with a mean speed of about 15-20 km/hour. Wind, in general, is known in the Mahas region as tūg. There are many types of tūg known locally as Matūnga (which literally means the wind of the east), nau (the south wind), salāh (the north wind) and balāt (the west wind). The directions of these winds is determined by the River Nile direction, bearing in mind that the Nile changes its course three times in the Mahas region. Yet the names for those winds remain the same.

Another type of tūg is the Samūm, which is a hot dry desert wind occuring usually during the months of May and June. It is particularly severe in the Southern Mahas region, because of its geographical extension which means it is directly in the path of the Samūm coming from the Libyan desert. This Samūm are sometimes so hot that the whole system of life activities has to change. People have to stay in shade most of the time. It is interesting to note that these two months are mostly idle as far as the agricultural cycle is concerned. They are the two months which separate the winter rotation from the summer rotation and during them no basic agricultural work is done. In fact these two months are the holiday of the Nubian farmers.

There are many stories about black or red storms covering the region of the Mahas, especially its southern part, so completely that visibility is nil. This type of

dust storm is known locally as 'argana. One of the last of such dust storms recorded and remembered by people was in May 1948. It was so severe that some people lost their way and were found dead after the end of the storms. A similar storm was recorded in 1984, which continued for the whole night, and this is the last storm remembered by the people of the Mahas.

Flora

The desert climate of the area, as the term implies, gives no options for the growing of a vegetation cover over the region. Thus plants are confined to the Nile banks, dry water courses and the edges of the desert. Date Palm (Phoenix dactylifera) line all the area along the river banks. Dom Palm (Hyphaene thebacia Mart.) is also found in the area in addition to an abundance of Halfa grass (Demostachy, Cynosuroide stapf.). The vegetation of the area also consists of many species of the Acacia family; most common are Sunt (Acacia nilotica), Talh (Acacia seyal Del.) and haraz (Acacia albida Del.), Hashab (Acacia senegal), kitir (Acacia melifera). Various other trees are also found e.g. Dahasir (indigofera oblongifolia forsk) and Tarfa (Tamar articulata), Tundub (Capparis decidua), and rarely Sidir (Zizyphus spinachristi).

In addition to the above mentioned plants, the Nile flora consists of many others which have always been used by the Nubians for different purposes. These are known by their vernacular names as follows; Murmundi which is used as animal

fodder and also helps the accumulation of silts, protecting the cultivable land from being destroyed or washed away by the current which is mostly stronger during the low Nile season. And since most of the river valley lacks natural stone barriers this plant is vital in maintaining the fertility of Jarf (river bank) land. This role is also played by other plants which are scattered along both banks of the Nile in the region. These are called Sesabān and dīus ajūs. Another important type of plant on the Nile banks are those used as medicinal herbs. Most important among them is tanum, jurtī (Fruit of sunt tree) and Kadnum-bass (Solanum incarum: Solanceae). There are also many seasonal grasses which grow on the Jarf land and fields especially in the winter season. An example of these grasses is tabar (Comositae lactuca taraxifolica).

The desert flora consists of Halfa grass and tumam (L. Panicumturgidan forsk). Both are used as animal fodder; as well as Halfa grass which is used for making ropes.

As for khor (dry water course) flora, it consists of Hadad ;'Ushar) tati-tatour (Hanzal), Hargal and Humpuri (Sanamkā).

Funa

Animal life in present day Mahas is represented in many types. First are the wild animals, e.g. gazelles, rabbits, rats, foxes and hyenas which exist not far from the River Nile.

Secondly, the domestic animals, which play an important role in Mahas subsistence economy, e.g. cattle which are used for agricultural purposes as well as for food in addition to sheep and goats. Donkeys are one of the most important animals especially for agriculture and transportation. A few camels are also found, and they are used as a means of transporting heavy loads. Also there are dogs and cats.

In the Mahas region, beside the domestic birds-chickens and pigeons - there exist various wild geese, crows, sparrows, doves, hoopoes, starlings, herons, hawks in additon to the migrating birds which come from Europe to the area in the winter season.

As for the acquatic animals, there are many types of fish species in the Mahas region which is one of the most important sources of food. Corocodiles also exist but are rarely encountered. Other reptiles (e.g. tortoise and Nile lizard) are also reported.

Soil

In spite of the desert soil there is cultivable land on the alluvial terraces which are restricted to the narrow strip beside the Nile. This arable land can be divided into the following types :

a) Salūka land (farré):- which includes the sloping sides immediately adjacent to the river, in addition to islands. These are flooded annually.

b) Shadūf land (éré):- which is next to Salūka land and includes the higher mud banks of the river. They are flooded only during seasons of high Nile waters.

c) Sāgia land (Barjū):- which is the main and permanent land. It is the alluvial terrace which is well above the flood level. It is less fertile than the previous types.

d) Basin land :- which is the lower alluvial areas known as depressions that are watered during the annual inundation. Nevertheless, there is no basin land in the Mahas reach, and the few examples of it in Nubia have been developed recently in Dongola and Kerma regions.*

3- Economy

From the above mentioned description it is obvious that, the Nubian land is not rich in options and opportunities to be utilized by its people. Yet, despite this lack, surprisingly, throughout history Nubia was subjected to successive raids and great influence on its internal affairs from its neighbours especially Egypt in the north. There were many factors behind this. Firstly, Egypt tried to expand its authority over Nubia to secure its southern frontier.

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* Allan, W.N. "Irrigation in the Sudan" in ToThilly (ed), Agriculture in the Sudan, Oxford University Press, London, 1952, p. 623.

Secondly, the economic factor is regarded as one of the most important in attracting Egyptian attention to Nubia since early times. Nubian natural resources in the form of gold, copper and diorite stones used in the building of royal monuments as well as African animal products from Nubia or regions further south were very greatly desired in Egypt. The third factor was the African human source (slaves), who were much wanted in Egypt for many purposes.

It is obvious that this traffic in natural resources and slaves, in addition to the river-side ecology represented by the Nile, were the main factors which encouraged settlement in this area from early times. And despite the scarcity of cultivable land in Nubia, agricultural activities were and still are the basis of the subsistence economy of most of the Nubians. In trying to compensate for this limitation the Nubians applied an intensive type of cultivation rather than an extensive one. Also they adopted many other agricultural practices which gave Nubian agriculture its especial features and characteristics.

The Nubian agricultural cycle consists of three rotations. The winter rotation (shitwī) is the most important since in it the main subsistence crops, some cash crops and vegetables are sown. The summer rotation (séfī), is less important. In it, mainly millet, millet fodder, and some summer vegetables are sown. The flood season (damīra) is regarded as continuation of the summer season. In it mainly millet, beans and maize are cultivated in addition to water-

melons and sweet melons.

The crops cultivated in Nubia can be divided into three types, first cash crops; mainly dates. Second subsistence crops such as wheat, barley and millet. Thirdly forage crops; mainly millet fodder, maize and beans. All these crops are distributed carefully in the agricultural cycle.

Originally, the system of irrigation was based on traditional means, the Sāgia and the Shadūf (both of which will be described later). Early in this century these traditional methods began to be replaced by a modern system of irrigation (water-pumps). This new method has steadily developed and now takes a very important place in the economic life of the country. Nevertheless, the main features of the economic organization of earlier times continue to be preserved in the organization of the new pump-irrigation schemes. Agricultural schemes in Nubia are either owned by the public sector, the private sector or the co-operative sector.

In addition to agriculture, cattle, sheep and goats are raised and animal husbandry is today only slightly less important than agriculture. And now both are integrated to a great extent in the local subsistence economy of the region.

Another aspect of the Nubian economy is trade, either in the form of village trade or river trade, in which cash crops (usually dates and occasionally wheat) are used as articles of exchange.

Moreover, beside the local subsistence economy and trade, another aspect has begun to take an influential place in the Nubian economy. This is the income from Nubians working outside their country. The phenomenon of immigration arose as a result of many factors, mainly the scarcity of cultivable land and problems of land fragmentation. Also the introduction of some modern agricultural technologies, especially in the field of irrigation, decreased employment. Added to all this was the factor of the growth of population in the area which helped in the continuity of this phenomenon, which is now regarded as one of the major sources of income.

Needless to say, the Mahas economy was and still is an integral part of the whole Nubian economy. However, there seem to have been some local factors which gave the Mahas a particular character as far as economy and commerce are concerned.

The local character of the Mahas manifests itself in the cataracts that are found along the Nile reach. There are very mountainous and hilly patches which make the river impossible to navigate. The fact that Nile runs directly west-east in the southern part of the Mahas region then bends to run south-north in the middle zone, and finally south-east to north-west in the northern zone made it impossible for trade routes to pass through most of the Mahas region. This meant the semi-isolation of the region.

However, internal route systems connect the Mahas region with the south and the trade of darb-al-arb'ain (see Map No. III p.204). Also the geographical proximity of the area to the region of Dongola, which is famous for its boat building, made possible the passage of southern commodities into the region of Mahas and through it to the north.

Also the fact that the area is mountainous and hilly made it a very secure settlement area during troubled periods. There are many medieval and especially terminal medieval villages and hamlets in the region of the Mahas which flourished protected from the great wars between the kingdom of Dongola and the Mamelukes in the thirteenth and fourteenth centuries.*

All these factors made this area very conservative culturally, and so we now find remains of ancient Nubian cultural practices especially in the technological aspects. This is why this area is now known as one of the most productive and agriculturally successful regions in Nubia. i.e. the heritage of agricultural knowledge from the past and respect of the profession of agriculture also from the past combined to make the farmers of the Mahas region closely attached to their land and proud of it. They,

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* Mukhtar, R. "Antiquities of the third cataract region (east bank)" unpublished B.A. Honours dissertation, Faculty of Arts, U. of K., 1978, p. 57.

therefore, exert their utmost efforts to get the maximum possible production.

4- The People

As far as the ancient population is concerned, the Nubian land has seldom been the exclusive domain of any one group of people. Foreign conquerors, alien merchants and adventurers and friendly as well as hostile nomads have always rubbed shoulders with the indigenous peasant population of Nubia and have contributed not a little to its cultural as well as to its racial history.[1] Hence, the present population is the product of along and fairly continuous interbreeding of the existing population from a surprising variety of places.[2]

In the seventh century and as a consequence of the Baqt treaty, Nubia witnessed a major migration of Arab tribes. Part of these tribes settled in Nubia and intermarried with the indigenous population. Also during the sixteenth century new additions were made to the socio-cultural setting of Nubia, Sultan Salīm sent garrisons composed largely of soliders from Bosnia, Cireassa, Hungary and Kurdistan into Nubia, who were stationed at Aswan, Qasr Ibrim and Sai to protect the Egyptian southern borders. Their descendants

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1. Adams, W. Nubia Corridor to Africa, Allan Lane, London, 1977, p. 44.

2. Trigger, B. History and Settlement in Lower Nubia, New Haven, Yale University, 1965, p. 16.

(al-Kushāf) born of Nubian women and speaking only the Nubian lanaguage regarded themselves as Bosnians or Turks rather than Nubians and were claiming special privileges on these basis as late as last century.[1]

Consequently, one can say that Nubian society now consists of a mixture of indigenous elements and these Arab and Turkish elements. However as late as 1964, the Nubians inhabited the area of the Nile valley south of the first cataract to Dabba town. The Nubians are linguistically and culturally distinct from their neighbours. There are five Nubian groups, the Matukīa (Kunūz) in the north, Fadīja, Sikkūt and Mahas in the middle and Danagla in the South.

The name "Mahas" is applied both to the land and its inhabitants. It has been suggested that the earlier version of the modern "Mahas" is "neyhasu" which was used by the ancient Egyptians to refer to the people who inhabited the area south of Egypt.[2]

However, the modern Mahas inhabit the area of the Nile valley between Jabal Dūshā in the north and Abu Fatmā village in the south. Administratively they come under the Dalgo centre, in the northern province. According to their

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1. Ibid., p. 17.

2. Osman, Ali. "Nubia from C. 3000 B.C. to 1550 B.C." for UNESCO International Commission for a Scientific and Cultural History of Mankind, June 1988, p. 1.

oral tradition, the Mahas are related to be descendants of the Arab tribe qurīsh.[1] Another story states that the Mahas are the descendants of 'Ubid bin ka'b al-'Abasī and they were 70,000 in number when they came to the Mahas region. And the Mahas had their king at Jabal Sesbī till the Turko-Egyptian conquest of the Sudan in 1821.[2]

In addition to the Mahas, there are other groups of non-Nubians inhabiting the area. They are small in number, and made up of ex-slaves and nomadic and semi-nomadic elements. Ex-slaves who have been living with Nubians for generations and are accustomed to their ways of life can be regarded culturally as Nubians. They work mainly in domestic service and farming.

The other group is made up of Arab tribes, mainly Bisharīa and gararīsh. They are camel-owning tribes who reside in the region. They play an important role in the Mahas economy and society. During the last and early twentieth century they offered the only means of transporting heavy loads, but now they have been obliged to adopt a a settled life beside the Nile and began to cultivate small plots leased from the Nubians. They have no land rights, and although they use the Nubian language to communicate with

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1. Burckhardt, J.L. Travels in Nubia, John Murry, London, 1822, p. 64.

2. Shuqair, N. Jughrafiyat Wa Tārīkh Al-Sudan, (in Arabic) Dar Al-thagafa, Bayrut, 1967, pp. 732-433.

Nubians; they are linguistically and culturally distinct from them.

To sum up, as was mentioned previously the Mahas region seems to have had some local factors which helped in preserving the special cultural characteristic of the Mahas tribe to a greater extent than the other Nubian tribes. The Mahas people are still very closely related to each other. And there is a socio-economic equilibrium which resulted from a common feeling of equality. Also there is remarkably peaceful coexistence and economic interchange and interdependence between the indigenous population and other groups of non-Nubian origin.

CHAPTER TWO

AGRICULTURE IN NUBIA : A HISTORICAL REVIEW

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1. Nature of Evidence

It is very difficult to write a complete account of many early technologies and their development due to the scarcity of direct archaeological and historical evidence. Even though history began in 3000 B.C., with the invention of writing, yet it was not until several hundred years later that writing was used widely for keeping records. And there are still illiterate societies which have not recorded their own history. Moreover, whenever these documents are available they are always event oriented, i.e. they deal mainly with the details of the elite (kings, governors, religious men), and their political and religious events, and is often written to reflect the way that they wanted it to be.

So, these documents even if they are complete, do not give much information about the common people; their cultures, their way of life, their technologies and economic activities. And although the archaeological evidence helps greatly in this respect, it is not sufficient to write a history of early technology. This is because of the nature of material classes and their durability or otherwise. Which means that one usually has to rely on fragmentary evidence obtained from archaeological excavation.

As far as Nubia is concerned, the intensive international campaign to rescue the cultural remains of Nubia, was essentially a salvage programme in which time was a pressing factor. This meant that there was a lack of problem-oriented excavations,and the resulting loss of possible data on some aspects of the Nubian culture. However, it is noticeable in most of the published archaeological reports from Nubia that few efforts were made to retrieve data concerning agriculture. This is because the pioneers of Nubian archaeology were mainly interested in royal momuments and cemetries.

So, in trying to give a clear picture of this technology, the archaeological and the local historical evidence will be supplemented with other available sources of information such as the historical works of classical writers and medieval Arab writers, the works of European travellers, explorers as well as the contemporary ethnographic evidence..

2. The Early Stages

In the beginning of this review a quick survey of the cultural developments which preceded the early stages of agriculture and led to it is important.

The prehistory of the Sudan is divided into different technological stages. The oldest among them is the lower paleolithic which is characterized by the frequent occurrence

of balance, choppers and other bifacial tools. Secondly the Middle paleolithic, where tools made on flakes were dominant and handaxes began to disappear gradually. The third stage is the late paleolithic which saw the emergence of tools made on long blades among certain groups, and large numbers of grinding stones and a few Lustrous Lunates towards the later part of this stage.[1]

Throughout the lower, middle and later paleolithic the most important economic activities were hunting, gathering and some times fishing.[2] During the final paleolithic particularly near the end of it, techniques were developed to permit the effective use of the wild grain which grew along the Nile, and thus to make possible the exploitation of new and rich source of food.[3]

The microliths (the tiny flints which served as cutting edges and points) are the most abundant feature of all the latest prehistoric industries of Nubia.[4] The appearance of these geometric microliths, led Wendorf and other to suggest that these lunates were mounted on some sort of ashaft, presumably made of wood. The thick retouched edge was set

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1. Wendorf, Fred. "The Paleolithic in the Sudan", in Osman, Ali (ed), Readings in Archaeology and Culture History of the Sudan, in honour of Negm Eldin Sharief, 1989 (in press), Chapter 7, p. 1.

2. Ibid., p. 1.

3. Adams, W.Y. Nubia : Corridor to Africa, Allan Lane, 1977, p. 107.

4. Ibid., p. 108.

into a slot at a slight angle, and held in place with pitch or other similar adhesive[1] (see Fig. No. I, p.208). The association of numerous grinding tools with these Lunates reinforces the suggestion, especially when it became evident that this tool made it possible to collect wild seeds.[2] If that is so, then this flint blade tool must be the earliest form of the present day sickle which is used for harvesting tool on the same principle. Also the appearance of this flint blade sickle at that time seemed to have contributed greatly to the development towards food production.

The food producing economy (Neolithic); was introduced to the Sudan in the fifth Millenium B.C. after several thousand years of cultural development characterized by intensive exploitation.[3] The earliest direct evidence for food production in the Nubian Nile Valley is dated to the times of the A-group tradition. The A-group people were the first to practice cultivation on a more systematic basis.

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1. Wendorf, Fred. "Late Paleolithic Sites in Egyptian Nubia" in Wendorf, F. (ed), The Prehistory of Nubia, SMU Press, Dallas, 1968, pp. 942-943.

2. Abbas, M.A. The Neolithic Period in the Sudan, C. 6000 - 2500 B.C., Cambridge Monographs in African Archaeology, 6 BAR, International Series 139, 1982, pp. 137-139.

3. Krzyaniak, Lech. "The Neolithic subsistence economy in the Sudan", in Osman, Ali (ed), Readings in Archaeology and Culture History of the Sudan, in honour of Negm Eldin Sharief, 1989 (in press), p. 1.

They cultivated wheat, barley and leguminous plants (peas, lentils), probably on a naturally irrigated flood plain of the river.[1] But still, agriculture was far from providing a complete subsistence base.[2]

The same type of cultivation is still practised by modern Nubians, and known among them as Salūka cultivation. The name Salūka is derived from the name of the traditional sowing-stick or Salūka. The name is also applied to the land cultivated by this tool.

However, since the evidence of tilling and sowing tools, dating to that period is lacking, this may indicate that wooden tools were also in use at that time.

Concerning the following phase which is that of the C-group,[3] it is controversial whether agriculture was a base of their subsistence. Emery stated that they were cattle owners on a large scale, and did not devote themselves to agriculture.[4]

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1. Ibid., p. 5.

2. Adams, W.Y. Nubia : Corridor to Africa, Allan Lane, London, 1977, p. 125.

3. The early Nubian cultures have been classified by Risener Alphabetically into three groups A, B and C-group. However, "B-group" was eliminated by later scholars as a distinctive chronological stage and it has not found confirmation in later archaeological work.

4. Emery, W.B. Egypt in Nubia, Hutchinson of London, London, 1965, p. 137.

Adams disagrees with this argument. He stated that it is not directly archaeologically supported, adding that if the identification of the round houses found at C-group sites as granaries, is correct, it may be an indication of substantial surpluses of production and accordingly agriculture must have been the main base of their subsistence. As for cattle, he compares the C-group people to the present day Shilluk of Southern Sudan, who count their wealth in cattle but derive most of their livelihood from agriculture.[1]

The social and political structure of the A-group which was probably organized under the authority of local chiefs has been the subject of numerous discussions. It is quite conceivable that regroupings within these populations led to the expansion of the Kerma culture as much as those of the C-group.[2]

The Kerma culture takes its name from modern Kerma-villages situated on the east bank of the Nile at the extreme northern end of Dongola reach.

The culture was described and divided by B. Gartein into four principle phases, Ancient Kerma (KA), Middle Kerma (KM), Classic Kerma (KC), and Recent Kerma (KR).[3]

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1. Adams, W.Y. Nubia : Corridor to Africa, Allan Lane, London, 1977, p. 154.

2. Bonnet, Charles. "Upper Nubia from 3000-1000 B.C." in Osman, Ali (ed), Readings in Archaeology and Culture History of the Sudan, in honour of Negm Eldin Sharief; 1989 (in press), p. 5.

3. Ibid., p. 6.

Adams stated that the wealth if not the power of Kerma evidently depended on an economic symbiosis with Egypt, and particular with lower Egypt.[1] Here, undoubtedly, trade with Egypt was an important factor behind the rise of the Kerma culture. But there were other factors which manifest themselves in its strategic position, which helped Kerma populations to control the valley in the direction of the fourth cataract, and perhaps even beyond, in order to oversee the route towards Kassala and the Red Sea.[2] In addition, in the Kerma and Letti Basins, the displacement of the course of the Nile from east to west has in part concealed ancient river courses of the prehistoric periods up till the second millennium B.C. The Swiss expedition's surveys located several sites in the eastern desert, near fossil tributaries of the river, which demonstrated that vast regions were cultivated and that important settlements existed.[3]

Hence one can assume that the role of agriculture in the economic life of Kerma was not of less importance than trade. Moreover, the close contacts with Egypt are not shown for the periods of Kerma studied. On the contrary, the almost total absence of imports in several phases can perhaps be

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1. Adams, W.Y. op.cit., p. 216.

2. Bonnet, Charles, op.cit., p. 7.

3. Ibid., p. 7.

interpreted as a sign of political tensions between the two states.[1]

If so, then commercial relations must surely have been affected by such tensions. But agriculture remained a major economic activity independent of the impacts of foreign relations.

Beside the local agricultural developments manifested in the Nubian groups and Kerma culture, there was an Egyptian impact manifested in developments during the new kingdom. The economy became more complex. For a description of Nubian economic life during this period and the Egyptian impact upon it, we can quote Trigger.[2]

> "... the pattern of land holding which had prevailed in middle Nubian times and was probably based largely on community ownership was replaced by an Egyptian one. Most, if not, all farmers, now worked on lands that were owned by the crown, the local princes, government administrators, or by the temples which were built throughout the region. This shift in patterns of land-ownership seems to have been accompanied by a shift a way from pastoralism and the direction of more intensive agriculture".

It is clear from the above account that agriculture in Nubia witnessed a number of developmental stages during

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1. Ibid., p. 8.
2. Trigger, Bruce, History and Settlement in Lower Nubia, New Haven, Yale University, 1965, p. 111.

this period, which Adams regards as an only one aspect of Egyptian colonialism.[1]

However, the plantation scene depicted in the tomb of Djehuty hoteps (Prince of Serra) suggests that the Nubians may already have been producing and exporting dates, as they did at the beginning of this century.[2] Concerning the other agricultural products they were hardly sufficient for local needs, mainly due to the limited area of cultivable land. It is also evident that the Shadūf as a device for lifting water, was probably introduced during the new kingdom. This, no doubt, helped greatly to compensate for the lowering of the flood level since the middle kingdom.[3]

The agricultural development during the new kingdom and Kerma was accompanied by a number of social and political development, the consequences of which were the growth of the economy and a more complex society during the following stages.

3. The Middle Stages

It is agreed that the economic life of the Napatan Kingdom was based mainly on control of trade along the river

1. Adams, W.Y. op.cit., p. 231.

2. Save-Söderberge, T. quoted in Trigger, Bruce History and Settlement in Lower Nubia, New Have, Yale University, 1965, p. 111.

3. Trigger, Bruce. History and Settlement in Lower Nubia, New Haven, Yale University, 1965, p. 111.

highway to Egypt.[1] As for agriculture, it continued as simple cultivation only to meet the local needs.

During the Meroitic times the main activity of most of the Meroitic people was various forms of agriculture. And we know that cattle-rearing and growing of grain crops played an important role in their life.[2]

From the remains found at Meroitic sites, it is obvious that the Meroites, in addition to cultivating the river Nile banks, developed a large agricultural economy in the Butana steppeland dependent mainly on rainfed irrigation.[3]

The direct archaeological evidence indicating the kind of food crop in Meroitic times is scanty. Yet, the classical writer Strabo wrote a description of Nubia around 25 to 19 B.C. mentions the cultivation of millet, which became one of the main subsistence crops in the Sudan. Millet being a heat and drought resistant cereal, made possible the extension of agriculture from the Nile flood plain into the the steppeland.[4]

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1. Dunham, D. "Outline of the ancient History of the Sudan", in SNR, Vol. XXVIII, 1947, pp. 5-6.

2. Shinnie, P.L. Meroe : A civilization of the Sudan, Thames and Hudson, London, 1967, p. 158.

3. Abdel Karim, Khidir. Meroitic Settlement in the Central Sudan:an analysis of sites in the Nile Valley and the Western Butana, Cmbridge Monographs in African Archaeology, 8. BAR, International Series 197, 1984, pp. 97-98.

4. Adams, W. op.cit., pp. 329-330.

Cotton was also grown in Meroe as shown by the discovery of fragments of cloth made of cotton.[1] Another piece of evidence which supports this is that documented by Ezana (C.A.D. 350-375), the king of Axum, after his invasion of Meroe. He claimed that he destroyed Meroe and up-rooted its cotton plants.

During the late Meroitic sequences the country was subjected to climatic changes and dry seasons, which had a considerable effect on the Island of Meroe, since rain-fed agriculture formed the basis of its economic life. And it was this economic instability that led to the population movements and finally the collapse and downfall of the Meroitic Kingdom.

However, the climatic changes had little or no marked effect on the area occupied by Meroe to the north. It is evident that this region had a flourishing agricultural economy mainly due to the introduction of the Sāgia. It is clear from available evidence that the Meroitic and Ptolemaic re-occupation of lower Nubia was apparently made possible not by arise in the level of the Nile, but by this important technological break through.[2]

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1. Shinnie, P.L. op.cit., p. 159.

2. Adams, W.Y. "Continuity and Change in Nubian Cultural History", in SNR, Vol. XLVIII, No. 48, 1967, p. 12.

The Sāgia is a more advanced lifting device than the Shadūf. It is an animal-driven water-wheel functioning with one ox or two cows yoked to a horizontal wheel which drives a vertical wheel by the meshing of teeth along its edges. This vertical wheel is fixed to one end of an axle. The other end of the axle is fixed to another vertical wheel which carries the water pots. As the animals walk around a circular path, the water buckets are lowered deep into a well where they fill with water, which is poured into a trough and from it to the irrigation channels (see Fig. No. II, p.209).

The Sāgia seems to have originated in Mesopotamia but the date of its invention is not recorded. It's introduction to the Nile Valley took place in the second century B.C. In Nubia, we have no evidence indicating its introduction until the second century A.D., when the distinctive Sāgia knobbed pots began to appear.[1]

The impact of the introduction of the Sāgia in Nubia was revolutionary, since it affect all the economic, political social and cultural aspects of life for the following reasons.

Since basin agriculture was impossible in most of Nubia because of the terrain,[2] the type of agriculture practiced was Sāgia cultivatic

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1. Adams, W.Y. Nubia Corridor to Africa, Allan Lane, London, 1977, p. 346.

2. Trigger, Bruce, op.cit., p. 163.

on land inundated during high Nile, and cropped as soon as the flood receded. So it was only practiced during periods of high water level, but was always threatened by low flood levels. The introduction of the Shadūf during the new kingdom helped to compensate during low flood levels; yet, irrigation still remained dependent on the level of the Nile, for the ability of the vertical lifting of the Shadūf is limited to a certain depth, and water could be supplied only to the natural level at the river edge. (See Fig. No. III p. 210).

Both the Shadūf and the Sāgia are made from locally available materials (wood, ropes, leather, pottery). Yet, while Sāgia manufacture requires a professional crafts-man, the Shadūf, as a simple device, can be constructed by any farmer.

The Sāgia is far more advanced and efficient compared with the Shadūf. Its advantages over the Shadūf result from the substitution of animal for human motivation, which alone permits a fivefold increase in energy input. In other words, the Sāgia is operated by animal and does not demand strenuous human effort. Furthermore, for the first time irrigation became independent of the level of the Nile, is due to the ability of the Sāgia to lift water from a much deeper depth.

Accordingly, there was an increase in the amount of

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* Adams, W.Y., op.cit., p. 346.

water supplied for irrigated land, which resulted in extensive exploitation of fallow land. Secondly, the capacity of the Sāgia to work efficiently throughout the seasons of the year offered the possibility of growing several crops a year instead of a single one in the flood season.

Most scholars seem to agree that the appearance of the state-like kingdoms in the north was a result of the economic revival which was a result of the introduction of the Sāgia and growth of population.

Another factor which may also have helped to develop agricultural technology during this period, is the mastering of iron working which made a decisive difference to the nature as well as the quantity of tools and weapons available to the meroites.* Also larger iron tools became available. Some of these tools have been found but are not common. Their rarity may be due partly to the rapid deterioration of iron, which corrodes very badly especially when affected by damp. Also weapons are more plentiful than tools, since as objects of greater prestige they were more commonly placed with the dead than were the workaday implements of agriculture and manufacture. Hoe blades or mattocks, the main tools of the cultivators, have been found as have adzes

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* Shinnie, P.L., op.cit., p. 162.

which were extensively used in wood-working.[1]

Among the finds of the Scandinavian Joint expedition to Sudanese Nubia was a sickle which was found in an intact X-group tomb at cemetry No. 416 on Shargundi Island at Abka (see Plate No.I , p.215).[2] Another sickle which is dated to the same period was also found at Faras East. This sickle is made of iron and looks more similar to present - day ones. The length of blade is 20.0 cm. while the tang is 8.5 cm. There is incised decoration on one side of the blade and a zigzag band follows the back. In the middle there is a palm branch design and on the upper part a short line crossed by three other lines[3] (see Plate No. II , p.216).

The finds also consist of many other tools which were used in agricultural operations or in preparing and manufacturing tools for them.

So, the change from tools made of stone and wood to iron tools for tilling, sowing and harvesting,definitely led to the progress and development of the agricultural process.

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1. Ibid., p. 162.

2. Save-Söderberge, T. "Preliminary Report of the Scandinavian Joint Expedition. Archaeological Investigation between Faras and Gemai Nov-1903-March 1964", in Kush, Vol. XV, Khartoum, 1967-1968, p. 243.

3. Save-Söderberge, T. Late Nubian Cemetries, SJE; Vol. 6, Sweden, 1982, p. 35.

4. The Late Stages

It is clear from historical and archaeological evidence that small-scale farming continued to provide the basis of subsistence in medieval Nubia.[1] So, although the medieval Nubian economy was based also on mining and commerce, agriculture to a great extent remained its subsistence base.

During the classic Christian period great energy and care seems to have been given to agriculture. Agricultural technology witnessed a new advanced era. A high level of agricultural organization was adopted to acquire the maximum possible production from the available resources.

With respect to the irrigation system, the Sāqia technology by this time was well established. The Nubians were mastering the building of the Sāqia and repair of its parts (water pots, ropes). The system of canalization was introduced. Another innovation in this field was the use of a small Sāqia (Kulutūd) to supply the major Sāqia with water when it became far from the Nile. And in many places that were naturally poor artificial terraces were built as high as the water-wheel could reach.[2]

Concerning the energy input animals used for deriving the Sāqia were also used for breeding. Consequently, this intensive form of cultivation and high level of technology

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1. Adams, W.Y. op.cit., p. 502.

2. Trigger, B. op.cit., p. 147.

which accompanied it, had a great influence on the process of production relations and system of land tenure. These relations were best manifested in the leather decree that was found at the third cataract region (Nawri village), which details an agreement between a land-owner and a farmer.*

This torba system, which is still practiced in some parts of Nubia, is a complete organizational system which involves the exploitation of most available cultivable land and regulates labour and partnership relations in the agricultural economy. It therefore provides the subsistence technologies of Nubia with the other tools of production, i.e. the Sāgia and associated implements.

The accounts of medieval Arab writers are important in throwing light on Medieval Nubian history. The best of those accounts is that of Ibn Salīm Al-'aswanī written during the tenth century A.D. He reports that :

> "The district is narrow and mountainous. The trees are the date and mokel .... the vine is there cultivated, there is no natural irrigation of the soil, for its being too elevated. The inhabitants sow by the feddan, or two feddans, and cows are employed to raise the water from the river by means of water-wheel. Wheat is scarce among them; barley and selt are more abundant. As their soil

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* Osman, Ali. "The Economy and Trade of Medieval Nubia", unpublished Ph.D. thesis, Christ's College, Cambridge 1978, pp. 61-62.

> is confined , they cultivate it a second time. In the summer after renewing the soil with dung and earth they then sow Dokhen, Dhoura, seasum and Loubya". 1

The second example is Al-Masu'dī (956 A.D.) who stated that their country (Nubia) produces palm-trees, durrah, bananas and wheat and is very similar to Yemen. There are grown big citrus, which equal the biggest ever produced in the lands of Islam. [2]

These scattered pieces of information about Nubia, its nature and the subsistence technology help greatly in reconstructing a clear picture of the Nubian region at that time. There is no great difference between that picture and the present day one.

The late periods of the medieval Nubian kingdoms witnessed long wars with the Mamelukes of Egypt, and it was this political instability that led eventually to the cultural and economic decline of these kingdoms.

5. The Modern Stage

The downfall of the Christian Kingdoms was followed by along period of weakness and political unrest until the establishment of the Funj Kingdom at Sinnar around 1504.

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1. Al-'Aswanī, Ibn Salīm. in Burckhardt, J.L. Travels in Nubia, 2nd edition, John Murry, London, 1822. Appendix No. III, p. 488.
2. Al-Masu'di (956 A.D.) in Vantini, G. Christianity in the Sudan, EMI, Bologna, Italy, 1978, p. 23.

The Funj tried to extend their influence to the north but they were defeated by the Turks at Hunnk which remained their northern boundary. Nubia then partly ruled by these Turks who were known as Kushāf. They ruled the territories between Aswan in the north and Ténarī in the south; while an independent kingdom - The Kokka kingdom - ruled the territories between Ténarī and Hunnk.[1]

The Swiss traveller Burckhardt visited Nubia during this period (1813). He started his journey from Aswan along the Nile up to the northern frontiers of Dongola reach, from where he returned. During this journey he described in detail much about the Nubians' way of life.[2]

As far as their economy was concerned, it is obvious from his accounts that agriculture still provided its subsistence base. But no further development was attained either in the technology of agriculture or in the quality of the cultivated crops. Moreover, the oppression and injustice of the rulers often obliged the inhabitants to abandon their Sawāgī (sing. Sāgia) and cultivated fields.

In Egypt, agricultural development was one of the major aims upon which Muhammad Ali laid the foundation of

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1. Osman, Ali. "The Post-Medieval Kingdom of Kokka", in Plumly, J.M. Nubian Studies, Aris and Phillips, Ltd. Warminster, Wilts, England, 1982, p. 182.

2. Burckhardt, L. Travels in Nubia, John Murry; London; 1822, pp. 1-140.

his state.[1] Therefore, the Sudan with its gold, slaves and agricultural and natural resources represented a new source of wealth of which he was in great need. So, soon after the conquest of the Sudan in 1821, he started to exert great efforts to develop agriculture. Firstly Egyptian peasants were brought into these new territories to teach their methods to the Sudanese cultivators, and the natives, who according to Richard Hill had no settled way of life, alternating between tribal war, primitive agriculture and cattle raising.[2]

In addition, Muhammad Ali after his visit to Sudan took with him to Egypt four Sudanese boys to learn new methods of agriculture, so that they could teach them to their people and encourage them to take up agriculture on their return.[3]

The agricultural tools were described as being few and simple, which led Muhammad Ali to send experts and carpenters to Sudan to manufacture water-wheels similar to

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1. Abu Salīm, M.I. op.cit., 1980, p. 213.

2. Hill, Richard. Egypt in the Sudan, Oxford University Press, London, 1959, p. 49.

3. Sa'id , M.A. "The Policy of Muhammad Ali in the Sudan", unpublished M.A. thesis, (in Arabic), Cairo University, 1970, p. 144.

the Egyptian model, since the Sudanese one was inefficient.[1] He also sent engineers to construct canals and banking in Dongola and Berber.[2]

In 1850 the Egyptians imported four thousands ploughs to introduce modern methods of ploughing.[3] Attempts were made to introduce new crops in addition to the development of the existing ones. Plantations of sugar cane were introduced in Dongola Province.[4] Rice, hemp and berries were also introduced. Cultivation of indigo and cotton was widely developed and various kinds of fruit trees were also introduced.[5]

New means of increasing agricultural productivity were adopted. These included, inspection visits to the farms, sending circulars to encourage the construction and repair of water-wheels and cultivation at the exact time.[6] Seeds were also distributed to the farmers.[7]

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1. Shuqair, N. Jughrafiyat wa Tārīkh Al-Sudan, (in Arabic), Dar Al.thagafa, Bayrut, 1967, p. 171.
2. Hill, Richard, op.cit., p. 50.
3. Abu Salīm, M.I. op.cit., pp. 218-219.
4. Ibrahīm, H.A. Muhammad Ali in the Sudan, (in Arabic), Khartoum University Press, undated, p. 137.
5. Hill, Richard, op.cit., pp. 51-55.
6. Sa'id , M.A. "The Reign of ʾAbbas and Muhammad Sa'id ", unpublished Ph.D. thesis, (in Arabic), University of Khartoum, 1977, pp. 193-194.
7. Shukry, M.F. Egyptian Rule in the Sudan from 1820-1885, (in Arabic), Cairo, 1947, p. 100.

Another step in these attempts at agricultural development, was the establishment of factories for processing the agricultural products. For instance factories for indigo, tanning and cotton ginning were established. It was the establishment of these factories that marked the beginning of agricultural industrialization in the Sudan for the first time.[1]

Another characteristic of the Turko-Egyptian economic policy in the Sudan was the attempts made to regulate land problems. When Muhammad Sa'īd visited Sudan he tried to handle this problem by issuing four edicts in 1857 in which he specified the area of the fedan. He also limited the taxes upon cultivable land and the water-wheel,[2] and also called for the registration of land.[3]

The Turkish conquest of the Sudan brought about some further social changes in the agrarian structure of Sudanese society.[4] Yet, the attempts made to develop economic life in the Sudan did not yield the expected results due to many factors. The first of these was that the real intention of the Turko-Egyptian government was not the development of the

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1. Abu Salīm, M.I., op.cit., p. 216.

2. Riyyad, Z. The Contemparary Sudan from Egyptian Conquer to the Independence, 1821-1953, (in Arabic), (Cairo, 1966, pp. 77-78.

3. Shukkry, M.F. op.cit., p. 10.

4. Adam, F.H. "Agrarian Relations in Sudanese Agriculture: A Historical Review", in SJD, Vol. 1, No. 2, 1977, p. 36.

Sudanese economy but merely exploitation. Secondly the corruption of the administration in addition to the imposition of heavy taxes which people were not accustomed to, and which were collected by force led a large number of the inhabitants to migrate, abandoning their water-wheels and cultivated fields.[1]

Another important factor was the introduction of cash crops. This attempt faced by many obstacles, since it was not logical for the traditional farmer to risk his subsistence crop for a new one about which he knew nothing.[2]

In addition to all these factors the monopoly policy, applied by Muhammad Ali had adverse effects upon economic stability, which led in the end to mutiny and revolt.

A quick survey of the abundant writings on the Mahdist period will show that Sudan during this stage did not witness any vital change in its agricultural strucutre. No further technological development was achieved, and agriculture was still practiced using the same traditional methods as before. Furthermore, the agricultural process was widely affected by the state of anarchy that resulted from the political situation like the movements of armies and the mobilization of

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1. For further information see :
   a) Sa'id, M.A., op.cit., 1970, p. 170.
   b) Abu Salim, M.I., op.cit., pp. 218-230.

2. Hopkins, An Economic History of West Africa, London, 1973, p. 30, quoted in Al-nadal, M.S. The Economic Policy of the Mahdist State, (in Arabic), Khartoum University Press, Khartoum 1986, p. 31.

tribes. In addition, the government used to interfere in agricultural affairs without knowing any thing about them. On the other hand, there were continued attempts from the government to encourage agriculture and overcome the prevailing state of anarchy. However, in spite of all these obstacles, agricultural products started gradually began to be replaced by cash rather than subsistence crops.[1]

Under British colonial rule, the policies were intended to exploit the country's human and natural resource to provide raw materials for the expanding cotton industry in the metropolitan country. The outcome of the colonial period was the creation of a new agrarian structure based on the cotton plantation.[2]

This new policy of monocrop cultivation was mainly applied in the central districts. In the northern province, the aim of the colonial agricultural policy as stated by Tothill was as follows :

> "To encourage the emergence of a prosperous permanent, happy, peaceful community based on agriculture ..., there must be an abundance and variety of good food, including fruit and vegetables, a good permanent and abundant water

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1. Al-gadal, M.S. The economic policy of the Mahdist State, (in Arabic), Khartoum University Press, Khartoum 1986, p. 72.

2. Adam, F.H. "Agrarian Relations in Sudanese Agriculture : A Historical Review", in SJD, Vol. 1, No. 2, 1977, p. 38.

supply"[1]

The major achievement of the condominium agricultural policy in the Northern Province, was in field of irrigation, through the development of a new system based on water pumps.

Irrigation by pumps drawing water from the rivers was introduced into the Sudan early in the present century on a small scale.[2] Although there were private schemes, the majority of them were public.

During and immediately after the first world war, the government opened up seven irrigation schemes in the province, primarily intended to increase the production of local crops and to meet the demands for fodder of the British cavalry regiments then stationed in Egypt. In the period between the two world wars they continued to function. Yet there was no further expansion of government projects until the Second World War, apart from the opening of a small scheme at Debeira in Wadi Halfa district in 1935.[3]

Soonafter the out break of war in 1939 and from then

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1. Tothill, J.D. "Note on Agricultural in Northern Province", 1942 quoted in Hwison, J.W. "Northern Province Agriculture", in Tothill, J.D. Agriculture in the Sudan, Oxford University Press, London, 1952, p. 742.

2. Ibid., p. 611.

3. Ibid., p. 749.

onward new methods of agriculture steadily developed and now have a very important place in the economic life of the country.[1] Nevertheless, the main features of the economic organization of earlier times continued to be preserved in the organization of the new pump irrigation schemes.[2]

To sum up, the early stages of food production in Nubia were succeeded by a more complex economic stage resulting from the introduction of the Shadūf during the new kingdom through the introduction of the Sāgia during the late Meroitic and the introduction of the pump-scheme during the colonial period. But seemingly since that time agriculture did not witness any vital change either in methods or organizations. Even with the introduction of the modern diesel pumps, no outstanding tangible effects are recorded.

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1. Ibid., p. 611.

2. Osman, Ali. "Economy and trade of Medieval Nubia", unpublished Ph.D. thesis, Christ's College, Cambridge, 1978, p. 60.

CHAPTER THREE

WATER-LIFTING DEVICES AND AGRICULTURAL IMPLEMENTS

CHAPTER THREE

WATER-LIFTING DEVICES AND AGRICULTURAL IMPLEMENTS

As mentioned previously (Chapter I p. 27), the Nubian environment does not provide many options for economic activities. The Nile presents the only possibility of agriculture. So, the Nubians from early times worked hard to control their environment in order to gain their livelihood. They used a number of agricultural subsistence technologies which were manifested in the development of a set of means of production such as water-lifting devices, water-conduction, agricultural tools and organization.

In this Chapter an attempt is made to give a full description of one of the Nubian subsistence technologies. This component is the water-lifting devices and agricultural tools.

1. Water-lifting Devices

Early in this century the area witnessed the introduction of modern water-pumps. Nevertheless, the traditional lifting-devices in the form of the Shaduf and particularly Sāgia were, until recently the backbone of agriculture in the Nubian region.

The Shadūf

This is a counter-weight lever used for raising irrigation water, known locally as kiyyé. It consists of two wooden pillars (sing. Kiyyen ūy) , supporting a cross

bar on which pivots along wooden pole (Kiyyen kām). To one of the ends of this wooden pole a dried mud ball (tugāl) is fixed, which acts as a counter-weight to the dipper. To the other end of this lever the dipper (dalū) is suspended by a rope. The Nubian farmers always use an empty tin or bucket as a dipper. The Shadūf can easily be constructed, worked and maintained by one man. It is usually used during flood seasons, when the high water level makes lifting easier. When a Shadūf is operated continuously it can water nearly a feddan per day. However, although it has along history in the Nile Valley, the original design and out-put capacity have remained the same without any subsequent improvement and/or promotion. Thus its basic disadvantages and merits have remained unchanged.[1] (Fig. No. III, p.210).

The Sāgia[2]

The Sāgia is an ox-driven water-wheel. The word Sāgia is an Arabic word that originated from Arabic verb Saga , which literally means to water. The equivalent Nubian word for Sāgia is askalé . There are three types of the Nubian water-wheels, the large one, the Medium which

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1. Abdel Magid, Anwar. Plant Domestication in the Middle Nile Basin an Archaeoethnobotanical Case Study. Cambridge Monographs in African Archaeology 35. BAR. International Series 523, 1989, p. 216.

2. For more on the subject see: Abu Salīm, M.I. op.cit., 1980.

is the standard in the area and the small one (Kulutūd) which is used to supply the large Sāgia with water. The term Sāgia is applied both to the water-wheel used for irrigation and to the irrigated land.

The Sāgia construction in the Nubian region is widely known and thoroughly established. This is naturally due to the long history of the Sāgia in the region, especially since it is wholly constructed from local materials and by local experts.

When the decision to build a new Sāgia is taken, a number of neighbours and relatives are summoned to help. This tradition is called faz'ā and is very old. The faz'ā is carried out when any heavy work has to be undertaken, for example, building a new Sāgia, making a water channel or a new irrigation trough. The people of the faz'ā are not paid for their help, but the owner of the Sāgia and his partners have to supply them with food and drink.

The best time for building a new Sāgia is the break after the end of the winter season before the start of the new agricultural cycle. The site of operation is always located under the palm trees beside the river.

The traditional specialist (Bāsir), is responsible for carrying out major repairs to the Sāgia, while minor repairs

are the responsibility of the farmers. Before starting the actual building of the Sāgia, the owner must prepare the needed material. The main material is wood, many types of which are used namely Sunt (L. acacia Nilotica, Julle), Sayāl (Acacia raddiana savi, gindé) haraz (L. acacia seyal de. Urung) and palm trunks. These types of wood are all available by the bank of the Nile and in dry water courses. After the owner makes sure that the needed wood is available, the Basīr comes to decide which pieces must be cut down. The axe (gama) is the tool used for this purpose. The logs are then left to dry, except Sunt, which needs to be immersed in water for a while to prevent it from cracking. Then all the men together pull the logs with ropes to the site of operation.

After preparing the necessary material, the Basīr gets his equipments which consist of the saw (Munshar), the drill (birrīmā) the claw hammer (gurnas). The measuring equipment comprises a string or a stick of a certain length and black paint for marking while recently a piece of chalk is used. Then he starts the construction of the Sāgia. Here we will classify the Sāgia parts into four sections as follows :

Section I : Driving Machinery

The Wheel :

The wheel is the first part to be prepared. Its Nubian name is argadé. Sunt wood is commonly used in constructing it, but Sayāl wood is also used. The

construction of the wheel is the most difficult and complicated task that needs attention, accruacy and experience. There are two wheels in the Sāqia, the large wheel (argadé daū) and the small wheel (argadé Kudūd and/or arqadīn 'as). Each wheel consists of three parts, which can be described as follows :

a) The cogs (sulgadé) which number 32-36 in the large wheel and 22-24 in the small wheel. The cog is a small log that is pointed using the adze ('alad) at one of its ends to be mortised in the wheel. It is one dirā' (58C.) and three gérat (width of one finger approximately 1.5 cm.) in length in the big wheel, and one dirā' in the small wheel (see Plate No.III, p.217).

b) The horizontal corssbeams (tunī and ulum): they are eight in number, each four of them attached to each other by the halving technique in a cross shape leaving a gap of equal sides of one shibir (span of a hand) in length. They extend parallel to each other both at the upper (ulum) and the lower (tunī) sides of the wheel. Their function is to join the wheel to the vertical perpendicular driving spindle (mishī). Their length in the big wheel is nine Shibir and six Shibir in the small wheel. The width is Shibir and six gérat in the large wheel; one Shibir and four gérat in the small wheel (plate No.III, p.217).

c) The round edge of the wheel (Nām) : It is composed of four curved parts which when put together give the circular shape of the wheel.

When the Basīr starts his work he first puts a peg as a centre, then he uses a string or a stick of a certain length to mark the boundaries of the circle using a string dipped in black paint or by making it with a piece of chalk. Then he treats the edges with the adze to remove the unwanted parts until it reaches the required curvature. The second step is to join these four parts to each other. In this respect the Basīr applies the rabbet-joining technique, using the adze to trim the ends of the parts until they fit together compactly. Then the centre of this joint is drilled using the birrima and fastened with a wooden peg (Ondi), so in each wheel there are four wooden pegs.

To join the parts of the wheel together the horizontal cross beams, after being placed together in the middle are fastened by pegs to the round edge. Secondly, the cogs which require a dug-out holes all round the wheel are fixed. A distance of one Shibir must be left between each hole and the next. The pointed end of the cog then enters in the hole and when it is exposed at the inner side it is fastened with a peg and/or by strips of a raw cowhide; when all the parts of the wheel are fitted together they are all firmly and thoroughly tied with strips of a raw wet cowhide (plate

No. III, P. 217).

The Vertical Axle (Mishī)

This is a perpendicular spindle, attached to the centre of the large wheel and turns it according to the movement of the animals. It is made of Sunt and Sayāl wood. It's whole length varies between three and four dirā'. The thickness is one Shibir for each side. The upper part widens to take a square shape. A cavity (tugumin uffi) 4 X 8 gérat in length is dug out, in which a part called the tugum is attached. There are two wooden pegs which are fastened to the middle of this axle to support the wheel known as argadīnkaj , which literally means "the donkey of the wheel". The lowerest part of this axle is a wooden tenon that is fixed into a hole in the bottom of it. This part is changeable one because it is always liable to wear out. (Plate No. IV , P. 217).

The Horizontal Axle (Toré)

This is an axle that joins the small wheel and the frame wheel that carries water pots (dugunti). It is five to six dirā' in length in the small Sāgia and six to seven in the large one. It's thickness is one Shibir at both ends. It ends with two tenons each of them about four gérat in length.

The Tugum

The tugum is a long beam which is about ten dirā

in length. One of its ends is pointed to allow its attachment to the cavity (tugumin uffī) of the vertical axle (mishī). The other end is split into two branches. The open side of these two branches is to be closed with a stick tied to their ends. Then, the resulting gap is woven with rope ('alas) to give a seat for the driver of the Sāgia. Also another rope (ulus), that extends from the yoke of the animals and pulls the whole Sāgia is tied to one end of these branches.

The Dīw

The dīw is along log which is usually made of a palm tree trunk. It is about eighteen dirā' in length and must not be shorter than sixteen. The dīw must be at a horizontal level over the base that supports the vertical axle. The dīw is positioned by planting a trunk of a strong wood (Sunt, Sayāl or palm tree trunk) strongly in the earth both on the right and left side of the Sāgia. These trunks (mugdo) always diverge into two branches. To attach the dīw to the trunk the dīw must be perforated at it's hardest end and then a strong stick (simir) is passed through this hole. The dīw is attached to the middle of the simir. Then all are strongly attached to the stem and its divergent branches. The same happens at the other side.

In the middle of the dīw there is a part called the 'arusa which is a piece of Sunt wood that is four Shibir long. In the middle there is a cavity which is eight gérāt wide. It is in this cavity that the pointed head of the vertical axle turns. At one Shibir from each end of the 'arusa there

is a hole, in which two pegs are fixed to fasten the 'arusa to the dīw; all of them are then tied with ropes (aman allī).

The dīw's main function is to keep the vertical axle and consequently the horizontal wheel in the right position, because if it is not balanced the whole Sāgia may collapse.

The Islangi

The Islangi is a yoke; a neck-piece in which a pair of animals are harnessed. It is made of haraz wood, for this is not heavy. It is three dirā' long, and in the middle of it there is a hump known as kagindé. Another part of it consists of the two sticks (sing. Missar) which are fastened to two cavities at it's ends. These two sticks have a thick head in their upper part to mortize them in the holes. From the lower ends of those sticks a rope (Missarīn allī) extends to roll around the animal's neck. Often a pad (toffil) made of 'alas rope remains, rags and palm tree fibres, is placed between the islangī and the neck of the animal to prevent friction that would hurt the animal's neck. (See Plate No. V, p. 218).

Section II : The Water Carriage

The Duguntī

The duguntī is a frame wheel that carries water pots. It is constructed from Sunt and consists of many parts. The first part is the basic frame, which is composed of four beams (duguntī). The length of each of these beams

is three dirā' or ten Shibir. They are attached by the havling technique, giving a cross-like skeleton with a square gap in the centre, each side of it being four gérat in length. Into this gap the horizontal axle is attached and then fastened tightly with a rope called iblīm which is also tied with another rope one Shibir long known as elwil. The second part is called fashé. It is a piece of wood, normally Sunt or talih, two dirā' long. At one-third of its length there is a cavity in which the tenon of dugunti is attached. The third part of this wheel is the 'ād, which is also called tarantarain ūy, because another part called tarantaré is mortised to its end. Tarantarain ūy in the Nubian language literally means "the leg of the tarantaré." It is a stick that extends from the angle where the beams of the dugunti join each other. It is at the same level with fashé, and the part attached to it, Tarantaré, is also equal to the fashé but smaller in size.

Concerning the whole wheel, the side that faces the Sāgia is known as attī which means the back, and the other side Sorong, which literally means "the nose" in the Nubian language, here means the front.

The 'Alas

The 'alas is a double rope to which the water pots are attached. It is made of Halfa grass in particular because it is durable in water. Its length depends on the

depth of the well. There is a stick that joins the double ropes, called the 'aglo which is one Shibir long. Each water pot is attached to two 'aglo, and the first 'aglo must be thicker than the other to bear the bend of the 'alas and it is called 'aglo nondi, which literally means "the male'aglo". The distance between one 'aglo and another is two knots of the 'alas, i.e. one Shibir, and between each double 'aglo and the other there are three knots (one and half Shibir).

During the flood season or in small Sāgia (Kulutūd) the pots are attached successively at each two 'aglo, and this is known as jabgol. Yet at other seasons the distance between one pot and the other is six Shibir, and between the double 'aglo and the other four Shibir.

To facilitate the pouring out of the water, a pad called dir (usually from 'alas rope) is used to raise the lower part of the water container. Another pad is put under the front part of the pot for the same purpose. Also a grass called tushī is tied to the edges of those pots to avoid friction with the bottom of the well.

The Fīshé

This is the water container, which is two Shibir long. Originally it was a pottery container, but recently iron ones imported from Egypt have been substituted. In the bottom of the fishé a small hole is preforated to allow

some water to escape and lighten the weight of the 'alas and the wheel. There are twenty four fishé in the big Sāgia and from nine to twelve in the small one.

The Sablo

The Sablo is the basin which receives water from the pots. It is three dirā' long and one dirā' wide. It is composed of two pieces of palm tree logs, or dom palm which is the best. These logs are dug out and tied to each other strongly with ropes while the gaps between them are filled with palm branches (turban tushī) and 'alas remains. Also a pad of 'alas (gourd) has to be put under the Sablo to facilitate the pouring out of water. The Sablo is opened into another part known as the 'ur'ūkū, which is also a hollowed out piece of palm tree log. It connects the Sablo with another similar part called jarratir. All these parts are tied together with a rope called minja, which is lashed around them and then fastened to a peg called menjin findé. The gaps are also filled with palm branches. Recently, rails and iron bars have been used instead of these wooden logs.

From the jarratir the water runs into another part called dirw. The dirw is a long log of palm tree six dirā' long. It is the last part that connects the main conduit. For this reason it is sometimes called Samin dirw, which literally means the dry dirw signifying that it carries water to the dry land.

Section III : The Plat-form

The Kodé

The kodé is the circular path in which the animals, driving the Sāgia move. The circumference is fourteen dirā in the standard Sāgia and smaller in smaller ones. There are two situations for the area between the small wheel and the large wheel carrying water pots. The first one is the kiden isikag in which the well must be paved up to the surface of the earth. In this situation the animals walk on firm ground. The water-kalo, the inner kalo of the toré, is laid on a stone on the inner side of the well. In the other situation that is called antiko, which means literally "something that is needed for planning or consideration", the well is not paved up to the surface of the ground. Therefore, the area between the small wheel and the large vertical one carrying water pots must be paved for the animals to move on. This pavement is called jibit and it is laid in a geometrical pattern based on four beams each of them called ūy, which literally means "the leg" i.e. the leg of the Sāgia. Sometimes, it is also called urkag which means "the carrier of the load". Two of these beams are near the well and each of them is called gullen ūy, which means "the leg beside the neck". Opposite to them their are two other beams each of them is called 'urin ūy which literally means "the leg beside the head. Then a long wooden beam called tibir kundi extends between the two legs of the head to carry all the load. Over this wooden beam come four logs, two of which are major ones. The first is called the front log the second one the back log. The two other logs extend from the end of the major log towards the Sāgia land with a wide opening

to the side. This is called mirg tan which means "the second log". They differentiate between them by calling them the front log and the back log.

Over these logs two rails extend in a cross pattern. They are called isikag or isikagir, which means the carrier of the water. Then a third rail extends externally and it is called malo. Before changing to iron rails, solid wooden beams were used. On the two rails is laid the water-kalo (the kalogo). And from the external rail two pieces of wood extend far behind the isikagir, on which the sablo is laid. These pieces of wood are known as sablo kagir, which means the carrier or supporter of the sablo. Also in this place another piece of wood (turban ūy) is tied, in addition to other pieces which extend to support the Sāgia screen.

Over the two rails a number of palm logs and dom palm logs are placed together to cover the logs laid in the area between the small wheel and the large vertical wheel. Also palm-tree trunks, leaves and fibres are used in addition to mud and dung all levelled and made even to become a part of the kodé .

The Sāgia Screen (Beyyé)

This is a shelter that is made to protect the water falling from the pots of the depositer from the wind. Generally it is known as a tūgin nūg, which literally means "the house of the wind". It is a woven mat made of split palm ribs, and sometimes from wheat straw. This mat is called gé ad. Another type of shelter is built from mud

in a circular shape around the Sāgia, and it is called madara. It is always made for the permanent Sāgia rather than the small one (kulutūd). It is also made when the level of the Sāgia site is lower than that of the agricultural land. The side that is facing the direction of the wind is often built higher than the other sides.

Section IV : The Water Source

The Well (Mittar)

The Nubian well is of two types, the old one which is called the kufrī (the pre-Islamic one) and the modern which is called Al-Baladi (the local one). The advantage of the modern well over the old one is in its width, which allows more length for the dugunti; whcih consequently leeds to lightening the weight of the water and making the operation of pulling the Sāgia easier.

Generally, the well is of a rectangular shape, along which the dugunti turns. The width and depth of the well differ from one well to another. The depth is usually determined by the water level and the height of the dugunti. In the standard Sāgia its maximum depth reaches twenty-six to twenty-eight dirā'.

When a well is to be constructed a suitable site must be chosen carefully. Firstly it must be higher than the level of the fields to facilitate the flow of the water towards them. This levelling is called midar by the Nubians. Secondly, the site must be in a wide place to include both the well and the kodé. Thirdly the site must be far

enough from the river edge to be protected from water erosion (hadām), and high water levels (flood). The fourth which is the most important factor, is to choose suitable soil, as it is difficult to dig stony soil, while sandy soil that is loose is liable to fall in.

The well is normally enclosed by stones. This operation known as kakur. The wall will be started by placing a strong base composed of large stones which are laid on each corner of the four sides. Then the walling is steadily built on vertically. The stones are arranged side by side and fitted together tightly avoiding any irrigular humps which may lead to the collapse of the well. To fasten the stones strongly, small stones called girgār, broken especially for this purpose, are used to fill in gaps.

Also there is a tunnel that connects the river with the well called nūj, which regularly supplies the well with water. The length of this tunnel differs according to the distance of the Sāgia from the river and its height above the Nile level. Its minimum length reaches nineteen dirā' and maximum length twenty-eight dirā'. Its width and height are around three Shibir but in modern wells the height of the tunnel is about one metre and the width is about eighty cm. The nūj is often not paved.

Behind the tunnel there is a big conduit which is called farīg. It runs towards the river till it joins the supply channel that provides the Sāgia with water during the low Nile. The farīg is sometimes directly connected

to the river itself. In this situation the Sāgia is called essi wér , which means; directly connected with water.

The Sāgia Movement

Below we will demonstrate the actual working mechanism of the Sāgia. First the animals are yoked. This operation is known as dukād which means that animals are tied to the Sāgia and ready to drive it.

The animals are usually attended by a young boy, who sits on the tugum, pulling the rope (ulus) that is tied to the animals' yoke, and sometimes whips the animals lightly to make them move faster. When the animals move on the circular path (kodé) around the spindle they drive the the large horizontal wheel which inturns moves the vertical wheel by the meshing of its teeth along the edges of the latter's teeth. In this way the wheel carrying the water pots. As this wheel turns the water pots descend one after the other into the well, where they are filled with water, then they carry it out to the top in a continuous movement. Here they pour out the water into the water depositer (sablo) which carries it through the 'ur 'ukū and the jarratir off to the main water conduit and then to the fields.

As there is continuous friction of some of the Sāgia's parts with each other, e.g. kadīs, kalo of the wheel and the sulgadé , the farmer oils them to protect them from wearing out. The oil is mainly a mixture of food oil, fat and ashes which is rubbed on a split palm rib that is used

like a brush.

To break the movement of the Sāgia, a piece of wood called mushug is used. It is one dirā or more in length, and used by placing it in the back of the small wheel to support it and prevent it from moving. When the Sāgia needs to be checked it is stopped by putting the mushug in front of the small wheel.

Another piece of wood called turban ūy is used. In the Nubian language turban ūy means "the leg of the farmer", because it is the wooden beam on which the farmer stands when he wants to fix and repair the Sāgia.

2. Agricultural Implements

a) Implements used in land preparation

clearing:

The Nubians' tools for clearing the fields may be described as follows :

The Sickle

The sickle (tirib) is a short curved bladed implement, fitted into a short wooden handle (Plate No. VI, p.218). It is available in different sizes. The large sickle (Hanjrro, Wadīb and/or Arabīn tirib) is used in dates harvesting and also in lopping of branches for fuel and animal fodder. The medium sickle is used for reaping of grain and forage crops, and is known only as tirib. The small one is usually used for weeding and known as tiribin 'as.

The sickels are made, mended and sharpened by the local blacksmiths. The area has also witnessed the introduction of imported sickles. Nevertheless, the local sickle is preferred to the imported ones, for it is believed to be stronger and better adapted to the local agricultural work. The imported sickle usually has a saw-edged blade. The local blacksmiths imitate this using a file, when requested to do so. The local sickle is made of strong iron (scrap car parts and files) to bear heavy duty. The handles are always of Sunt wood; and the process of cutting and preparing the wooden handles is also carried out by the blacksmith. This is mainly because the pointed end of the sickle blade (Shamandarīage) must be fixed into the wooden handle immediately after cutting while it is still green; to facilitate fixing and give a strong joint when it dries.

The Rake

The rake consists of a pole with a cross-bar toothed like a comb, or with several tines (usually varying between 8-12-14) held together by a cross piece (see Plate No. VII, p.219). It is known as kārandī and is used for drawing hay and clearing the farms. It can also be used for levelling and smoothing the land and covering seeds, in addition to raising small ridges which divide the farm into beds. The rake is made by traditional experts from haraz wood. Now the iron rake is dominant either in its local form or the imported one.

Tilling the Land

The Hoe

It is needless to say that the hoe originally evolved from the early lithic tools that were used during the paleolithic and early Neolithic ages. The Nubian word for hoe is toré . There are two types of digging hoe; the locally made which is known as Al-baladī and the imported one which is called Mashā.

The local hoe Al-baladī is of different sizes, the most important being the large hoe which is known as wāwīa. Before the introduction of the masha, the wāwīa was the only tool that was used for tilling the soil in the sowing of wheat and barley. The local hoe is believed to be stronger than the imported one, which led the local blacksmiths to compromise between the two types, imitating the design of the imported one to give a strong local hoe with a wide blade.

The other type of locally made hoe is a small and light one with a much shorter handle. It is preferred for digging seed holes in the Jarf land. Because of the narrow area of this land, this hoe with a small blade allows for more seed holes and consequently more plants. (See Plate No. VIII, p. 219).

The technique of making it starts with treating a suitable piece of iron by heating it until it is reduced to a malleable state. The next step is hammering the iron object on the anvil (Sindal), using the marzaba (sledge-

hammer). The cutting of the blade is carried out by hammering the chisel with the marzaba. It is generally cut in a triangular shape. Using borers the blacksmith makes the handle-holes in the hoe. The handles are local ones cut from strong wood, usually Sunt. Then the hoe is smoothed and sharpened by filing.

The mashā is also called hukūmī, which literally means "the government one" because its introduction to the region coincided with the establishment of the public pump schemes in the area during the Forties and Fifties. It has a wide blade, and a socket hole for the handle which may also have been imported (see Plate No. IX, p. 220). Sometimes farmers cut out a part of the blade if it is too long. It is used in tilling land for sowing wheat and barley and making seed holes for millet. This type of digging hoe is available in local markets and has also been provided by the banks, especially the Agricultural Bank, at a certain price.

The Plough

The most popular type of plough which is used in Nubia is Al Mihrāt Al-baladī (the local plough). It is called by its Arabic name, which is Al-Mihrāt. It may be the case that although the plough was known and used by the Egyptians from the early dynastic period and therefore possibly known to the Nubians, they did not use it for practical reasons. The agricultural land of Nubia is mostly rugged and very rarely flat enough to be ploughed easily. Cultivated areas were also too small and limited to need

extensive ploughing.*

The plough is made from steal by the traditional blacksmiths in the region. It consists of a wooden or an iron blade with a pointed end, which is fixed to a plate at a suitable angle so that the pointed end of the blade tongue can sink into the ground and turn with the movement of the oxen which drive it. This blade is fixed to a heavy frame which branches into two arms to be joined to a handle. To these arms is also attached a heavy wooden beam (islāngī) which extends towards the inside of the blade so that the yoke can be fixed to it. The frame is heavy to facilitate the action of the pointed blade i.e. its sinking into the ground (see Plate No. X , p. 220).

Levelling, Flatening and Division of Land

The Wāsū

This is a wooden implement which resembles a flat-faced shovel. It is used in levelling the farms, making banks for water conduits (martī) and small ridges (togmad) that divide the irrigated plots. The wāsū is designed to be used by two or three people according to the work to be done. It is always manufactured from Sunt wood.

It consists of a flat-bladed wooden board (see Plate

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* Osman, Ali. "The Economy and Trade of Medieval Nubia" unpublished Ph.D. thesis, Christ's College, Cambridge 1978, pp. 62-63.

No. XI, p. 221) which has recently begun to be replaced by an iron blade cut in a rectangular shape. This flat-edged blade is held up right by means of a wooden handle. In the wooden wasū there are two holes to which two ropes are tied while in the iron wasū there are two iron rings instead of these holes. After the two ropes are attached to the blade they are extended and then tied together and from this knot they split into two or three ropes according to the number of men using it. The one who holds the handle presses the blade into the ground either by pressing the handle itself or sometimes pressing the blade with his foot, then the others pull it by means of the ropes attached to it (see Plate No. XII, p. 221).

The Urbir

This is a long-handled wooden implement with a flat-bladed board (see Plate No. XIII, p. 222). It resembles the wasū in function, but is used in rather minor works, because it is designed to be used by only one man. The urbir is made by the traditional expert (Basīr) mainly from haraz wood. Nowadays an iron urbir is made by the local blacksmiths (see Plate No. XIV, p. 222). The wooden urbir is preferred for covering the seeds with a thin layer of soil, while the iron one is mainly used for dividing the farm into beds by raising small ridges of earth.

The Zahāf

Zahāf is a heavy log usually a hewn Sunt or palm tree

timber. It is an animal-drawn implement, attached to animals (ox) yoke by two ropes tied to each at its ends. It is used for levelling the land, always after ploughing it, to cover seeds with a thin layer of soil, break clods and prepare land for irrigation. When the animals move, one or two men must stand on the zahāf to give more weight, keeping their balance while it is dragged along (see Plate No.XV , p.223).

Implements used in Sowing

The Hoe

(See under implements used in land preparation p. 81).

The Silw

This is a sowing-stick that consists of a wooden stick slightly curved and then flattened with a pointed end. This pointed end is forced into the ground by pressing the stick with the hands and then rotating it to produce a hole for sowing. It is always used for sowing the Jarf land (see Fig. No. IV , p.211).

Implements used in Watering

The main tool used for watering is the hoe, especially the one with a wide blade.

Implements used in Manuring

Manuring in Nubia is done with organic manure (mārū), which was in general use before the introduction of chemical fertilizers. The main tools used for manuring are the digging hoe, sickle, baskets and mat trays. The baskets

are containers of woven palm or dom palm leaves, which are always supplied to farmers by the semi-nomadic people who live around them. The Nubians buy them to be used in various farming operations. There are two types of mat baskets, both of which are used in manuring.

The first type is a large basket especially made for carrying manure to the fields. It is called mārūn shibir and/or Ardān shibir. It has a conical shape, wide at the top and narrow at the bottom. This narrow part at the bottom ends in a small opening which is closed with a ball of woven palm leaves and fibres when the basket is to be filled with manure. Two of these baskets are always loaded and transported together to the fields by donkeys. They are suspended on a wooden pole (ardan koy) and/or (shibé) set horizontally across the saddle of the donkey on small handles. Sometimes, these large baskets, are replaced by a large sack called galība, which is transported in the same way (see Fig. No. V , and Fig. No. VI ,pp. 212-213).

The second type of mat basket is a small one with handles called kodīn shibir. It is used in various agricultural tasks; including filling the large baskets with the manure.

Another tool used in manuring is special mat tray (Mārūn konté). It is a flat shallow container with a raised rim, made of split palm ribs and leaves. These tray mats are used for carrying manure from where the donkey unload it to be spread inside plots. Nowadays, the chemical fertilizers come in their sacks and are scattered by farmers using

their bare hands.

Implements used for Weeding

The main tool that used for weeding is the sickle (see under implements used in land preparation p. 79).

Implements used for Crop Protection

The Nubians have a number of tools for protecting their crops gainst traditional enemies such as animals, birds and locusts.

Animal Scaring Tools

For scaring animals the Nubians build scarecrows of crossed wooden poles clothed in an old loose garment (see Fig. No. VII , p.214). For night protection they set traps beside the fields to catch rabbits and gazelles. These traps, are made of iron and are usually imported. They are repaired by local blacksmiths (see Plate No.XVI , p.223).

Another type of trap is known as kittatīb. It is made of local materials (split palm rib, rope and stone) by boys, and it is also used for the same purpose (see Plate No. XVII, p.224).

Another way of protecting the crops is by fencing them with screens made of lupin and halfa grass stems supported by split palm ribs. This fence is called kalīd. The lupin stems are used after being soaked in water for along time to give them strength. And it is chosen because animals (especially rabbits) do not find it palatable and

do not break through it. This kind of fence may also be built of mud and animal dung.

Bird Scaring Tools

The bird scaring tools are made to protect crops especially cereals (wheat, barley and millet) against the swarm of birds which usually attack fields during the ripening stages. For millet crops the Nubians build a platform known as hélo . This hélo consists of four wooden poles or sometimes two forked ones that exceed the millet in length. They are fixed firmly in the ground in the Middle of the millet fields. Then a small wooden bed (angaréb) or a sitting platform which is made of palm branches and ropes is tied to the poles. The platform is shaded by wheat straw. From the platform long ropes extend and are fixed to poles at the boundaries of fields in every direction. Nearby palm-trees can be used for this purpose. To these ropes are attached empty fruit tins filled with stones in addition to strips and shreds of clothes and paper. The person who sits on the platform, in addition to making loud noises to scare birds, is also responsible for pulling these long ropes. Consequently the things attached to them rattle and clank against each other. So the movement of the rope and the noise scare the birds.

To protect the wheat crop, throwing ropes are always used. There are two types, the first called togoj nondī (which means the male togoj), and the second as kid mī gondé

and/or furfūray.

The togoj is a whip-like rope made by whipeing old 'alas ropes with palm tree fibres. This is shaken in a special way downwards and away from the body, by boys or girls to produce a loud sound like a gun which scares birds.

The togoj karé is spliced from palm tree fibres or cutting strips of cloth. This rope is spliced thinner at its ends but in the middle it has an oval netted setting on which stones are placed to be thrown into the fields.

Implements Used in Harvesting

The sickle is the main tool that is used in harvesting (see p. 79).

Implements Used in Threshing

Threshing is in general done by three methods. The first is threshing using flails on a hard surface or threshing floor. The second is threshing by donkey hooves. The third is threshing by a locally made animal-driven machine.

The Threshing Floor

The site of the threshing floor (gaīs) must be carefully chosen according to the direction of the wind because it is the same site where the crops are to be strewn. The gaīs is formed by watering a large plot (Fa) or two to three small plots many times. Then wheat straw is spread on this watered plot and beaten with split palm ribs to harden its surface. Nowadays a barrel full of water

is rolled on the area until it is levelled.

After the threshing floor has been prepared it is provided with a pole (noren koy) which is firmly fixed at its centre if the crop to be threshed is either wheat or barley. A number of donkeys will be tied together and all attached to the threshing pole. These donkeys will then be driven around over the wheat until it is thoroughly threshed.

In the case of millet, the threshing floor will be plastered with clay and cattle dung. Then the cobs of millet will be threshed with flails.

The threshing floor for sesame differs from the previous ones in that it takes a rectangular shape, plastered also with cattle dung and clay. Two wooden poles are firmly fixed to the ground and one or two other poles cross them. To these cross poles the sesame plants are tied with their heads up until they are dried. Then the sesame seeds are rubbed off on a mat specially prepared for this purpose.

The third method is the noraj which is an animal (ox) drawn implement also used for threshing. It consists of a rectangular wooden frame 243X154 centi-metres in length. Inside this frame there are three wooden beams extending parallel to the beam running the width of the frame. To these three wooden beams eleven iron discs are fixed. These iron discs (diw) are the blades by which the crops are threshed. There are three discs in the middle beam and four discs for each of the other two beams. The disc is

5.9 cm. long and 2 m. thick. In the front part of the noraj sits the boy who drives it. The seat resembles a small angaréb bed, woven with palm or dom-palm fibre ropes. It is as broad as noraj and 57 cm. high. The attachment of the noraj to the yoke is by ropes (islāngī). When the animals move the noraj is dragged round and round the threshing floor and in turn the discs move and start threshing. This threshing implement was not known in the area during the period preceding the introduction of water pumps. But in spite of their availability now and their speed they are not in very general use, firstly, because they are very expensive compared with the old means of threshing. Secondly, threshing by noraj costs the farmer a large share of his crops. In addition the owner of the noraj imposes conditions concerning his oxen or cows, which must be allowed to eat the crops while they are drawing the thresher (see plate No. XVIII and XIX, pp. 224-225).

Implements used in Winnowing

Mat Tray

The kind of mat tray which is used here is known as shawīr. It is woven by the Nubian women from palm leaves and split palm ribs. Using this shawīr the grain is separated from the chaff, hay and pods. This is done by throwing the mixed products high into the wind (see Plate No. XX , p. 225).

The Pitch Fork

The pitch fork (daraīa) is a long wooden-handled fork

with four to five iron prongs, used for pitching hay. The pitch-fork was also introduced to the area after the establishment of the pump schemes. Now it is available in the area either in the imported form (iron made), or the locally manufactured one (iron or wooden pitch-forks), (see Plate No. XXI and XXII, p. 226).

The Shovel

Locally made spade with flatten blade used also in winnowing (see Plate No. XXIII, p. 227).

Implements Used in Grain Measurements

The traditional Nubian measurements of grains are not now used regularly. Rather, farmers have taken to the new ones which are used all over the country since they are governmental measures. However, the traditional measures are still well known. They are :-

Mid: Which equals one ūli, that means two handfuls.

Karaj: This is the smallest container measurement known. It is made of split palm rib and palm leaves as all other measurements are. It hold two mid.

Māshé : There are two kinds of māshé . One, called the māshé kudūd (the small māshé), hold six karaj. The other, called māshé daū (the large māshé) holds eight karaj. This is what is called in modern measurement the gérat or rubbu'.

konté : It holds six māshé . This was the largest container measurement known.

Mur: Mur equals the amount of two konté . It is not a container measurement. In modern measurement a mur equals twelve gérat, i.e. half an ardab.

Grain Storage

Grain, dates and other crops are stored in specially prepared containers made of mud and fermented dung by women in their homes. They get clay from the river bank, mix it with animal dung and water and leave it to ferment. Then the clay is regularly turned either using the hoe or under foot. The clay is beaten with the bare hands and rolled until it becomes evenly mixed and smooth in texture.

The shaping process starts by taking a mass of clay in the palm of one hand and with the help of the other the maker rotates the clay slowly repeating the process until the container is formed. The end product is then plastered with fermented cow dung. Two openings are made, the first a wide opening one in the upper part of the bin, with a flat tray-like cover. The second is on the side towards the bottom of it, from which the grain is usually drawn. This small opening is closed by fixing a small cylindrical shaped piece of mud (ladaia) into it. The two openings have covers thoroughly sealed with clay to protect the stored crop from pests.

The capacity of the large mud bin known as shuna is two to three ardabs, while the smaller one gusé holds one and a half ardabs.

There is another type of storage container, which is called galo, which is made of pottery. Usually an old water jar (foké) is used for the purpose and is always used for storing the household dates for daily use (see Plate No. XIV, and XXV, pp. 227-228).

3. Continuity and Change

The main elements of water-lifting and conduction in Nubia are :

a- The water source.

b- The technology.

Of these two main elements the first one, i.e. the water source, has remained the same all through the known history of agriculture to the present. This source has always been the Nile. In some parts of Nubia, in Dongola for instance, other sources of water are being extensively exploited especially ground water. But in the Mahas region and other parts of Nubia ground water from well is not used for agricultural purposes. However, there are now some signs of interest in exploiting the ground water and a very limited number of wells is being used in the open plains of Koka reach on the west bank. But already the problems of water from wells have discouraged the farmers from using them, particularly the scarcity of water and its salty nature, which in addition to the salt in the ground retards the growth of crops.

As far as the technology of water-lifting and water conduction is concerned, there is a noticeable aspect of change. The shadūf is no longer used and it is agreed by informants that the last of them disappeared in the early Fifties. This was also the time when a sharp decline in the use of the sāqia as water-lifting device began with the increase in the number of pump schemes installed by agricultural co-operative societies. The connection between the decline of the sāqia and the disappearance of the shadūf is significant because it is clear that these two water-lifting devices were complementary. While the sāqia was used to irrigate the sāqia land the shadūf was used to irrigate the fodder agriculture within areas of palm trees and the drier parts of the jarf land.

However, until recently in some parts of the Mahas region the sāqia was used as complementary to the pumps, especially those pumps which are not owned by the co-operative societies, which are small pumps owned by individuals or small groups to irrigate their own land. In such cases the sāqia is used to irrigate small plots of vegetables and fodder crops under palm-trees. To be more specific , this took place during and just after the shortage of fuel during the 1973-1975 in the wake of Egyptian-Israeli October War. Dependence on the Sāqia increased because they were still mainly made of local materials and needed no imported goods for their operation.

It is clear therefore that the sāqia and the shadūf

were used for some time simultaneously as well as the sāgia and the pumps. And although the shadūf has now disappeared completely and the sāgia is not used, many families still keep them intact. The knowledge of both the shadūf and the sāgia is still very much alive and all informants see no problem in making either of them.

The main factor of the change in the water-lifting devices from shadūf to sāgia to pumps is the need for greater efficiency and more abundant water to irrigate more land. These two objectives have been achieved therefore the area of land cultivated now in the Mahas region is far greater than the area cultivated using both the shadūf and the sāgia. Now all available agricultural land adjacent to the Nile in the Mahas region is exploited by the co-operative pump schemes.

So one can speak of three major stages of development of agricultural efficiency in Nubia as far as water-lifting devices are concerned. The shadūf which as we have already noted was known from the Egyptian New Kingdom, could irrigated one half to two-thirds of an acre. The Sāgia which was introduced during the early Meroitic kingdom, could irrigate four to five feddans at high Nile and two and half to one and half at low Nile.* The pumps could irrigate all the

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* Allan, W.N. "Irrigation in the Sudan", in Tothill. J. (ed), Agriculture in the Sudan, London, Oxford University Press, 1952, p. 628.

available agricultural land. However, this advantage was not economically rewarding since expenditure on pumps is substantially greater than expenditure on sāqia.

In many cases there is a scramble for agricultural land among the farmers especially with the return of many migrants from the Petro-dollar Arab countries. This new situation is the reverse of what happened after the introduction of pump schemes, when less man-power could produce more crops in the cultivation of more land. The number of people who migrated from Nubia in general and the Mahas region in particular to earn cash in foreign lands vastly increased during the Fifties , Sixties and Seventies. These decades coincided with the economic boom in Saudi Arabia and the other Gulf countries. Therefore the increase in migration was huge. But starting from the early Eighties the migration rate out of the area decreased and in 1985 many of those working abroad came back to share the local resources with their kin.

During the climax of migration out of the region there was a general decline in the interest of people in agriculture as well as general decline in its importance as a subsistence economy, since there was a steady flow of money into the region from the migrants in the Petro-dollar countries.

One other problem that faces the farmer of Nubia in general and the Mahas region in particular with the modern-water lifting devices, i.e. the pump is the fluctuation in the avail-

ability as well as prices of petroleum products and spare parts which makes the operation, maintenance and repair of these pumps a hazard. Also knowledge as to the operation, maintenance and repair of such pumps is not readily available. It is a major problem to find a trained operator or assistant. This lack of course increases the probability of greater and more frequent damage to the pumps.

Some of the informants regretted the good old days of the shaduf and sāgia, when every farmer was personally and directly involved in the operation, maintenance and repair of the traditional water-lifting devices. This personal and direct involvement created a feeling of belonging and ownership while with the pumps there was a feeling of unfamiliarity. At the same time, the feeling of communal living and life with the traditional devices was said to have been stronger than with the pumps, even though most of these pumps are co-operatively owned. Moreover, it is evident that the quantity of crop production during the sāgia cultivation was greater than from pump cultivation. This is said to be because of the fact that the farmers paid much greater attention to their sāgia cultivation, since the area of cultivated land was more limited and sāgia operating demanded a farmer's personal presence most of the time in their fields.

As far as water conduction technology is concerned there is no noticeable change from the medieval and post medieval period to the present. The different types of canals and the different types of irrigation plots which were known then are still being used in the same way. The

only apparent difference between the two systems is in the size and height of the canals of the pump schemes. These canals have to be high enough to conduit water to all parts of the irrigated area and large enough to accommodate the amount of water poured into them from the pump.

The types and varieties of agricultural tools used in the different stages have experience only minimal change. In most cases the same type of tool is still used, but the material from which they are made now is increasingly iron rather than wood. Nevertheless, this did not change either the function or the purpose of these tools (e.g. the wooden urbir, wasū, kārandī and darāīa).

The increase in the area of land cultivated and the quantity of harvest necessistated the introduction of more advanced and efficient tools for ploughing threshing and winnowing, as elaborated above in the section about tools.

Yet in most cases the traditional agricultural tools could accommodate the results and the effects of the introduction of modern lifting-devices into the Nubian agricultural world. It looks as if there existed, and still exists, a direct relationship between the level of technology and the amount of land exploited. As far as the Mahas region is concerned, the technology that was developed through time in connection with agriculture as a system was equivalent to the total amount of agricultural land available. That is why this technology accommodated the sāqia land as well as the lands cultivated by the pump schemes which was in effect all

the available agricultural land in the region.

Therefore any development in the agricultural technology today must be accompanied immediately by an increase of the area of land to be cultivated. And since in reality there is no more new land to be exploited for agriculture except for two area: the Kokka and Marian bood, the Nubian agricultural traditional technology remains efficient enough for present-day Mahas agriculture.

CHAPTER FOUR

THE AGRICULTURAL SYSTEMS

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1. The Nubian Agricultural Cycle

The Nubian agricultural cycle is divided into three seasons, winter season, flood season and summer season. Agricultural seasons are known to Nubians according to the months and dates of the Coptic calender, Nubians believe that this gives them the correct and exact dates of sowing seasons.

The agricultural cycle starts with the flood season which extends from August to October (Misrā-tūt). Crops sown in this season include millet, millet fodder, maize, Dolichos lablab, cow pea in addition to water-melons, sweetmelons, pumpkins and okra. The flood season is then followed by the winter season which extends from mid-October to April (bāba-baramūda). The winter season is the most important season for the Nubian farmer. In it his main subsistence, cash and forage crops are sown in their numerous types and in large quantities. The crops sown in winter season are wheat, barely, maize, sorghum, safflower, chicken vetch, chick pea, haricot bean, ferugreek, field pea, tick beans, lupin, dolichos lablab, barsīm, onions, garlic, tomato, rocket cress, fennel, cumin, caraway and coriander.

The third season, which is less important, is the summer season. It extends from May until August (Pichuns

-Abīb). The very hot weather of summer beside the low level of the Nile water at that time does-not encourage cultivation. However, farmers always cultivate some millet, millet fodder, dolichos lablab and Jew's Mallow. Meanwhile, farmers work on preparation for the new agricultural year. (See diagram No. I, p.205).

2. The Operations

Before starting the new agricultural year, the Nubian farmer first has to make sure that he is ready by carrying out all the important preparations. During sāqia times, sāqia maintenance was the first priority. This included splicing new 'alas ropes to replace the old ones, getting new pots to replace broken ones and renewing sāqia parts as necessary. The water conduit had to be cleared of weeds and dirts. The clearing of the main conduit was carried out by groups of farmers, while the subsidiary one were cleared individually i.e. each farmer had to clear the part crossing his field.

The second step after preparation was the division of land between farmers. Rope is the most common tool for measuring and dividing the farms. The operation is carefully carried out so that each farmer receives an equal share. It is repeated every year to give each farmer an opportunity to shift from one farm to another. This is essential because the degree of the fertility of land differs from one place to another. The idea is therefore, to give each farmer a chance on both the more fertile and less fertile

lands.

The actual work starts as soon as farmers receive their plots. First they start hoeing to clear weeds and uproot the left-overs of the previous crops. If there are many weeds; they first water the land and wait until the new weeds germinate, then get rid of them using either the hoe or the traditional plough. They use a rake to collect dry weeds and then burn them, and if there are hard mud lumps or stones they deposit them in lower parts of the farm or water conduit.

When the land is ready, they start sowing by one of three methods. First is by broadcasting which is mainly used for sowing wheat and barley. Sowers carry seeds in bowls, dishes or empty cans and then scatter handfulls over the soil in a wide sowing of the arm from left to right. The operation is often done by old peoples, either men or women, because it needs skill and patience rather than strenuous effort. After the seed has been scattered, farmers till the soil using hoes or the traditional plough. (See Plate No. 26 , p. 228).

The second method is by sowing seeds in individual holes made with a hoe or sowing-stick. This method is used for sowing millet, maize, okra and sesame. Sorghum and leguminous crops are sown in the same way but require closer spacing. The farmer makes the holes one after another moving backwards. When he finishes, he sows the seed in a forward movement, then levels the land with the urbir to

cover the seed with soil. For small-seeded crops like sesame, sorghum, Jew's mallow or purslane farmers cover the seeds with a thin layer of soil using their own hands. They adopt a sitting position and move forward. (See Plate No. 27 , p. 229). In jarf land farmers get some soil from another area to cover the seed. However, now even millet and tickbeans seed are sometimes dropped behind the plough, but with great care to keep the correct spacing. Land then is levelled by zahāf where the plough is used, otherwise it is levelled using the urbir or rake. The levelling operation is followed by division of the field into small squares or rectangular plots (sing. Fa and/or ūbug) by means of ridges of earth tugmad using mainly the urbir and wāsū. A number of these squares or rectangular plots arranged in a raw form the larger plot called agmā. The number of Fa in an agma is decided by the level of the surface of the agricultural plots.

The third method of sowing, is by transplanting. It is used for dates palm, tobacco and vegetables, mainly tomatoes, egg-plant and onions. Seeds are first sown in small nursery beds, manured and watered continuously. Farmers spread ashes over these beds to protect the seeds from ants, and it is also covered with a piece of cloth to keep off birds. They keep watering them till the seeds germinate and shoots are ready to be transplanted into the bigger beds, which are already prepared. Transplanting is done by scratching the soil with sickle or any other

short-shafted implement, then placing the seedlings and covering them with soil. Sometimes the transplanting is done through team work, one person scratching the soil and others transplanting the seedlings.

Now, the land is ready for watering. This needs careful regulation and close supervision to avoid shortage or over-watering. Wheat receives seven waterings, the first immediately following tilling. Hence it is called kjin-aman which literally means the "tilling watering". The second watering is called tibég and takes place three weeks later. The other five waterings take place at relatively shorter intervals than that between the first and the second. Millet has many more waterings than wheat because it is sown in summer and the high temperatures increase evaporation.

Diversion of water from the main canal to the subsidiary canals and fields is done by means of the hoe. To protect the canals from erosion by running water, farmers deposit stones at the junctions. For the same purpose they also use water tubes, which are usually empty tins or old buckets. These are called sablo and/or barbakh.

After watering the seeds start to germinate and grow up. Under the same conditions favourable for the cultivated crops, weeds start to grow among them. This necessitate the weeding operation, during which every member

of the family in addition to neighbours and relatives take part in the work. The nubian word for weeding is kodé. Weeding is done by sickle and farmers often sit while performing it. In closer-spaced crops like wheat and barley the sickle is not so important because weeding by hand is more usual. Weeding by hands is used especially to clear the ground of nāgila (cynoclon dactylon pers). Another method of ridding the soil of nāgila in fallow land is by cultivating it with Dolchous lablab.

In the Nubian region where land is intensively farmed, farmers adopt many methods to preserve soil from being exhausted by the continuous cropping of the same land. Ample application of manure are general in addition to rotation of crops and frequent resting stages for the land.

Before the introduction of chemical fertilizers Organic manures were in general use. The chief among them is animal dung. Pigeon manure, bat manure and human manure were also used but relatively little. To make the compost, farmers obtain dung from animal pens, mix it with natural desert earth known as karab batād. After a period of time the resulting compound carried to the fields on donkeys. In the case of wheat and barley, donkeys unload manure inside the cultivated plot. The quantity of manure is determined by the size of the plots. As soon as the seeds germinate, farmers start to spread manure from the mound of manure in the middle of the plot. They bend forward and push manure

with both hands into the cracks in the earth. This operation is called Mārū-ka-arawinan, which literally means "the spreading of manure", so it only describes the movement involved.

The second manuring process takes place after the third watering. This time manure is unloaded outside the cultivated plots, so as not to damage the wheat which has by now grown considerably. From there women carry it on special mat trays (mārūn kontéˊ) on their heads to the cultivated plots. They stand inside holding the mat tray with the left hand, while using the right hand to throw handfuls of manure all over the field. The process is called kadéˊ which also expresses the action of throwing. Abu Salīm mentions a third process of manuring which is called Maréˊ meaning the process of throwing manure lightly over weaker parts of plants.*

As for millet, the operation is a little different. Millet is always manured after weeding (kodéˊ). Women, boys and girls carry manure to plots in the same way described above. They sit down beside each millet plant and using sickles, scratch the soil up around the plant to support it. This process is known as wēréˊ and it is followed by the manuring process in which handfuls of manure are placed on

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* Abu Salīm, M.I. op.cit., 1980, p. 154.

the roots of each plant and it is called wērté. On weak parts of plants handfuls of manure are placed and this process is called suludé. As for vegetables, they are manured by making holes near each plant and mixing manure with the soil.

Soil deterioration is also avoided by the rotation of crops. In this rotation millet is sown first followed by a leguminous crop, and then wheat, with frequent stages of land resting in between. During the resting stage fallow land is manured in situ, i.e. by close tethering, when farmers tie up their cattle on fallow land during the night. After four or five nights when the soil has received considerable quantities of dung and urine the cattle are moved to another piece of land.

However, nowadays the main manure used in large amounts is chemical manure which is commonly given once at sowing time. Organic manures are still in use but on a limited scale (for vegetables and Barsīm).

The Nubian farmer pays great attention to pest and disease control taking every possible precaution. Nevertheless, crops are sometimes attacked by diseases which the farmer tries to control in his own way. 'Asal (aphis) is the most common disease known in Nubia. It attacks wheat, millet, okra, dolichos lablab and cowpea and is very damaging. At the time of sāgia cultivation resistance to aphis was obtained by placing a certain local plant (hargal) in the

middle course of the sāgia trough (sablo). When water passes over the hargal, the plants' salts are carried to the plants. Another disease is urung (rust) which infects date palms, millet and dolichos lablab. Dates are also affected by a disease called 'arkish and no local cure is known for it. Millet is liable to many pests, one of them causing a disease locally known as kurrī. There is no preventive method applicable in this situation, only more water and manure are given to produce new germination. Millet is also infected by kīffīd (smut) though not often. When it attacks the millet, the separation of infected seeds from uninfected ones is the only remedy. Tomato and tobacco are attacked by a root pest that causes a disease known as dukūs and/or dukūj which causes severe damage.

Furthermore, when crops reach the ripening stage great effort are required to protect them against natural enemies (birds, locusts). Birds are one of the most serious problems that confront the Nubian farmer, since they can cause extensive damage to crops. There are no mechanical means of combating birds, so the Nubians have developed their own set of methods. Children are mainly employed for this job, sitting on the top of the hélo, shouting and pulling the ends of the ropes that surround the field. Other children keep running on the ground also shouting, cracking togoj and throwing stones, and beating empty tins

to scarebirds. Farmers also set dung smouldering at various part of the field to drive the birds away. As for locusts, farmers regard them as a catastrophe which they can't control, and mentioned that large swarms are common and severe damage to their yields often reducing it to nil.

When crops are ready to be reaped, wheat and barley straw is cut at middle level. Reaping is always done with sickles. The reaper takes a bending position, holding the sickle in his right hand and the straw in his left, chops the straw off and deposits it on the ground. Then the straw is tied into bundles with palm-leaves and gathered in piles near the threshing floor to be dried in the sun. As for the harvesting of millet and maize, the stalks are cut at ground level and lined on the plot. The harvester then sits beside them, breaking the cobs from the stalks and collecting them in a basket or a jute sack and transferring them to the threshing floor where they are placed and left to dry. To harvest tickbeans and sesame the plants are cut below fruit level, tied into bundles and placed around the threshing floor. Lupin is picked by hand from its roots. Okra and roselle are gathered by hand.

The period of drying ranges between a week to ten days for wheat and barley, and two weeks to three weeks for sesame. After drying threshing starts. It is done either by treading with donkeys, or by the noraj, both processes being known as noré operation, or with flails which is known as tuké.

Wheat, barley and tick beans are threshed either by donkeys or by the noraj. The same methods are used for most of the other crops, especially when there are large quantities. Threshing always starts early in the morning and continues till noon with some breaks in between. During these breaks animals are let loose and the farmers, assisted by their sons, turn the mixture of products over so that the mixture from the bottom comes to the surface to be threshed (see Plate No. 28 , p.229).

Millet and maize are threshed with flails on the threshing floor. Four to eight men hold sticks with both hands and beat them to separate the seeds from the core. Maize is sometimes threshed by women beating it with split palm ribs on an angaréb. The seeds come down through the openings of the angaréb onto a mat placed underneath. seeds which are not separated during this operation are usually separated later on by hand.

After the threshing operation is finished the farmers rake to separate seeds from the small broken stalks. The second stage is then carried out by women who use mat trays for winnowing. Maintaining an upright position, they throw the mixture high in the wind. The seeds fall on the ground and the hay, chaff and pods are blown away, where other women sweep them up. Farmers' wives are assisted by their female relatives and neighbours participate in this operation. (See Plate No.29 , p.230). Pitchfork and shovel

are also used but only by specialists in return for a certain amount of the crop. Sometimes the threshing operation has to be repeated after winnowing, but only on a smaller scale (see Plate No.30 , p.230).

When the winnowing is over the crop then is ready for division (fagid). Nowadays, crops are divided according to the new production relations that evolved since the introduction of pump schemes to the area. The crop is now divided, between pump scheme and the farmers. In the case of okra and Barsīm, the cultivated plots are measured and the pump scheme takes a certain amount of money annually for watering them.

During sāgia times the system of remuneration followed was based on a local arrangement known as toddan. Toddan was an agreement between a number of farmers to share one sāgia. Their number usually varied between six and twelve farmers, with eight being the most common. Each farmer had to bring his own animal to drive the sāgia, as his share, in addition to minor parts such as ropes and water pots. In turn they all had the chance to drive the sāgia and water their land. If there were eight farmers the day was divided into two shifts. After harvest each farmer received an equal share of the crop, but only after all obligations concerning means of production were settled Such obligations were always paid in the form of share in the crop. The land-owner, for example, received one-eighth as the rent for qurair land (alluvial land), and one-twelfth

for Barjū land which is less fertile and more difficult to irrigate. Also, if a farmer was not one of the sāgia establishers, he had to pay in kind what was called the ewrārī as rent for using it.[1] A fixed amount of the crop was also set apart in payment for seeds if necessary.

Two bundles of wheat and two cultivated plots of millet were set apart for the blacksmith and fagīr (the religious teacher) of the masīd (the traditional school) in return for their services. Accordingly they benefited both from the crop and straw. The same applied to the helmsman, but he also received two to four gérat of dates from each house in the village. Nicholles[2] and Abu Salīm[3] stated that the Basīr, who kept the wheel in repair was also paid in kind. However in the Mahas region the Basīr is remunerated in cash only for building the device, and any service rendered afterwards is free.

Remuneration for the noraj and pitchfork varies from one village to another. In Mashakīla village for example, one gérat per ardab is taken for the pitchfork, the same proportion being taken by the noraj, half for the device and the other for the animals which draw it. In the meantime in

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1. Osman, Ali "The Economy and Trade Medieval Nubia", unpublished Ph.D. thesis, Christ's College, University of Cambridge, 1978, p. 58.

2. Nicholls, W: The Sāgia in Dongola Region", SNR, Vol. I, 1919, p. 26.

3. Abu Salīm, op.cit., p. 171.

kajbar village seven karaj per ardab is set apart for the noraj and four karaj for the pitchfork.

Unlike in Dongola Province,[1] ewratti[2] was not hired either in kind or in cash, simply because the work was always carried out by the farmers' children. Also the job of ṣamad[3] in the Mahas region is only an honorary one. If any, he is normally one of the shareholders and receives only his share.

After all claims are paid, one-third of the harvest is then taken by the owner of the animals as rent. This remuneration increases to half of the crop if the owner takes the responsibility for feeding his animals.

The crop is then collected and placed in hide containers (jurāb) to be taken to the dwellings, where it is stored in mud bins (gusé) and shuna. Otherwise it is packed up in jute sacks and left in yards.

Wheat straw (ḥasad) and millet stalks (Hagé) in addition to the left-overs of leguminous crops are collected to be used as animal fodder and fuel. They are stored in empty and/or ruined houses as well as in nearby mountains

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1. Nicholls, W., op.cit., p. 25.
2. Ewratt'e is the boy who drives the Sāgia.
3. Ṣamad is the chief cultivator.

and diffī.* In many places they are stored in enclosures built near the domes of famous religious men or women who will keep away any danger. On islands, because of floods, humidity and fermentation they are placed on a wooden raised level surface called sadīb.

3. Crops of the Nubian Region

(i) Cereal

Wheat

Wheat (elle) is the main subsistence crop in Nubia. Wheat is also regarded as a second cash crop in the region (after dates), but the region's production is usually barely enough to meet the local needs. It is a winter crop that is sown in November and takes one hundred and twenty days to ripen for harvesting in March. Nubians grow the bread type of wheat, and the so-called Baladī variety is in popular use with most of the cultivators. Compared with other crops, wheat is more salt-tolerant and needs controlled irrigation, therefore the fields are always on the high sāgia lands (Barjū).

Barley

Barley (sering) is also a winter crop that is more salt-tolerant than wheat and needs less water and care. It is used as animal fodder and is also often eaten by the

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* Diffī is a tower built of mud.

poorer clases. Lately the cultivation of barley has been largely abandoned.

Millet

Durra millet (maré) is of a remote antiquity in Sudan. Yet in present-day Nubia it is a minor subsistence crop, which is mostly for forage crop. The Baladī variety of durra is the dominant type in the area, and is called maré nulū, which means "white durra".

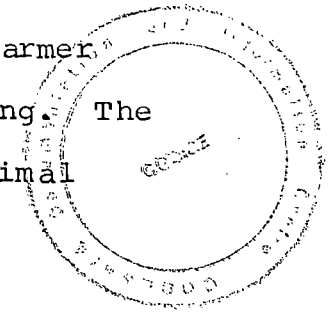
Millet is basically a summer crop which is sown in the summer as well as in flood seasons. The summer crop is sown at the end of May as millet fodder to meet the shortage of animal fodder during the summer period. This millet fodder is grown under palm trees to benefit from their irrigation as a perennial crop which need to be watered throughout the year. Millet fodder is always cut green.

The damīra millet crop is sown in August, in place of wheat, on sāgia land. At this time there is abundant water since it is the flood season. In good conditions the damīra millet takes no more than seventy days to mature.

Maize

Maize is known locally as Makāda. It is grown as a summer crop sometimes, but mostly as a flood crop. Maize is often sown under palm trees or intersown with lubīa on jarf land. Otherwise it is sown on islands because it

needs fertile soil and is very susceptible to drought. Maize is not much grown in the region. Because of the narrow area of the cultivable land, the Nubian farmer prefers to cultivate durra which is less demanding. The small amount of maize grown is mainly used as animal fodder.



(ii) Oil Seeds

There are a number of types of oil seeds which are cultivated in Nubia. First is sesame (sesamum orientale L.) which was grown as a flood crop on sāgia land. It was mainly a subsistence crop sown in small patches for local use. Sesame seed "pressed in an 'asāra to give edible sesame oil.

The second oil seed is safflower seed which is known locally as kushé . It was grown during the winter season in small quantities on the ridges of wheat fields. It was used as food oil. It is also mixed with wheat and roasted to be offered on all important occasions.

Nowadays neither sesame nor safflower are grown in the area in large amounts. The people depend on the production of oil from other areas to fill the gap.

Another type of oil seeds is caster (. khirwa' Ricinus Communis L.) which grows on river banks and dry water courses.

Although there are now attempts in many parts of the

Sudan to exploit oil seeds commercially, none have so far been made in Nubia.

(iii) Pulse Crops

Cow Pea (Vigna unguiculata (L.) Walp;Lubia helu).

This is known locally as diginté. It is sown on salūka land in its upper part, the part of the jarf which corresponds to the area that is covered with flood water. A few rows of it are sown in the flood season in August and harvested in December. It is mostly consumed locally as animal fodder, and sometimes as human food. Its leaves is used in cooking and the beans eaten after boiling.

Dolichos lablab (Lubia 'afin)

This is locally known as ashrangé and is the most important crop that is sown on salūka land. It is sown as soon as the flood water retreat, either alone or with durra or maize. In good conditions ashrangé lasts all the year round till the next flood season when it dries and becomes ready for hand picking and threshing. Apart from its importance as a forage crop, ashrangé also supplements the local diet with its beans which can be eaten green as vegetable or as boiled beans balīlā (N. arjé).

Dolichos lablab is probably not indigenous to Africa but came up the Nile long ago.* It is mentioned by the

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* Bacon, G.H. "Crops of the Sudan" in Tothill, J.D. (ed) Agriculture in the Sudan, Oxford University Press, London, 1952, p. 345.

medieval Arab writers,[1] as well as European travellers, as one of the main crops of Nubia beside millet, barley and wheat. It is also mentioned by the Swiss traveller Burckhardt[2] with the name kashrangieg, which is still use for these beans, even in the Arabic speaking areas in Sudan.

Chick Peas (Hummos; Cicet arientium L.)

This is locally called kabakābé. It is a winter crop that is sown on salūka land, and on sāgia land if sown in considerable quantities. It takes four and a half months to ripen. Locally it is always boiled to be eaten as boiled peas, balīlā, especially in Ramadan. Also Chick peas are cooked as dumpling.

Haricot Beans (Faṣūlīa; L. phaseolus vulgaris)

This is known by the name faṣūlīa in Nubia and in other parts of Sudan. It is a winter crop, that is usually sown in small patches in salūka land and sāgia land. The green pods of fasulīa as well as its dry beans are important parts of the local diet.

Lupin (turmus; L. lupins termisk forsk)

It is known locally as akindé. Lupin is also a winter crop that is always sown in small patches in flood

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1. Al-'Aswanī, I. in Burckhardt, J.L. op.cit., 1822, p. 488.

2. Burckhardt, J.L. op.cit., 1822.

plains. The beans are very bitter and cannot be eaten unless boiled or soaked in salted water for two or three days. It is used as both human food and animal fodder. The stems of this plant are also soaked in water and then used for making animal enclosures.

Tick Beans (Ful Masrī; L. vicia faba)

This was not a popular Nubian foodstuff in early times. However, now it is one of the main crops of the winter rotation. Most probably its introduction to the area coincided with that of the pump schemes. It is grown both as a subsistence and as a cash crop. It is known in the area by its Arabic name, ful Masrī. Tick beans requires a cold winter and fertile soil. So it is sown in November or early December in guraīr land, and takes about three and half to four months to mature.

Chicken Vetch (Gilban; L. lathyrus1)

This is a winter crop locally called gūrū. It is grown on a small scale, mainly as animal fodder (both its leaves and seeds), but its seeds are often eaten by poor people. It requires light watering, yields abundantly and takes four months to mature.

Field Peas (Basilla; L. Pisum satiunm)

This is also a winter crop that is grown in the region. Both its beans and leaves are cooked to give two dishes. The beans can be cooked fresh or dry.

iv. Forage Crops

Since there is no potentiality for natural grazing in the region, the Nubian farmer is obliged to work hard to meet the needs of his animals for forage. Certain areas of arable land are often left for the cultivation of animal fodder, e.g. millet fodder, maize and Dolichos lablab. Apart from these specially cultivated crops, animal fodder consists of dry wheat straw and millet and maize stalks.

Another forage crop recently introduced to the area is Barsīm (Lucerne alfalfa. Medicago sativa L.). Barsīm is sown in the winter season on sāgia land. After it is established, it is cut just before flowering. The intervals vary from twenty days in the hottest weather to forty-five days in exceptionally cold weather. Its yields an average of twelve cuts a year.

V. Spices

1. Fennel (Shammar, Fœniculum Vulgare Mill).
2. Cumin (Kimun akhdar, Cuminum cyminum L.).
3. Caraway (Karawia, Carum carvi L.).
4. Coriander (Kasbara, Coriandrum sativum L.).
5. Garlic (Tom, Allium satium L.)

These five spices are winter crops sown on sāgia land. They are used for spicing and flavouring. They are grown as cash crops and for home consumption.

Onion (Basal; Allium sativum)

This is known as felé and is widely grown as a winter

crop on sāgia land. Onion take four to five months to ripen.

(VI) Fruit Crops

Date Palm (Phoenix dacty lifera)

Throughout history the date palm (féntī) has played an important role in the economic and social life of the Nubians. It is the backbone of their economy. The desert climate of Nubia with its high temperature, low humidity, sunshine and water give the palm trees suitable conditions for growing and bearing good fruit. In good condition when off-shoots are removed, planted and tended carefully a tree may produce in four to five years and bear its full fruit in its tenth year.

As in other farming operations, the seasons for transplanting the shoots are governed by the Coptic calender. Transplanting takes place in 'abib - Misra (July the 8th to September the 5th) and/or 'amshir (February the 8th to March the 9th). Abīb is preferred for removing shoots from the mothers because of the availability of water at that time. Removal of the off-shoots is a very skilled operation. First the off-shoots which are going to be removed are selected, then the roots are covered with soil and watered. The shoots are severed with a chisel driven by a sledge-hammer. Attention should be paid to avoiding damage to the parent and the off-shoot. The separated off-shoots are then handled carefully, the branches pruned and trimmed with a sickle and then they are wrapped in a jute rag.

Regular irrigation is very important at close intervals, and hand watering is much better to prevent damage. As soon as they are fit for planting the shoots are taken from nursery to garden.

In misra-tūt (August-September) dates become ready to harvest. The main varieties of palm trees grown in the Mahas region are the dry dates. The first type is the ébeté (Barakāwī) which is the most abundant and popular of the good dates. Next comes akandīna. The other types are gaw, adeshuw, kulma, shidda, karūsh, ūlmadi and kudin féntī which are mostly consumed locally.

Dates represents a very important part of Nubian food (ceremonial food, dough and as fruits) and drink (sharbōt, nabīt and dakkāī). The leaves and stalks of the palm are used in basketry and the fibres for making ropes. Palm trunks were widely used in repairing many of the sāgia parts, as well as roofing and making domestic furniture.

Citrus Fruits (citrus spp.)

The most important type of citrus fruit in the country is the lemon, especially the Baladī type. The Nubian cultivator is very keen to have at least one lemon tree beside his date palms, because beside its nutritous value it is very vital in traditional medicine, especially as antidote to poison. Moreover, lemon is the only citrus species that will stand the scanty irregular irrigation. It grows readily from seeds and needs no special care. The

lemon tree normally yields twice a year.

Mango (Mangā; Mangifera indica L.)

This native of tropical Asia has not been in the Sudan more than a few decades.* It was also introduced very recently in the Mahas region, and mango tree orchards are very rare.

Watermelon (citrullus vulagris schrad)

Among the main fruits of the region, it is grown in the winter. It is easily grown and often planted casually along the ridges of plots, canals or on any bit of waste ground.

Sweetmelon (Shammām; cucumis spp.)

It is locally known as ga'ūn. It is also grown in the winter season, but needs great care and skill in cultivation.

VII. Vegetables

Okra (Bamīa; Hibisus esculuntus)

This is both a summer and flood season vegetable which is known locally as uīé. It is an important vegetable in the local diet and used in cooking either green or dry to make different local dishes. It is sown on sāgia land and grown for home consumption while the surplus is sold.

Jew's Mallow (Mulūkhia; Corchorus olitorius L.)

This is a summer vegetable used in cooking. When it

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* Bacon, G.H. "Crops of the Sudan" in Tothill, J.D. (ed), Agriculture in the Sudan, Oxford University Press, London, 1952, p. 387.

is established after cultivation, several cuts at five day intervals are made.

Purslane (Rigla; Portulaca oleracea L.)

This is a flood season vegetable, that is used in cooking as well as in salad.

Rocket Gress (Gargīr; Eruca sativa mill)

It is locally known as Mūgin ūr. It is a salad plant that is especially cultivated or grows naturally in the fields.

Radish (Figl; Raphanus sativas L.)

It is among the vegetables that Nubians, commonly grow in their gardens.

(VIII) Miscellaneous crops

Karkadé is cultivated in small quantities on the ridges of agricultural plots. The Nubians cultivate it for its red fleshy calix which is generally used for making refreshing drinks.

Tobacco (Tumback; Nicotiana rustica N. tabacum L.)

Known locally as tūli . It is a coarse-growing plant which is smoked. It is grown in the region in small patches for local consumption.

Fenugreek (Hilba; Trigonella Foenum-graecum L.)

Fenugreek is a winter crop that is grown on sāgia land. It is known locally as karim, and regarded as a nourishing

food. Also the seeds and fenugreek juice are taken orally for stomach troubles.

(IX) Fibres

Cotton (Gutūn; Gossypium spp.)

As mentioned previously (Chapter Two p.46) there is early evidence of cotton in the Sudan. In the Nubian region it is called koshmāg and was cultivated only on family holdings, but is no longer cultivated.

4. Division of Labour

Agricultural work in the Mahas region; as in all Nubia; is a family task. Paid labour is not needed. Whenever there is any heavy work to be done such as, harvesting, there is a community gathering known locally as faz'ā which is always organized to help carry out the work.

The division of labour for agricultural tasks between the different members of the family varies according to sex and age. Males dominate, since farming requires hand labour, and hence they own all property, whether tools or animals. Women are confined to assisting with certain operations of a less strenuous nature, such as weeding and manuring. Winnowing with mat-trays is also a women's task, but women also help in harvesting when necessary. In addition women whose husbands are dead or outside the country or have no body to cultivate their farm do cultivate themselves. In this respect we can quote Hassan Daffa'alla's description of

the Nubian women in the following :

> "Evidently Nubia had the best working women in the whole Sudan, and Nubian women play a considerable part in the social economy".*

The second criterion for division of labour is age as is noticeable in the Mahas agricultural work. The main work is always done by middle-aged men. Old men and women help in sowing seeds and supervising. Children, usually boys, accompany their fathers to the fields and help in various agricultural operations. But the children's main contribution is in crop protection operations, such as scaring birds or making traps for wild animals. In addition, they drive oxen and donkeys around the threshing floor, and used to drive the sāgia in the past.

A third criterion for division of labour in the Mahas agricultural community is training and specialization. There are both full-time and part-time specialists. Full-time specialists include the basīr and the helmsman. However, part-time specialists, who devote only part of their time, either dialy or seasonally, to their crafts in addition to their work in farming or any other work, are more common. Examples of these are the tabīd (the local blacksmith) and the winnower.

5. Continuity and Change

The agricultural system in Nubia has been discussed above as being composed of the cycle, the operations, the crops and the division of labour. They reflect a varying

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* Daffa'alla, H. The Nubian in Exodus, C. Hurst and Co. Ltd., London, 1975, p. 54.

degree of continuity and change.

As far as the agricultural cycle is concerned there is a slight change from what was known in the remembered history of the Mahas region. The agricultural cycle used to be based on two main factors : the seasonal division of the year and the counting of the year in the Coptic months. Now the cycle is still strictly based on a seasonal division, however the use of the Coptic calendar is giving way to the increasing use of the Latin calendar. This has apparently become a necessity with the increasing tendency to link the Nubian agricultural cycle with the national agricultural cycle, which is counted in latin months. The connection between the local and the national agricultural cycle is dictated by the increasing role played by government bodies in agricultural planning, through the local councils and the local branches of agricultural banks. Also the Mahas co-operative union, which is the main regulating body for Mahas agricultural activities, now schedules its agricultural activities and supervises them as part of the national time-table.

The agricultural operations that are known in Nubia today seem to have been established with the establishment of the sāgia. In general all these operations have remained the same and are now practiced on the same principles as in sāgia era. Even the vernacular names for these operations today are the same as yesterday, as well as the general knowledge of these operations. Still there have been some

changes in one of the agricultural operations namely manuring. Farmers are now increasingly using chemical fertilizers which they can buy from central markets at Kerma and Dongola, or which they can get from the Agricultural Bank through the Mahas Co-operative Union. Although other agricultural operations have mostly remained the same throughout their known history, some slight changes can be observed in beliefs, practices and traditions connected with them, as will be discussed later.

The crops that are now known in Nubia in general and in the Mahas region in particular are numerous. Some of them have been known in Nubia since its domestication during Neolithic time e.g. durra. Most probably durra as mentioned in the text of this Chapter (p.117) is now a second rate crop. It is quite clear, however, that it was the staple diet before the introduction of wheat to the area. Many basic Nubian folklore and the culture holds durra in high esteem. Now durra is still an important component of many ceremonial practices and beliefs and of course is considered to be a major source of animal fodder.

Some other crops are not indigenous to Africa or to Nubia. They were domesticated elsewhere and introduced to this area. Most important of these are wheat and barley. Both of them seem to have become main diet crops, and people still remember eating barley as much as wheat up to the early Fifties. However, barley now is rarely consumed while wheat is the staple food as well as having been a cash crop until

recently. However currently a large amount of wheat is consumed locally due to the noticeable change of preferences in favour of wheat as well as to the increase in population as a result of the change in the men's migration patterns. Before the late Fifties and early Sixties when the main destination of the Mahasi men was Egypt, they returned home after long stays in Egypt. In most cases this lasted something between four and six years. Now however, most Mahasi men working in the Gulf countries return home annually. So the increase in consumption has meant that there is no surplus at all of the locally produced wheat crop. Therefore, it is no longer a cash crop since the local wheat now is not sold to gain either money or other commodities. In fact the writer has been told and has observed that the Mahas region needs as much as double the amount it produces of the crop. This mainly comes either from adjacent areas such as governmental scheme at Burgaig area in northern Dongola, from Kerma town, the main commercial centre of the region or from other wheat producing areas in the Sudan such as Khashm Al-girba or from abroad. The writer has been told about one of the major trade deals carried out by the Mahas Co-operative Union during 1984-1985 which was the importation of a vast amount of wheat from Canada through Saudi Arabia. The writer also informed by the members of the Co-operative Committee that this was done at a total cost of about two millions Sudanese pounds.

Curiously enough, even the imported wheat is sometimes sold locally by house wives to obtain the money they

need to buy other commodities such as sugar, tea and oil. Many of these house wives also donate wheat to others who have consumed their stored amount before the coming of the new season. In such cases the same amount that was given will be returned when the receivers have either produced or bought new quantities.

Some other crops were introduced to the region sometimes during modern history. These are the new world crops, the most important of them being Maize, which was used a lot until the late Fifties and early Sixties. It was prepared in two forms. The first and most important is the local bread which is eaten mostly with milk. The second is as roasted cobs. However, now maize food is not known in most parts of the Mahas region.

The fourth kind of crops introduced to the Mahas region arrived with the pump schemes. Most important among them are tick bean, fasūlīa, barsīm and fruit other than citrus.

The main factors in the division of labour in the Nubian agricultural system are age and sex. This remains the same today. However some factors in the division of labour have been modified due to social changes. These changes include the absence of children who now attend schools. And the increasing absence of school leavers who migrate to the Gulf countries as soon as they have finished their intermediate education. This increasing number of migrants at early age is due to the personal ambitions of these young boys, which

in most cases are limited in building a house and getting married. This is in addition to a decline in the job market in the governmental sector, which is in any case seen by these boys as unrewarding. Due to these social changes, most of the agricultural work is now done by middle aged and old men who have already done their share of earning money from outside, and by women of all ages. So for instance the bird scaring which was normally done by children is now done by old men and women, while all other operations are divided between middle aged men and women. Recently, the shortage in local labour has led to the introduction of the hired labour system in the local agriculture. This resulted in the recruitment of labourers from western and southern Sudan as well as from upper Egypt. They are employed on monthly payment, and are therefore not part of the local agricultural system and have no rights either in the crop, the land or in the water-lifting devices.

To conclude this chapter, it can be said that some new features are just appearing in connection with the Mahas agricultural system. These features are the introduction of mechanical pumps which have been followed recently by the introduction of some other agricultural machinery. Secondly, the connection of the Mahas agricultural system with the national agricultural system as mentioned above.

The connection of the local agricultural system with the national one is viewed by farmers with unease because they do not control the factors behind it. They are never

sure whether they will get what they have been promised by the government in the form of pump operating facilities, (spare parts, oil, operators) chemical fertilizers and improved seeds.

To further illustrate more the issue of the introduction of modern agricultural machinery we quote Hurreiz, who stated that :

> "In spite of its numerous merits, the changes associated with development and modernization were the beginning of external domination. For the first time the traditional agriculturist, subjected to contemporary development, found himself at the mercy of factors over which he had no control. He gave up a comprehensive and well-integrated system over which he exercised full control, in favour of a new system which was not yet well established and over which he had no control".*

Moreover modern agricultural machinery is expensive to hire, since farmers do not own it. At the same time, the farmers cannot operate it and so also have to hire the operators. But there is a feeling that these operators do not care much about the land they plough or the crop they harvest and/or thresh which means that some damage is expected through the use of this machinery. The local farmer say that they cannot afford such damage.

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* Hurreiz, S.H. Studies in African Applied Folklore, I.A.A.S., Khartoum University Press, Khartoum, 1986 p. 106.

CHAPTER FIVE

BELIEFS, PRACTICES AND TRADITIONS CONNECTED WITH TRADITIONAL AGRICULTURAL TECHNOLOGY IN NUBIA

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Traditional agriculture as the main economic activity in Nubia has evolved and developed through time with a connected set of beliefs, practices and tradition that are clearly reflected in the Nubian world view and life cycle. Any one who is acquainted with Nubian culture will notice how agriculture influenced and is being influenced by this culture.

These beliefs and practices are a result of the historical evolution of the Nubian society and culture. This evolution was a long, gradual and continuous process, lasting from the early prehistoric ages to the present. To understand the meanings, indications and reflections of the above beliefs and practices and to put them in their proper contextual setting we need to give here a brief survey of the historical evolution of Nubian society and culture.

1. Historical Background

The cultural history of Nubia is believed to have begun around 3,500 B.C. with the appearance of the local A-group culture.* Hence our concern here will be the period

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* Adams, W.Y. "Continuity and Change in Nubian Cultural History", S.N.R., Khartoum, 1967, p. 3.

which started with this date till the Islamic period. This period can be divided into three major stages as follows :

1. The proto-historic period which includes : A-group, C-group and Kerma culture.

2. The ancient period including, Napatan, Meroitic and X-group.

3. The Medieval period which includes the Christian and Islamic periods.

Considering the first stage, the A-group culture had reached an evolved stage which combined traits from pre-dynastic as expressed by Trigger :

> "The A-group culture shared with the predynastic Egyptian ones a concern with burial rituals and grave goods that was hitherto foreign to Nubia".1

and he adds :

> "The graves and burials were in no way different from those of Upper Egypt. Bodies were wrapped 'in straw' matting and halfa grass .... several baskets filled with unidentified seeds and fruit were also found".2

Very little is known about their religion, beliefs and their social and political structure. However, scholars have argued that the beginning of the social and political structure

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1. Trigger, B. Nubia Under the Pharaohs. Ancient People and places, Vol. 85, Thames & Hudson, London 1976, p. 36.

2. Ibid., p. 33.

as well as religious practices of the later period, i.e. the C-group and Kerma culture, seem to have started during the A-group time.[1] There is now an ongoing discussion on whether the A-group was in fact a centrally organized culture which represented the first pharaohs in the Nile Valley.[2] The question is still open. One thing is however clear : the Egyptian traits and Egyptian goods found in A-group graves indicate strong ties with Egypt.

As far as the A-group economy is concerned, it seems to have been of the early Neolithic type.

The C-group culture was for a long time believed to have been introduced to lower Nubia. It was thought to have been more negroid in character and therefore was believed to have come to lower Nubia from the south or the south-west.[3] However, after further archaeological excavation during the international campaign to salvage the Nubian heritage, it became evident that the C-group was a local culture which had evolved from the preceding A-group culture.

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1. Bonnet, Charles "Upper Nubia from 3000-1000 B.C.", in Osman, Ali (ed), Readings in the Archaeology and Culture History of the Sudan. In honour of Negm Eldin Sharief, 1989 (in press).

2. William, B. "The Lost Pharaohs of Nubia", in Archaeology, Vol. 3 , N. 5, Boston 1980, pp. 12-21.
and :
Adams, W.Y. "The Lost Pharaohs of Nubia", in Near Eastern Studies, Vol. 44, N. 3, pp. 185-192.

3. Emerey, W.B. Egypt in Nubia, Hutchinson of London, London, 1965, p. 133.

The C-group people were sedentary and depended presumably more on plant farming than on livestock.[1]

There is no clear evidence of social stratification and religion was :

> "... probably not as yet associated with a dominant priestly class, and it reared no enduring monuments".

It is also stated by Adams that :

> "Sacrificial animals were often buried within the later cemetries of the C-Horizen ..... Cattle burials are also present, though they are less numerous than sheep and goats ..... Some cemeteries of the later C-Horizon include upright stone stelae with incised drawings of cattle. These may represent an attempt by the Nubians to ... make a symbolic offering of cattle to the dead without actually depriving the living".2

The C-group culture seems to have been Egyptianized in its later stages, since it is evident that the Egyptian religion and administration were of considerable status in lower Nubia at that time.[3]

The famous American Egyptologist G.A. Reisner excavated the site of Kerma between 1913 and 1916. He described it

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1. Adams, W.Y. op.cit., 1977, p. 154.

2. Ibid., p. 157.

3. Adams, "Post-Pharaonic Nubia in the light of Archaeology, No. 1, JEA, Vol. 50, 1964, pp. 102-120.

as an Egyptian colony and considered the building (western Defuffa) as an Egyptian trading post.[1] Many other scholars disagreed with Reisner in his generalized conclusions about Kerma and argued that it must have been a local kingdom. However, those scholars did not conduct further archaeological work in Kerma so they were in fact using the same data that Reisner had found at the site. In fact new excavations did not start in Kerma until the Swiss expedition from the University of Geneva started its work in the different sites of Kerma culture in 1970. Since then a lot of new archaeological evidence have been gathered to give a more comprehensive picture of the Kerma culture. It is now believed that Kerma was a local centralized kingdom which ruled most of central and northern Sudan for a long period.[2] It had a complex economy, socio-political institutions and religious practices. The characteristics of the Kerma culture can be recognized from its pottery and its burial customs. The burial customs were characterized by bed burial, ram and human sacrifices and domed tumuli. The Kerma tumulus is dome-shaped, in many graves the encircling ring

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1. Reisner, G.A. Excavation at Kerma, Part IV-V, Harvard African Studies, Vol. Vi, Harvard University Press, Cambridge, Mass, U.S.A. 1923, pp. 3-5.

2. Bonnet, Charles. "Kerma: An African Kingdom of the 2nd and 3rd Millennia B.C.", in Archaeology, Vol. 36, No. 6, Boston, 1983, p. 38.

of stones is dark in colour, while the surface of the mound within the ring is covered with white or yellow pebbles. Adams concludes that :

> "Here we find many resemblances to the C-group and A-group cultures, but at the same time the first clear sings of oriental despotism".1

The capital of this local kingdom which was at the site of the present-day Kerma was a big town of substantial buildings and services. Kerma can claim the distiction of being the oldest indigenous town in the Sudan.[2]

After the downfall of the kingdom of Kerma there is a gap in our knowledge of the cultural development of Nubia for some centuries. This gap might be due to the lack of archaeological investigation pertaining to this period. Nevertheless, the beginnings of the Napatan Kingdom which was centred around Jabal Al-Barkal bears some major resemblances with the Kerma culture especially in burial customs. The indigenous traits of the Napatan culture are summed up by Adams in the following :

> "The Napatan culture exhibits obvious indigenous traits. Such traits are human sacrifice, ... bed burial and the manufacture of hand made pottery according to a tradition stretching back unbroken to A-group and even Shahienab times".3

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1. Adams, W.Y. op.cit., 1977, p. 198.

2. Bonnet, Charles, op.cit., 1983, p. 38.

3. Adams, W.Y. "Continuity and Change in Nubian Cultural History", in SNR, Vol. 48, Khartoum 1967, p. 11.

There is also a strong Egyptian influence in those beginnings which led scholars to describe Napata as possibly an Egyptian off-shoot kingdom.* However, most modern studies consider Napata as a part of the Kushitic Kingdom which started about 1000 B.C. and ended in 350 A.D. During this period both Napata and Meroe were major religious and administrative and economic centres.

The Kushitic Kingdom was a highly prosperous civilization, with cities, complex societies, international trade relations and a writing system. The territories of Kush included all the Sudanese Nile Valley down to the area south of Khartoum. In the early stages Kush ruled Egypt for around fifty years and had contacts with the Mediterranean world. And in its later stages it enjoyed good relations with the Ptolemies in Egypt and the Byzantine Empire.

The religion of Kush during the Napatan period was basically the Egyptians cult of Amon. Therefore the early temples at Al-Barkal, Kawa and Meroe itself were of Egyptian type. But with the development of the kingdom and its growing orientation towards Al-Butana, a new cult appeared, that of the God Apedamak who was distinctively local. The Meroitic civilization is described by Shinnie as :

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* Emery, W.B. Egypt in Nubia, Hutchinson of London, London, 1965, pp. 208-221.

> "... an African civilization, firmly based on African soil and developed by an African population".1

Shinnie also gave examples of the persistence of cultural traits which are summed up by him in the following:

> "Persistence of cultural traits from the ancient population is seen in the face cuts, still in use as decoration and as tribal marks in the Sudan..... Antimony was used by women as eye paint, as is still customary in many parts of Africa and the Near East".2

Finally came the second stage of Nubia's culture history which was the X-group culture.

At the beginning of the middle ages Nubia witnessed the introduction of Christianity. Adams illustrated this as follows :

> "The advent of Christianity wroght an ideological transformation in Nubia unparalleled since the coming of civilization itself. Within a matter of generations ... the traditions of the Pharaohs, which for 2,500 years had stood as the touchstones of civilization, were discarded in favour of new symbolic orientation. Royal tombs and temples, vainglorious proclamation, glyptic art, mortuary furniture, and the belief in the divinity of kings all disappeared as if overnight, and were replaced by new canons of faith, of art and of literature".3

Other changes occurred with the beginning of the Christian period in Nubia. First when Nubia was converted to Christianity in the fifth century, it obviously became

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1. Shinnie, P.L. Meroe A Civilization of the Sudan, Ancient People and Places, Vol. 55. Thomas and Hudson, 1967, p. 169.

2. Ibid., pp. 155-156.

3. Adams, W.Y. Nubia Corridor to Africa, Allan Lane, London, 1977, p. 506.

a part of the Christian community and had its own complex "inter-" and "intra-" regional relations and affinities. This relationship was one of give and take in which Nubia played a positive role in the Christian world, especially in Egypt, while at time it received many material and non-material from this wider Christian world. Secondly, the cultural influence and domination of the Nubians covered a considerable area of what we know as Sudan today.[1] This resulted in the spread of Nubian technology-especially Nubian agricultural technology beyond the traditional Nubian territories to cover most of the present-day Sudan, as is evident from the modern distribution of such technologies.[2]

As for the Islamic period, it is evident that Islam reached Nubia almost at the same time as Christianity. So when Islam eventually took over the rule of Nubia and the adjacent lands it inherited all the domains of Nubian Christianity and spread beyond them.[3] Therefore early Islamic period in the Sudan is characterized by establishment

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1. Vantini, Giovanni "Christian Relics in Sudanese Traditions" in Nubia Christiana. Vol. 1, Warszawa 1982.

2. A clear indication of this is the fact that nearly all technical names connected with the agricultural tools, cycle and operations still pertain their Nubian affinities.

3. Osman, Ali, "Islamic Archaeology in the Sudan", in Krause, M. Nubishe Studien, Philipp von Zabern, Mainz am Rhein, 1986, pp. 347-355.

of a number of Islamic kingdoms in different parts of the country. And the history of Islam during its early period is essentially the history of these kingdoms.*

The introduction of Christianity and Islam to Nubia was a great departure from the earlier cultural complexes, simply because these two religions are celestial. This resulted in a number of changes in Nubian religious life and general cultural attitudes. Therefore, it is expected that this would be reflected in Nubian beliefs and practices. Nevertheless, there is in fact a considerable number of those beliefs, practices and traditions that can only be ascribed to the local indigenous culture.

Against this background an attempt is made here to classify, interpret and analyse the beliefs, practices and traditions connected directly or indirectly with traditional agriculture in Nubia. The classification will be first in relation to agricultural operations and second to the Nubian life-cycle; in addition to beliefs practices and traditions connected with the water wheel, sāqia.

2. Beliefs, Practices and Traditions Connected with Agricultural Operations

As far as the agricultural operations are concerned, it is worth mentioning that the Nubian agricultural

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* O'Fahey, R.S. and Spaulding, J.L. Kingdoms of the Sudan, Studies in African History, 9, Methuen and Co. Ltd., London 1974.

organization along with the beliefs and practices connected with it is a direct outcome of a long history of trial and error, hard work and close observation. Thus, the acquired knowledge and experience was transmitted carefully through organizations orally, visually and/or practically. These organizations include ten interrelated stages which are :

1. Land preparation
2. Sowing
3. Watering
4. Weeding
5. Manuring
6. Crop protection
7. Harvesting
8. Threshing
9. Winnowing
10. Storage

Each of the above-mentioned stages is well-established in folk knowledge and various traditional methods and techniques.

At the opening of each agricultural year, toddan is the first thing to be established, According to it the day is normally divided into two shifts. The first shift, which is called shāyyég , starts at mid-night and lasts till midday, when the second (Dibīn) begins and continues till mid-night.

To know the exact time at which each shift begins and ends, a wooden peg (Cujir) is fixed in the ground and the

end of the shāyyég or the dibīn is judged by the length of its shadow. The cujir must be set up in the presence of all shareholders and to their satisfaction. For night shifts the Nubians used to observe astronomical signs such as the times when the moon certain starts rise or set, to determine the times between shifts. Variations in these phenomena throughout the agricultural year is common knowledge with which all farmers have to be familiar. Every week the two shifts must be interchanged, i.e. those who worked during the morning shift must take the afternoon shift and vice versa. This process of agricultural time division is locally called tatī.

The day on which cultivation is to be started, is specified by the fagīr who will choose a good day for them according to the Arabic calender. Otherwise it is specified by elders in the community, who possess deep experience and knowledge of agriculture. On this day, all farmers must begin cultivation. The sāgia then is ready to be operated. All shareholders get together and take part in preparing and sowing a small plot. In this plot the first sāgia water is to be received. The seeds are carried in a container with some dates. After sowing the dates are eaten, then the sāgia is operated. When the first water enters the plot, the the adhān* is immediately called by one of the attendants while others burst into laughter and clap loudly. The adhān might be called at any time, i.e. not necessarily to coincide

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* The Islamic call for prayers.

with one of the five prayers, however they often prefer to make it coincide with the afternoon prayer. This tradition is known as 'aman ūsar, which literally means "to get water out". The most important thing about this tradition is that it should be done on this specific day; thereafter farmers are free to choose a suitable day or time to start their cultivation, but definitely not before land division.

To divide the land between the farmers who form the toddan they first mark the land into equal parts, then each of them brings his own saham (a certain token). The saham must be something green either a branch or a palm leaf. They show their 'ashum (sing. saham) to each other, then a person who has not seen them takes all the 'ashum and turns his back to the fields he starts to throw them backwards. Where each saham falls indicates to the farmer where his field is.

The second step then is kjji (tilling of the soil). All shareholders, their sons, relatives and neighbours help to carry out this work. As was mentioned previously (Chapter three:p.64) this kind of community gathering and communal work is known as faz'ā; and it is note worthy that faz'ā is carried out whenever there is heavy work to be done, such as building a new sāgia, digging a new water conduit or at harvesting. Farmers sing during these communal tasks. Their work songs are merely chantings of religious praises in which they ask God to help them in their work, praise the

Prophet Muhammad and show their intention to visit his gubāh (tomb) and to see the holy lands. The style of singing is always the same with one acting as a main singer and the others acting as his chorus (for the song lyrics see Appendix No. I , p.173).

When the crop is ripe, a good day for harvesting must also be specified in the same way described above. One of the farmers calls for a faz'ā in the village and other nearby villages on the announced date, the harvest festival begins, and all people come carrying their sickles to take part in the faz'ā of the harvest. A sheep or a ram has to be slaughtered by the owners of the crop and cooked for their food. Moreover, the first harvest is taken by the farmers' wives who assisted by their female relatives and neighbours, and immediately ground with a jao (grinde stone) and made into kabīda (pancake). As a karāma* or offering these meals are then served for all people who attend the faz'ā and some of it is sent to the old people who could not attend.

As soon as harvesting is finished, farmers carefully choose a suitable place for threshing. Animals used in threshing are always driven by children who sing many songs

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* Karāma is an animal sacrifice or any ceremonial food that is offered as a token of gratitude or bestowing mercy and blessing.

while driving them around the threshing floor (for the song lyrics see Appendix No. II). When finished, women then take care of winnowing. Ceremonies connected with the gaīs (threshing floor) and winnowing are always carried by old women. A karé (a straw mat shelter) is constructed for them at one of the sides of the gaīs and furnished with a number of angaréb beds and mats. In this karé they spend whole days of winnowing, eating their meals and drinking tea which are usually sent to them from the village.

On entering the gaīs, they keep on repeating the word Bismillāh (in the name of God), and praying for the Prophet Muhammad. They take certain items with them and place them near the gaīs. These include the Qurān , a silam (a copper dish) full of water, some food and dates (seven pieces), alum, ush ūrum (fennel flower), Arabin imīd (the salt of the Arabs). Then they burn incense of bitter gum and sandal wood shavings. During winnowing whenever they finish a part they carry some of it to be placed near these items. Much noise or speech is undesirable in winnowing, while any mentioning of evil is absolutely forbidden. When winnowing is over, dates are given to the children to eat, and the crop is divided among the shareholders.

Using the konté the whole crop is divided into equal shares. The saham method of division is also used here. Farmers first choose their tokens and show them to each other in the presence of a person has not seen them during the choosing of the saham. Then they ask him to put them into

the heaps of the crop. When he finishes, each farmer recognizes his share and collects it. When the crop is taken home, women take a certain amount of it, usually two or three karaj to be distributed to relatives and neighbours. This amount is locally known as kayar.

3. Beliefs, Practices and Traditions Connected with Life-cycle

In the Nubian life-cycle birth, marriage and death are regarded as the most important events, followed in importance by circumcision and departures. However, our concern here will be the rituals that are associated with agriculture and agricultural life in their various forms.

Starting with birth, from the very beginning when the midwife is called for a delivery, she first takes some durra grains and scatters them on the person who comes to summon her. On her way to the house of the mother to be, the midwife scatters durra right and left to please the angels, as they believe. When she enters the room she scatters durra on the woman in labour and the women attending her. Then the grandmother takes the rest of the durra, adds more to it together with some dates and puts them with a spool of white thread, to tie the umbilical cord of the baby.*

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* 'Abd Allah, Sayyid, M. op.cit., 1974, p. 41.

During labour the woman grasps two palm branches which are hung above her, and to please the spirits these are kept in the room for the full forty days of the confinement period. Often an egg-plant and some dates and wheat are placed in a bowl near the mother's head.[1] To protect the baby's eyes against eye diseases an antimony stick is dipped in onion and applied to the eyes. Protection from the evil eye is through hijab,[2] a small closed bag containing various substances such as salt, durra and fennel-flower which is hung around the baby's neck or his arm. When the baby is born the midwife chews the heads of seven dates with some durra grain and spit it into the baby's umbilical cord.[3] Secondly, the midwife makes a raft of wheat straw and palm leaves, and places on it some durra grain, little pieces of kabīda (pan-cake), seven dates, garad, perfume and antimony.[4] She takes the raft to the Nile with three other women and leaves it to float, while they speak to angels: "This is your gift for delivering the baby safely, and we will bring you another similar gift if the mother and her baby are safe up to the end of the forty days of confinement".[5] The midwife is then,

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1. Kennedy, J. "Mushahara : A Nubian Concept of Supernatural Danger and the Theory of Taboo", American Anthropologist, Vol. 69, 1967, p. 689.
2. A Charm or amulet.
3. 'Abd Alla, Sayyid, M. op.cit., p. 42.
4. Ibid., pp. 42-43.
5. Ibid., p. 43.

given her fee which is usually a certain amount of money and small quantities of durra and dates. On her way home she scatters some durra as a gift to the angels. When the external part of the umbilical cord of the baby dries up and falls off, it is taken by the baby's father if the baby is a boy, to be buried beneath the water-wheel, otherwise it is taken by a woman and buried in kitchen.[1]

On the seventh day, as well as on the fortieth day after the birth, the mother and child accompanied by a mid-wife and neighbouring women go in a procession to the Nile to offer seven plates or pieces of 'asīda, balīla, seven dates, perfume and henna.[2] The faces of mother and child are washed and after incantations for health and happiness, the group returns to the house carrying containers of water and green palm branches. These palm fronds are thrown into the house, and the water sprinkled inside "to fill the childs' father's house with life".[3] Both fenugreek and date porridge are served for the mother for the full period of confinement, because they are regarded as tonic and nourishing drinks.

As far as marriage is concerned, first the groom's parents invite the whole village to their home. On the day

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1. Personal information from Muhammad Ūshi, Mashakīla, Al-Mahas region, the first of January 1988.

2. Kennedy, J. op.cit., p. 689.

3. Ibid., pp. 689-690.

of the invitation, women go to the wedding carrying their gifts. These gifts, known as kasé are always in the form of foodstuffs, such as oil, wheat, barley, durra or dates. kasé is given to any body who celebrates the marriage or the circumcision of his or her children as a share in costs of the preparation of the occasion.[1] In the case of marriage these quantities of grain are then collected and carried to the bride's house as a part of her dowry. On the first day of the wedding the groom is given his gift which is always a share in palm trees, land, sāgia or animals. On the second day the groom and the bride go together to swim in the Nile. While swimming, the groom chews dates, sugar or a piece of kabīda and spits it into the river as the share of the angels. On the way home he pickes any thing green (palm branches, weeds or lubīa plant) and when he enters his room he puts this green branch in a high place, where it will remain till the fortieth day after the wedding. The groom must perform the ritual of going to the Nile every day till the seventh day. Visitors who come to congratulate the groom take some durra or safflower seeds, and as soon as they see him they scatter them on him. On the seventh day after the wedding the désha of the groom[2] carries many palm branches

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1. Osman, Ali. "The Economy and Trade of Medieval Nubia", unpublished Ph.D. thesis, Christ's College, University of Cambridge, Cambridge 1978, pp. 155-157.

2. The groom's closest friend who is normally unmarried.

while he accompanies the groom around the village. Whenever he meets old men he gives them one of the palm branches and in turn they give more gifts to the groom. Another ritual which takes place on this day is for the groom to take a handful of durra or barley that is placed near him and give it to his bride. The bride returns it to him and they repeat this action seven times. The last time, in a quick movement, they scatter the seeds on each other, this time with the participation of their relatives. On the fortieth day after the wedding these seeds are carefully collected to be planted in the first plot at the beginning of the first season of the new agricultural cycle. Otherwise it will be used to feed an animal that has recently delivered and is known for its abundance of milk.*

The departure of male migrants who have returned for a visit is associated with many customs. One of these is the preparation of food for his journey. A propitious day is chosen for this. Some women, usually three, get a mat tray full of wheat, with heads of seven dates on top of it. Each of the three women takes a handful of wheat and puts it into the grind stone, then they turn it together. The farewell is usually attended by the fagir of the village, who hands a green branch to the man who is leaving, after marking a

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* 'Abd Allah, Sayyid, M. op.cit., p. 59.

line on the earth. The man crosses the line after saying good bye to his family, then returns the green branch to the fagīr. It is noticeable that migrants always prefer to take their holidays during the season of date harvesting in their home area.*

Regarding the death ritual, first the corpose is washed on an angaréb on which a number of palm branches are placed. Palm branches are also used as arches for a a woman's bier. When the death is announced, mourning is applied everywhere in the village, celebrations are postponed and singing is banned, even on the sawāgī (sing. sāgia) and grindstones. To share the costs of the condolence days, foodstuffs such as wheat, durra and sugar known as gubar is given to the mourning families. After forty days certain ceremonies are held, which include a karāma (animal sacrifice) and serving of dates. Before the ceremony starts, boys collect Nile pebbles in big quantities and bring them to the place of the gathering. When the serving of food and dates is over, the fagīr with his students starts the ritual by chanting the tasabīh. Students are then divided into many groups. Each group recites one of the tasabīh, and one stone is set a side for each single recitation.

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* Ibid., p. 81.

When the phrase has been repeated one thousands times, a sign is made on a green palm branch, and this is done repeatedly eleven thousand times. After that men carry the Nile pebbles to the grave and put them around the grave stones, then pour water on it. Nowadays in some areas, pebbles are no longer used for this ritual. Instead, people have started to use Lupin. After the tasabih is finished, lupin seeds are collected and kept till they are planted on the land that owned by the dead person. The crop of this cultivation is sold and the money is used to purchase sadaga (alms) given in the name of the deseased.* Another ritual concerning death is the visiting of the cemeteries, which usually occurs on occasion of al-id-al kabir and al id al saghir. Early in the morning women visit the graves of their dead relatives, scatter some durra and dates on them and fill a pot of water to place beside the grave. Men, after saying their morning prayer, go and cut a bundle of palm branches, then go to the cemtery and level the graves, setting palm branches upright at both ends of them. However,

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* Personal information from Mukhtar 'Abd Al-Gadir, Tajab, Al-Mahas, March 1990.

the branches must be cut from the date palm trees that were owned by the dead person.

4. Beliefs, Practices and Traditions Connected with the Sāgia

The effects of the introduction of the sāgia to Nubia were revolutionary.* The increase in irrigated land encouraged sedentary agricultural life and consequently there was a growth in population. Thus it gave a good potentiality for the growth of kingdoms in the region. However, its impacts upon many other sides of the Nubian life were no less than its economic impact. The sāgia was the major water-lifting device in the region for many centuries.

Consequently we can observe how profoundly it affected the socio-cultural aspect of the life of the Nubians. They made it, used it, humanized it and gave it their full love obviously because it secured and maintained their life and well-being.

To the Nubians the sāgia, like human beings, is subject to kabsāh and the evil eye. Kabsāh is a type of ill-luck that affects one or all parts of the sāgia. Nubians diagnose kabsah when the meshing of the two wheels is not in order, which is a symptom that may cause the collapse of the whole sāgia. According to their belief the sāgia is subject to

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* Adams, W. Nubia Corridor to Africa, Allan Lane, London, 1977, p. 346.

kabsah when a person who is ritually impure, a funeral or a woman who is making a mushāhra* ritual, passes by it. It is also threatened when a woman, who is involved in one of the rituals attached to pregnancy and childbearth, looks at it on her way to the river.

Since the sāgia is thought of as being subject to kabsah and the evil eye, it has to be protected by certain measures. One of them is for the owner, at the beginning of the agricultural year to collect some soil from beneath the wheel and the toré (the horizontal axle), put it into a container and pour some of the first water of the sāgia on it. Then he sprinkles the mixture on the parts of the Sāgia that do not enter the water(e.g. the two wheels) while repeating the word Bismillāh (in the name of God). Another way of protecting it is by making incense of a mixture of the powder, resulted from the friction between the parts of the sāgia, a small wooden piece of the sāgia, and garad (the fruit of the sunt tree), and passing it through the wheel. Some people used to take some soil from the shrine of the saint in whom they believed, tie it into a small cloth bag and hang it on the wheel.

If the sāgia is affected by kabsah, the process of

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* The word Mushāhra is drived from the Arabic word "Shahar" which means month. It is a state of vulnerability to all ailments to which a person passing through life-cycle periods is subject. It gives the same meaning as kabsah.

purifying it is always carried out by an old woman. This woman starts the process by fastening a rope to one of the turning parts of the sāgia, and takes the other end with her to the river where she stands in the water and throws the rope in it. Then she fills a dish with river water and carries it with her. On her way back to the sāgia she pulls the rope. When she arrives at the sāgia she burns incense and passes it over the sāgia. She puts the incense out by sprinkling some water on it from the dish she brought from the river, then she sprinkles the rest of the water on the parts of the sāgia and concludes the ceremony by untying the rope from the sāgia.

There is also a common belief that some of the sawāgī (sing. sāgia) were inhabitied or possessed by jinn,* and when the sāgia was often out of order or the yield was always low this was immediately ascribed to jinn. It was also believed that some of the sawāgī were associated with bad luck which could cause the death of its owners or their animals.

To show his gratitude to the Sāgia and the great role played by it in his life, the Nubian farmer takes seven pieces from the first okra crop, threads them together in the form of a necklace and adorns the mishī (the vertical axle) with them. The same is done for the first date crop,

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* A supernatural being

which would be tied to the fīshé (the sāqia water pot). The dates then go with the pots in their up and downward movement till they fall off.*

5. Reflections, Interpretations and Analysis

From the above mentioned accounts of beliefs, practices and traditions connected with traditional agriculture in Nubia, the following aspects may be seen as focal points of interest worthy of reflection, interpretation and analysis.

The impact of the environment upon Nubian economic and socio-cultural life is very clear. The landmarks of their world are fields, palm trees, hinterland, mountains and the Nile, with all beliefs and rituals centred on them.

The second fact is that a good deal of beliefs, practices and traditions are connected with the agricultural system as well as with the Nubian life-cycle. So, the interconnection between the beliefs, practices and traditions on the one hand and the agricultural system and Nubian life-cycle on the other is very strong and prominent.

Thirdly is the fact that many of these beliefs, practices and traditions reflect aspect of communal life which is the most obvious characteristic of Nubian society. Since agriculture is part of the Nubian life-cycle, many beliefs, practices and traditions connected with it reflect this basic

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* For more on the subject see:
Abu Salīm, M.I. op.cit., 1980, pp. 188-193.

and important feature of Nubian societies.

This Nubian communal life is based upon the interrelated system of economic and social aspects of their culture and therefore builds up a socio-economic equilibrium in the society. This socio-economic equilibrium results in a stable economic and social set-up. It is therefore clear that Nubian society is devoid of great social and economic differences. In other words, there is no economic and social class stratification. In the above mentioned beliefs practices and traditions, the faz'ā, the 'ayar and karāma, at different stages in the agricultural operations and the kasé and gubar in the life-cycle system are basic features of Nubian communal life and Nubian socio-economic equilibrium.

The fourth is that, these beliefs, practices and traditions are of diverse origins, i.e. we find non-Islamic elements although all Nubians now are believing and practicing Muslims. This fact is a clear indication of cultural and historical continuity. Thus their origins lie in the historical and cultural development of Nubia through time.

To measure continuity and change in these beliefs, practices and traditions we must try to classify them into chronological order. However, they are not dated directly. The cross-dating method could be used here taking the dated aspects of Nubian agricultural practices as a reference point. This reference point has to be water-lifting devices, since being physical in nature, their evidence such as nobed pots, has been discovered in an archaeological context and

they have been dated.

Another reference point for a relative dating of beliefs, practices and traditions is connected with Nubian agriculture is the different developmental stages of the Nubian agricultural system. This would have developed from basic stages to complementary stages. Therefore the advent of water-lifting devices, e.g. the introduction of the sāgia, would be followed by the development first of the basic agricultural practices. Then this in turn would be followed by the development of beliefs and practices.

Using this dating method, the beliefs and practices can be classified into two groups. Group (a) will include the major agricultural practices, while group (b) will include the major beliefs and traditions.

a- The basic practices connected with the agricultural system such as toddan, tatī and faz'ā are expected to have developed with the development of the agricultural system. The only practice for which we have an approximate date is toddan, which has been mentioned in the Nubian document found at Nawri in the third cataract region dated to the time of King Basil at the end of the tenth and the beginning of of the eleventh century A.D.* Since it is apparent from this

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* Osman, Ali, "The economy and trade of medieval Nubia", unpublished Ph.D. thesis, Christ's College, Cambridge 1978, pp. 61-62.

document that the toddan system was firmly established then, it can be deduced that other practices connected with it as mentioned above were also firmly established. Since these practices were major elements of the Nubian agricultural system they must have been developed with the development of a major agricultural system, most probably during the introduction of the sāgia to the region.

The practices of toddan and tatī were fully performed during the sāgia agriculture. However, with the introduction of pump schemes they became unimportant. The main philosophy of the toddan and tatī systems was to make it possible for a number of farmers to share in the establishment and administration of one of the water-lifting devices. And this made it necessary to have a system for division of watering time. This has changed with the introduction of pumps. The two systems have therefore become unnecessary and are now disappearing.

As far as land division practices are concerned, they are still in use, but some basic changes occurred in them with the introduction of pump schemes. The saham division of land has disappeared now and instead each farmer has a defined and permanent plot of land.

The need for the faz'ā in the Nubian agricultural system in general has increased due to the scarcity of manpower in relation to the agricultural land to be cultivated, which was in turn governed by the necessities of their subsistence

economy. There was still a shortage of manpower even after the introduction of pumps. Therefore the faz'ā is still very much in use. Over and above the shortage of manpower, faz'ā is necessary during harvesting of major crops such as wheat and dates. This is because once the crop is ready to be harvested, it should be done quickly, for any delay causes loss.

Faz'ā is an old Nubian tradition. It also can be dated to the medieval period since the word Faz'ā appears in many Nubian documents with meaning "to call for assistance". It was then and still is voluntary and free participation in the needed job. Yet it is reciprical in nature, meaning that any body who does not attend other people's faz'ā should not expect them to attend any of his. This communal character is still well observed and respected.

b- The major beliefs and traditions connected with Nubian agriculture will be discussed below giving possible explanations and discussing continuity and change in their performance.

Many of these beliefs, such as those connected with the river Nile, and the concept of mushāhra are persistent cultural traits which are indigenous or show today. It is worth mentioning that these beliefs are always connected with life-crisis rituals, which indicate that these customs are meant to be protective symbols from various dangers to which someone might become vulenerable during these drastic stages.

The procession to the Nile to bestow fertility; throwing food and gifts into it to appease its spirits; or washing with Nile water as a means of purification, are all indications that confirm the assumption that the Nile was once worshipped and considered as a deity; especially since a tradition prevailed in Egypt in ancient times of throwing a virgin into the Nile as a sacrifice in order to propitiate the diety who presided over its water.[1]

Another persistent cultural trait is the use of incense for protection from the evil eye, and metal (copper dish) to chase away evil spirits.

The use of green things in the form of palm fronds or green boughs always symbolizes fertility, prosperity and continuity. Good omens as well as prosperity are symbolized by dates and grain. Dates symbolize general goodness, wealth and health in themselves, while the numbers signify good luck, protection and the proper way to do things.[2] Dates also symbolize affluence and probably had much more complex associations when served to groups who gathered for the feasts

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1. Russell, M. "Views of Ancient and Modern Egypt" Edin, 1830, p. 436, quoted in Hurreiz, S.H. "Birth, Marriage, Death and Initiation Customs and Beliefs in the Central Sudan", unpublished M.A. thesis, University of Leeds, 1966, p. 74.

2. Kennedy, J. "Nubian Zar Ceremonies as Psychotherapy", Human Organization, Vol. 26, 1967, p. 192.

associated with marriage, as well as at the several events included in the sequence of rituals following a death.[1]

The use of grain, especially durra, which is proved to be connected with many life-cycle rituals can be referred to the persistence of durra in the region since ancient times. Moreover the use of grain in general, especially in marriage ceremonies, may signify growth and fertility. Also the white colour of durra and safflower seeds,[2] which are mainly used, symbolizes purity.

Animal sacrifice and commensal eating of the ceremonial food fatta[3] is also a common Nubian practice. This food is associated with communal solidarity, generosity and good will.[4] The practice of animal sacrifice or other ceremonial food is known as karāma. As with many other customs animal as well as human sacrifice can be traced back to the C-group and Kerma culture (see p.138). Generally speaking, animal sacrifice now is performed as a token of gratitude to God

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1. Callender, Charles and Fadwa El Guindi, Life-Crisis Rituals among the Kenuz : Case Westren Reserve University Studies in Anthropology, No. 1, p. 16.

2. Safflower seed is salted and roasted to be offered to guests on happy occasions.

3. Local food made of bread and soup.

4. Kennedy, J., op.cit., p. 192.

or for the bestowing of mercy and blessings from him. Animal sacrifice in the Northern Sudan is associated also with boat building, on the anniversaries of holy days, on a wedding day, on the occasions of birth circumcision or building of a new house.[1]

Another custom which could also be related to Islamic customs is connected with birth rituals when the midwife chews some dates and durra grains and spits them on the baby's umbilical cord. This can be related to the process of tahnīk, that was carried out by the Prophet Muhammad for many Muslīm newly borns. Tahnīk is a process of chewing some sweet food such as date or honey and placing it into the mouth of the new born baby and rubbing its chin to train it to eat.[2]

As far as death rituals are concerned, death would remind any person of God more than any other occasion. It is at times of calamities and such crises that man would turn to God.[3] For that reason, customs connected with death are very religious in nature. At the same time there are vestiges of ancient religious practices which can be observed intermingled

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1. Madani, Y.H. "Boat Building in the Sudan" Material Culture and its contribution to the understanding of Sudanese cultural Morphology, unpublished Ph.D. thesis, School of English, University of Leeds, 1986, p. 141.

2. Muhsin Khān, M. The translation of meanings of Sahīh Al-Bukhari, Arabic English Vol.VII, Islamic University, Al-Medina Al-Manauwara, 1979, p. 272.

3. Hurreiz, S.H. "Birth, Marriage, Death and Initiation Customs and Beliefs in the Central Sudan". Unpublished M.A. thesis, University of Leeds, 1966, p. 146.

with contemporary religious practices. Examples of these customs are the visiting of the cemeteries to level the graves and cover them with Nile pebbles. These customs could be referred to the C-group, Kerma and Meroitic cultures. There is also the custom of putting food and drink on or beside the grave, which may be dated to the A-group culture. Now all these customs have acquired Islamic characteristics and interpretations. They are interpreted now as karāma, that is being put for animals, or given to poor people or children to eat, which may bring Mercy to the soul of the dead person. In addition there is the cutting of palm fronds and setting them on the graves. The belief that prevails behind this custom is that the Prophet Muhammad did it once and when asked by Muslims about it he answered, that the split palm rib might ease the dead person's torture.[1] However the presence of palm fronds or drawings of it was known in the Sudan since ancient times.[2]

There are also many other Islamic practices e.g. placing the Qur'ān near the threshing floor, calling the adhān during the 'aman ūsar, and the recitation of the name of God and praying for the Prophet Muhammad. All these can be seen as

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1. Sunan Al-nisa'y, (in Arabic), Bisharh Al-hafiz Jalāl Al-dīn Al-Sindy, Dar Ihīā' Al-turath Al-'arabi, Bayrūt, Lebanon, Vol. III, undated, p. 106.

2. Save-Söderbergh, T. "The Paintings in the Tomb of Djehuty hetep at Debeira", Kush, Vol. 8, Khartoum 1960, pp. 38-39.

Islamic protective symbols. Moreover, there are many other customs which could be interpreted as Islamic, which are performed in a setting of popular Islam. Popular Islam in the Sudan incorporates beliefs and practices that are related to cultures that prevailed in the area before the coming of Islam.* Examples of these customs are the work songs in praise of the Prophet Muhammad. Secondly, the food and drink that are placed near the threshing floor for sayyidnā Al-Khidir to come to bless the gāis, beside the use of charms.

From the evidence above it is clear that the Mahas culture is characterized by an interplay of different cultural influences which reflect the unity and diversity that characterize Sudanese culture in general.

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1. Madani, Y.H., op.cit., 1986, p. 149.

CONCLUSION

CONCLUSION

The hypothesis of this research which has been detailed in the introduction states, on the one hand, that agriculture is one of the most ancient and continuous processes of the Nubian culture, and that it symbolizes and embodies many of the Nubian cultural practices. In addition, it is very closely connected with many other cultural processes and with the socio-economic process in particular. On the other hand, it states that any change in Nubian agricultural technology would entail a change in the position of agriculture in the Nubian cultural processes, in addition to other aspects of the agricultural organizations and the socio-economic set-up of the Nubian society. The study has proved that this hypothesis is valid and has illuminated the importance of agriculture in Nubian culture in general. (See Diagram No. II, p. 206 and Table No. I, p. 207).

The specified aims of the research which were detailed in the introduction as the documentation, analysis and interpretation of the traditional agricultural technology in Nubia; a better understanding of the relationship between traditional and modern agricultural technology; and a better understanding of agriculture as a socio-economic activity; have been fulfilled.

The study has shown that there is a direct relationship between the type and efficiency of the water-lifting devices in use and the extent of the agricultural land exploited. It has become clear therefore that the area of

cultivated land increased with the introduction of the sāgia and reached its maximum with the introduction of the pumps. In fact the introduction of the pumps in the Mahas region led to an expansion of the agriculture and the exploitation of all available lands.

The study has also shown that the net income of the Mahas farmers from agricultural products has increased substantially with the increase in the cultivated land which was a direct result of the improvement of water-lifting devices.

The improved income from agricultural products which came about as a result of the introduction of these pumps is a real ceiling in the agricultural capabilities of the region. This reality stands in contrast with the noticeable increase of population in the Mahas region and with the noticeable decrease in their cash income from the petro-dollar countries. If this crisis is to be faced then the traditional way of improving water-lifting devices will not suffice. What is needed is modern technology to exploit the semi-desert lands around the region. This modern technology is not going to be the improvement of the water-lifting devices alone, but a highly efficient modern organization and administration which would need more close intervention and supervision either by the government or an efficient co-operative union.

The study has also shown a change in the status of agriculture among the Nubians. Until the Fifties, agriculture

was clearly a part of the Nubian life-cycle. Therefore, every Nubian would learn the art of agriculture when he or she was seven years old. This meant that by the time young men left their region to migrate to earn cash they would have already become knowledgeable farmers. So if and when they returned to settle finally in their region they would easily take up agriculture as profession to earn their living.

But with the introduction of schools things have changed. Most children go to school when they are seven years of age and continue schooling until they are in their teens or twenties. And even if they practice agriculture within their school years, during vacations for instance, they would not amass enough knowledge about the art of agriculture to take it up as a profession when they leave school. Their knowledge of agriculture is further limited because the school's long vacation coincides with the off-season of the agricultural cycle i.e. May, June and July, when the winter season has finished and the flood season is yet to start.

For all these reasons, agriculture has now become of less importance in the life-cycle of the Mahas. Rather, it is becoming an occupation which is mastered by those children who do not go to school and young men who do not migrate. This means that most of the Mahas men who are returning from migration to the petro-dollar countries, whether voluntarily or not, fail to take up agriculture as a profession easily. They need to be instructed before they become efficient

farmers. This instruction takes time and effort.

The study has also shown that the introduction of modern water-lifting devices was not followed by any change in the traditional agricultural system. Therefore, the schemes which were introduced into the Mahas region were worked and managed by the same agricultural system which was developed to work and manage sāgia agriculture. So the toddan, tatī and the faz'ā as main agricultural tools remained the same with the pump schemes.

This fact demonstrates the utmost importance of the study of traditional technologies in their organizational context. In our case study, the traditional agricultural technology which was composed of two major parts - (a) the water-lifting devices and (b) the agricultural system - worked efficiently to produce economic and social equilibrium between income and expenditure when the modern lifting-devices, i.e. the pumps, were introduced, no attempt was made to introduce a new agricultural system. This anomaly led to the above-mentioned social disruption which led to a loss of knowledge and practice of the Mahas agriculture, as well as the apparent failure to attain the maximum economic benefit in hope of which the pumps were introduced.

APPENDICES

APPENDIX I

The Faz'ā work song No. I

The original text :

هلو عليه	هلو عليه
هلو عليه	هلو عليه
على النبى	هلو عليه
اسم النبى	هلو عليه
اسم الرسول	هلو عليه
اسم الحبيب	هلو عليه
هلو عليه	هلو عليه
يا اخوانا هيه	هلو عليه
شيلوا الصلاة	هلو عليه
قبل الوفاة	هلو عليه
هلو نبى	هلو عليه
هلو رسول	هلو عليه
ساعدو جمى	هلو عليه
مُروجمى	هلو عليه
اليّه قيلى	هلو عليه
اليّه قيلى	هلو عليه
تُربا بطال	هلو عليه
إكا أويمون	هلو عليه
إدين هرقان	هلو عليه
إكا جوقمون	هلو عليه
إليّه قيلى	هلو عليه
وا بوشاربة	هلو عليه

APPENDIX I

The Translation:

Cheer up, to work

Cheer up, to work

Cheer up, to work

Cheer up, to work

To the Prophet,

Cheer up, to work

Muhammad,

Cheer up, to work

The name of the Prophet,

Cheer up, to work

The name of the Messenger,

Cheer up, to work

The name of the beloved,

Cheer up, to work

Oh, brothers,

Cheer up, to work

Pray,

Cheer up, to work

Before death,

Cheer up, to work

Pray for the Prophet,

Cheer up, to work

Pray for the Messenger,

Cheer up, to work

Help us,

Cheer up, to work

Give us strength,

Cheer up, to work

The red wheat,

Cheer up, to work

The red Wheat,

Cheer up, to work

The wheat soil,

Cheer up, to work

The lazy farmer,

Cheer up, to work

Won't sow you,

Cheer up, to work

The careless woman,

Cheer up, to work

Won't grinde you,

Cheer up, to work

Oh the red Wheat,

Cheer up, to work

With an antennas

Cheer up, to work

Appendix No. I

The Faz'a working song
Song No. II
The Original Text:

يالو يلا	
	يالو يلا
النبى نار جوروا	يالو يلا
يالو قبة	يالو يلا
القبة الخضراء	يالو يلا
يالو نبى	يالو يلا
نبى آمنن تو	يالو يلا
حليمن تو	يالو يلا
بنت وهبن تو	يالو يلا
مكين قريشين تو	يالو يلا
مكين ارباب	يالو يلا
على النبى	يالو يلا
النبى نار جوروا	يالو يلا
جو ابديلوا	يالو يلا
جو صليلوا	يالو يلا
مكيل جولو	يالو يلا
كعبل جولو	يالو يلا
جو آبديلو	يالو يلا
مدينل جوروا	يالو يلا
النبى سوروا	يالو يلا
على النبى	يالو يلا
على الحبيب	يالو يلا
محمد	يالو يلا
ساعدنا يارب .	

APPENDIX I

The translation :

Let's go let's go

Let's go to the Prophet,

Let's go let's go

Let's go to tomb,

Let's go let's go

The green tomb

let's go let's go

Let's go to the Prophet,

Let's go let's go

The Prophet, the son of Amna,

Let's go let's go

The son of Halīma,

Let's go let's go

The son of Bint Wahab

Let's go let's go

The son of the Quraīsh of Mekka,

Let's go let's go

The Master of Mekka,

Let's go let's go

Let's go to the Prophet,

Let's go, let's go

Go to worship,

Let's go let's go

Go to pray,

Let's go let's go

Go to Mekka,

Let's go let's go

Go to ka'ba

Let's go let's go

Go to worship

Let's go let's go

Go to Madīna

Let's go let's go

To visit the Prophet

Let's go let's go

To the Prophet

Let's go let's go

To the beloved

Let's go let's go

Muhammad,

Let's go let's go

Oh God help us.

APPENDIX II

The threshing work song :

The Original Text:

الى نورى ولو نورى

ولو قاقا نقركا إنلو هو ... هوو

آرابن برتو وومجالبة

بنتك كاقنا ويكا دينو

همبو كاقنا أُوّق دينو هو ... هوو

إليّه قيلى وو بو شاربه

تُربا بطال إكة أويمونا

إدين هرقان إكه جوقمونا هو ... هوو

ياالله بارك وو إلهى

بركن نور وو إلهى

باركو دينچى ياالهى هو ... هوو

APPENDIX II

The translation :

Today is threshing,

Tommorow is threshing,
The day after tomorrow we will take the threshed wheat

Ho .. Hoo

Oh stranger Arabs' girl,

If you have dates,

Give me one,

If you have doum,
Give me two

Ho .. Hoo

Oh the red wheat with an antennas,

The lazy farmer won't sow you,

The careless woman won't grinde you,

Ho .. Hoo

Oh God bless it,

Oh God blessings,

Oh God bless it for us.

GLOSSARY

Abīb	: A Coptic month
Ād	: A part of the dugunti of the Sagia.
Adeshuw	: A type of dates
Adhān	: The Islamic call for prayers
Aglo, aglo nondi	: The sticks which join the double rope of alas. To it the water pots of the Sāgia are attached.
'Agma	: A number of plots arranged in a row
'Akandīna	: A type of dates
Akindé	: Lupin
'Alad	: Adze
'Alas	: A double rope to which the water pots of the water-wheel are attached.
Al-id-al-kabir	: Corban Bairam
Al-id-al-sagīr	: Lesser Bairam
Al-mihrat al-baladi	: The local and/or the traditional plough
'Aman alli	: Ropes used for fastening the 'arusa to the dīw of the Sāgia.
'Aman ūsar	: A tradition connected with reciving the first water of the Sāgia.
Angaréb	: A wooden bed
Antiko	: Literally means "something that is needed for consideration or planning, a situation in which the well of the Sāgia is not paved up to the service.

Arabin imīd : A type of salt

Arabin tirib : The large sickle

Ardan koy : A wooden pole to which two of the Manure's baskets are suspended to be set horizontally across the saddle of the donkey.

'Ardan shibir : A large basket especially made for carrying manure to the fields.

Argadé : The wheel of the Sāgia

Argadin 'as : The small wheel of the Sāgia

Argadé daū : The large wheel of the Sāgia

Argadé kudūd : See argadīn 'as.

Argadīn kaj : Two wooden pegs fastened to the middle of the vertical axle of the Sāgia, to to support the large wheel.

Ardab : A grain measurement equal two mur (see below).

'Argāna : Dust storm.

Arkīsh : A plant disease that affect dates.

Arjé : Boiled beans.

'Arusa : A piece of sunt wood used to be attached to the middle of the dīw of the Sāgia in which the pointed head of the vertical axle turns.

'Asal : Apphis.

'Asara : Oil presser.

'Ashrangé : Dolichos Lablab.

'Ashum : Tokens used in land and crop division.

'Asida : A kind of food made of millet flour .

Askalé : The water wheel .

Attī : The sight of the back side of the Sāgia.

'Ayar : Certain amount of the crop distributed to relatives and neighbours immediately after the harvest.

B

Bāba : A coptic month .

Balāt : The west wind .

Balīla : See arje'.

Bamīa : See uīé .

Baqt : The name of the famous treaty signed between the Muslim Arabs and Christian Nubians in A.D. 642.

Barakawī : See ébeté .

Baramūda : A Coptic month .

Barbakh : A water tubes used to protect the canals from erosion by running water at junctions .

Barjū : The high Sāgia land.

Barsīm : Lucerne Alfalfa - Medicago Satival.

Basal : See felé

Basilla : Field peas

Basīr : The traditional specialist in wood working.

Beyyé : The Sāgia screen .

Bīrrīma : The drill

Bismillāh : In the name of God .

C

Cujir : A wooden peg .

D

Dahasir : Indigofera ablongifolia farsk .

Dakkāi : Wine made of dates .

Dalū : The dipper of the shadūf .

Damīra : Flood season .

Danāgla : A Nubian tribe .

Darāīra : The pitch-fork .

Darb-al-arbain : A Camel carvan route which connect western Sudan and Drau in southern Egypt.

Désha : The groom's closest friend who is normally unmarried.

Dibin : Night shift of working the Sāgia.

Diffī : A tower built of mud.

Diginté : Cow pea .

Dir : A pad from alas used to raise the lower part of the water pot.

Dirā : A local mean of measurement which equal 58 cm.

Dirw : A long hollowed out palm tree log which carries water to the main conduit.

Diw : A single iron disc of the noraj.

Diw : A long log that is placed at a horizontal level over the base that supports the vertical axle of the Sāgia to keep the Sāgia balanced.

Dius ajous : A Nile flora schrub

Dugunti : The frame wheel that carries water pots of the Sāgia

Dukād : The working of the Sāgia .

Dukūj : A plant disease that caused by root pest and causes severe damage to tomato and tobacco.

Dukūs : See dukūj.

E

Ébeté : A type of dates

Éllé : Wheat

Elwīl : A rope tied with another rope (iblim) to fasten the horizontal axle to the dugunti.

Éré : See shadūf land .

Essi wér : Is the name of the Sāgia when the farīg- (See below) is directly connected with water.

Ewrārī : A rent paid in kind for using the Sāgia.

Ewrattī : The boy who drives the Sāgia.

F

Fa : A single cultivated plot.

Fadīja : A nubian tribe

Fagid : Division.

Fagīr : Religious teacher

Farīg : The big conduit which is runs towards the

river to join the supply channel that provides the Sāgia with water during the low Nile.

Farré : See salūka land.

Fashé : A piece of wood in which the tenon of the dugunti of the Sāgia is attached.

Fasulīa : Horicot beans

Fatta : Local food made of bread and soup.

Fazā : A community gathering summond whenever there is heavy work to be done.

Felé : Onion.

Fentī : Dates - date palm.

Fīshé : The water pot of the Sāgia

Foké : Water jar.

Ful masrī : Tick beans.

Furfuray : A throwing rope by which stones are thrown into the fields to scare birds.

G

Gaīs : The threshing floor

Galība : A sack into it organic manure is carried to the fields.

Galo : A pottery container which is used for storing the household dates.

Gama : The axe.

Gargir : See mūgin ūr.

Ga'ūn : Sweetmelon.

Gaw : A type of dates.

Géad : A type of Sāgia screen made of wheat straw.

Gérat : A grain measurement which equals $\frac{1}{12}$ of the Mur.

Gérat : Mean of measurement-width of one finger-approximately 1.5 cm.

Gilban : See gūrū

Girgār : Small stones used in walling of the well of the Sāgia.

Gourd : A pad used to be put under the sablo of the Sāgia to facilitate the pouring out of water.

Gubah : Tomb.

Gubar : Foodstuffs which is given to mourning families.

Gullen ūy : Literally means "the leg beside the neck. They are two of the four beams on which laid the the jibit (see below).

Gurnas : The claw hammer.

Gūrū : Chicken vetch.

Gusé : A mud bin which used to storing grain and dates.

Gutun : See koshmag

H

Habad : A type of dry water course flora.

Hadām : Water erosion of Nile banks.

Hage : Millet stalks.

Hampuri : A type of dry water course flora.

Hampurti : Halfa grass.

Hanjro : See Arabin tirib.

Haraz : Acacia albida Del.

Hargal : A medicinal herb

Hasad : Wheat straw.

Hashab : Acacia senegal.

Hélo : A high platform which is built in the middle of millet fields, from it boys scare birds.

Hijab : Charm or amulet.

Hilba : See Karim.

Henna : Tropical shrub ornament (lawsonia inermis) its leaves used as dye for ornament of the hair or other parts of the body (hands and feet).

Hummos : See Kabakabé

I

Iblīm : A rope used for fastenning the horizontal axle of the Sāgia to the dugunti.

Irkī : Hamlet.

Isikag : Two rails or two wooden beams which are supporting the kalogo of the Sāgia (see below).

Isikagir : See Isikag.

J

Jab gol : A way of placing the water pots, of the Sāgia, in the flood season.

Jao : The grinde stone.

Jarf : See salūka land.

Jarratir : A hollowed out piece of palm tree log which receives water from the ur ūkū of the Sāgia.

Jibit : A part of the kodé of the Sāgia (see below).

Jin : Super natural being.

Jurāb : A hīde container used in transporting : Crops to the dewllings.

Julé : See Sunt.

Jurtī : Fruit of sunt tree.

K

Kabakabé : Chick peas

Kabīda : The local pan-cake made of wheat flour .

Kabsah : See mushāhra

Kadé : A process of throwing manure over the fields

Kadīs : A piece of wood placed below the vertical axle of the Sāgia.

Kadnum bass : A plant used as medicinal herb (solanum incarum : solanceae).

Kagindé : A hump used to be in the middle of the yoke of animal, drawing the Sāgia.

Kakur : The process of enclosing the well of the Sāgia by stones.

Kalīd : A fence made of lupin and halfa grass stems to protect crops from animals.

Kalo : A piece of wood in which the tenon of the horizontal axle near the small wheel of the Sāgia is fixed.

Kalogo : A piece of wood in which the tenon of the horizontal axle near the wheel carrying

water pots is placed.

Karaj : The smallest container of grain measurement known. It is a mat basket which holds two mid (see below).

Karāma : An animal sacrifice or any ceremonial food that is offered as a token of gratitude or bestowing mercy and blessings.

Karawīa : Caraway.

Karandī : The rake

Karab batād : Natural desert earth used as manure.

Karé : A straw mat shelter.

Karkadé : Rozelle.

Karrūsh : A type of dates.

Kasbara : Coriander.

Kasé : Gifts in form of foodstuff, given to any body who celebrates marriage or circumcision occasions.

Kashrangieg : See ashrangé.

Khirwā : Castor (Ricinus communis L.).

Kiden Iskag : The situation in which the well of the Sāgia is paved up to the service.

Kid mi gondé : See togoj kare.

Kīffīd : Smut

Kimun akhdar : Cumin

Kitir : Acacia melifera.

Kittatīb : A type of trap made of local material and used for catching animals.

Kiyyé : The shadūf

Kiyyen kām : Literally means "camel of the shadūf" It is a long wooden pole on pivot to which a dipper tied to one end and weight at the other.

Kiyyen ūy : Literally means "the leg of the shadūf". They are the two wooden pillars supporting a cross bars on which pivots kiyyen kām (see above).

Kjji : Land tilling

Kjjin aman : The first watering of the wheat immediately following tilling.

Kodé : Weeding.

Kodé : The circular path in which the animals driving the sāgia move.

Kodīn shibir : A small mat basket which is used in various agricultural tasks.

Koshmag : Cotton

Konté : Mat tray.

Konté : An especial mat tray made for grain measurement purposes. It holds six māshe (see below).

Kudin fentī : A type of dates.

Kufrī : The pre-Islamic.

Kulma : A type of dates.

Kulutūd : The small water-wheel.

Kunūz : A Nubian tribe.

Kurrī : A plant disease caused by a pest to which millet is liable.

Kushé : Safflower seed.

L

Ladīa : A small cylindrical shaped piece of mud used to close the small opening of gusé.

Lubia afin : See diginté

M

Madara : A type of Sāgia screen made of mud.

Mahas : A Nubian tribe.

Makāda : Maize

Malo : A rail which supports the sablo kagir of the Sāgia.

Malūkhia : Jew's mallow.

Manga : Mango .

Maré : Durra millet.

Maré : A process of throwing manure lightly over weaker parts of plants.

Maré nulū : The white durra millet.

Martī : Water conduit.

Mārū : Organic manure.

Mārū-ka-arawinan : The spreading of manure.

Mārūn konté : Special mat tray that is used in manuring.

Mārūn shibir : A large basket especially made for carrying manure to the fields.

Marzaba : Sledge-hammer.

Masha : The imported hoe.

Māshé kudūd : A mat basket especially made for grain

: Measurement. It holds six karaj (see above).

Māshé daū : A mat basket used for measurement that holds eight karaj.

Masīd : The traditional school.

Mashīkha : A village.

Matūnga : The east wind.

Matukīa : See Kunuz.

Menjin findé : A wooden peg to which one of the Sāgia ropes-minja- is fastened.

Mid : A local mean of grain measuremnt which equal two handfuls.

Midar : The levelling of the site of the Sāgia before constructing it.

Minja : The rope that ties the Sāgia parts-sablo, ur ūkū and jarratir-together.

Mirg tan : Literally means "the second log". It is a part of the kodé of the Sāgia.

Mishī : The vertical perpendicular driving spindle of the Sāgia.

Misra : A Coptic month.

Missar : Part of the yoke consists of two sticks which are fastened to two cavities at is ends.

Missarin allī : The rope which tie the animals' necks to the yoke.

Mitter : The well of the Sāgia.

Mugdo : Two strong wood trunks with a divergent branches used to support the dīw.

Mūgin ūr : Rocket Gress

Munshār : The saw

Mur : A mean of measurement that equals the amount of two konte (see above).

Murmundé : One of the Nile flora plants.

Mushāhara : A state of vulnerability to all ailments to which a person through a life-cycle periods is subject.

Mushug : A piece of wood used to be put in the back or in front of the small wheel of the Sāgia to break its movement.

N

Nab : Gold

Nabīt : Wine made of dates.

Nagīla : Cynoclon dactylon pers.

Nam : The round edge of the Sāgia wheel.

Nau : The south wind

Noraj : An animal driven implement which is used for threshing.

Noré : Threshing.

Noren koy : A wooden pole that is fixed at the centre of the threshing floor.

Nūj : The tunnel that connects the well of the Sāgia with the river.

O

Ondī : A wooden peg

P

Pichuns : A coptic month.

Q

Qurīr : See shadūf land.

R

Ramadan : The Muslims' fasting month.

Rigla : Purslane.

Rubbu : See gerat.

S

Sablo : The basin which receives water from the water pots of the Sāgia.

Sablo : See barbakh.

Sablo kagīr : Litally means "the carrier or supporter of the sablo". It is a piece of wood on which sablo is laid.

Sadaga : Alms.

Sa'dib : A wooden raised surface in which animal fodder and fuel are stored.

Sāgia : P. sawāgi. It is a water-wheel.

Sāgia land : Barjū, The main permenent land. It is the alluvial terrace which is well above the flood level.

Saham : Token

Salūka : The sowing-stick.

Salūka land : Farré, includes the sloping sides immediately adjacent to the river.

Salāh : The north wind.

Ṣamad : The chief cultivator.

Samin dirw : Literally means "the dry dirw". It is a a long log of palm tree that carries Sāgia's water to the main conduit.

Samūm : A hot dry desert wind.

Sayāl : Acacia raddiana savi.

Séfī : The summer season.

Séring : Barley

Sesabān : A type of Nile flora plant.

Shadūf : A counter-weight lever used for raising water.

Shadūf land : éré the land next to Salūka land which includes the higher and banks of the river.

Shamandaraīg : The pointed end of the sickle blade which is fixed into the wooden handle.

Shammam : See ga'ūn

Shammar : Fennel

Sharbōt : A drink made of dates.

Shawīr : Mat tray

Shāyyeg : Morning shift of working the Sāgia see ardan koy.

Shibir : A local mean of measurement equal a span of a hand.

Shitwī : The winter season

Shidda : A type of dates.

Shuna : A large mud bin which used for storing grain and dates.

Sidir : Zizyphus spinachristi.

Sīlam : A cooper dish.

Silw : See salūka.

Simir : A strong stick used for attaching dīw to the mugdo.

Sindal : Anvil.

Sorong : Literally means "the nose", here means the front side of the sāgia.

Togoj : The throwing rope.

Togoj nondi : A whip-like rope used to make a loud sound to scare birds.

Togoj karé : A throwing rope by which stones are thrown into fields.

Tom : Garlic

Torba : The farmer

Toré : The hoe

Toré : The horizontal axle of the Sāgia.

Tūg : Wind

Tugāl : A dried mud ball which acts as a counter-weight to the dipper of the Shadūf.

Tugin nūg : Literally means "the house of the wind". It is the Sāgia screen.

Tugum : The seat of the Sāgia's driver.

Tugumin uffī : A cavity in the vertical axle of the Sāgia into which the tugum is attached.

Tuké : Threshing by flails.

Tulī : Tobacco.

Tumam : A desert flora plant (panicumturgidan forsk).

Tumbak : See tulī.

Tundub : Capparis decidna.

Tuni : The lower side of the crossbeams of the Sāgia's wheels.

Turban tushī : Alas remains and palm branches used to fill the gabs between the two pieces of the sālbo (see above) of the Sāgia.

Turban ūy : Literally means "the leg of the farmer". It is a wooden beam on which the farmer stands when he wants to fix and repair the Sagia.

Sulgadé : The cogs of the Sagia's wheel.

Suludé : A process of manuring the weak parts of millet plant.

Ṣunt : Acacia nilotica.

T

Tabar : A seasonal grass grow on the Jarf land (comositae Lactuca taraxifolica).

Tahnīk : A process of chewing some sweet food such as date or honey and placing it into the mouth of the new born baby and rubbing its chim to train it to eat.

Tanum : A Nile flora plant.

Tarantaré : A part of the duguntī of the Sāgia.

Tarantarin ūy : Literally means "the leg of the tarantare" see ūd.

Ṭarfa : Tamar articulata.

Tatī : The dividing of time among farmers for working the Sāgia.

Tati - tatour : Colocynth.

Tibir kondi : A long wooden beam which extends between ūy and urin ūy of the ur-kag of the Sāgia.

Tibég : The second watering of wheat.

Tirib : The sickle.

Tiribin 'as : The small tirib.

Toddan : An agreement between a number of farmers to share one Sāgia.

Toffil : A pad made of 'alas rope remains, rags and palm tree fibres, and placed between the yoke and the neck of animal to prevent it from harm.

Turmus : See akindé.

Tushī : A grass which is tied to the edges of water-pots of the Sāgia to avoid friction with the bottom of the well.

Tūt : A coptic month.

U

Ubug : See Fa.

Ulmadé : A type of dates.

Ulum : The upper side of the horizontal cross-beams of the Sāgia's wheel.

Ulus : The rope that extends from the yoke and pulls the whole Sāgia.

Umūdyia : Administrative unit.

Uīé : Okra

Urbir : A long-handled wooden implement with a flat-bladed board.

Urin ūy : Literally means "the leg beside the head". They are two beams of the four beams on which Jibit is laid.

Ur kag : A geometrical pattern based on four beams on which laid the Jibit (see above).

Ur ūkū : A hollowed out piece of palm tree log that receives water from the sablo of the Sāgia.

Urung : Rust.

Ushar : See habad.

Ush urum : Fennel-flower

Ūy : Literally means "the leg". i.e. the leg of the Sāgia.

W

Wādīb : See hanjaro.

Wasū : A wooden implement which resembles a flat-faced shovel.

Wāwīa : The large type of the local hoe.

wére : A process of scratching soil around a millet plant to support it before manuring.

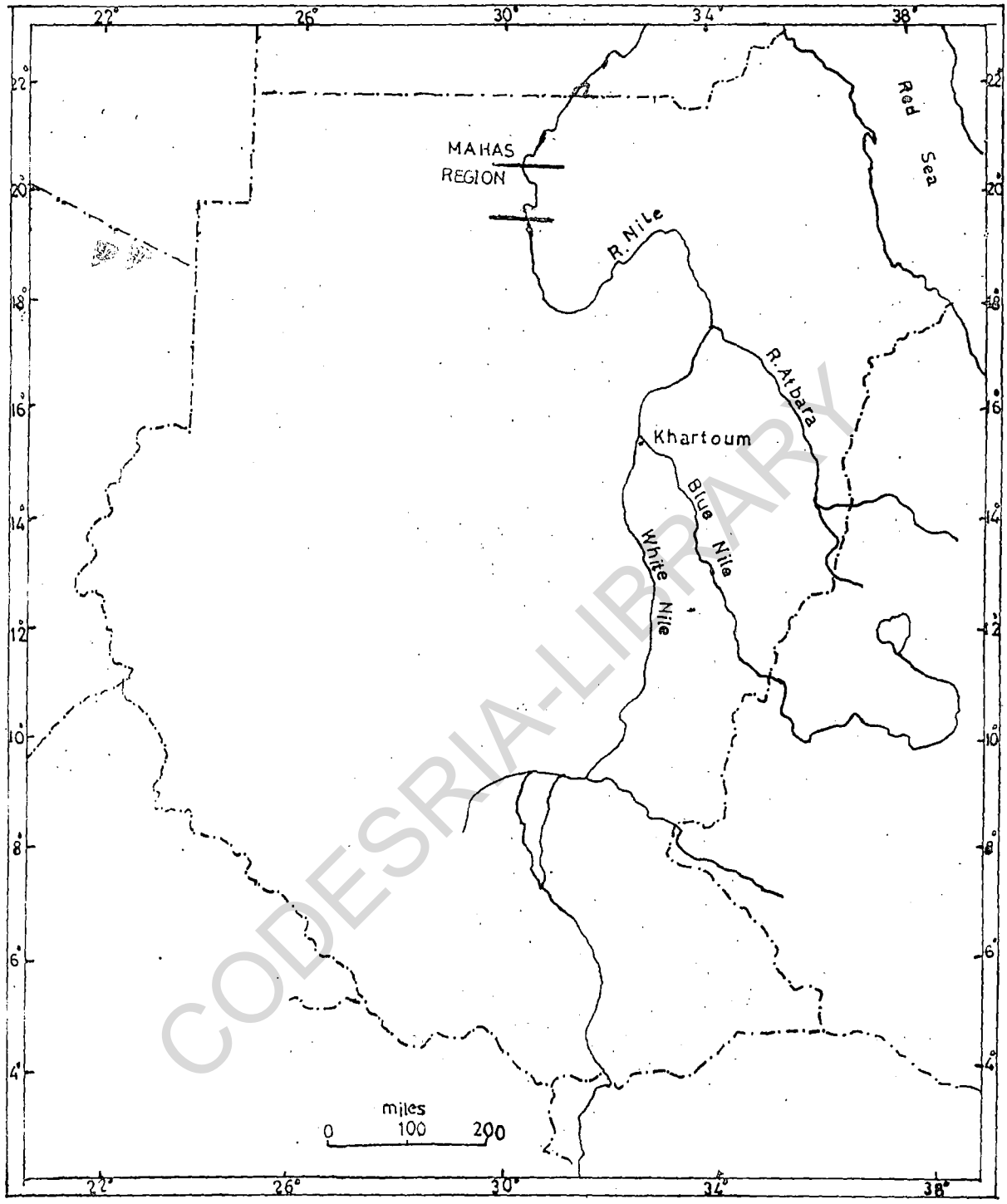
Wérté : A process of manuring millet.

Z

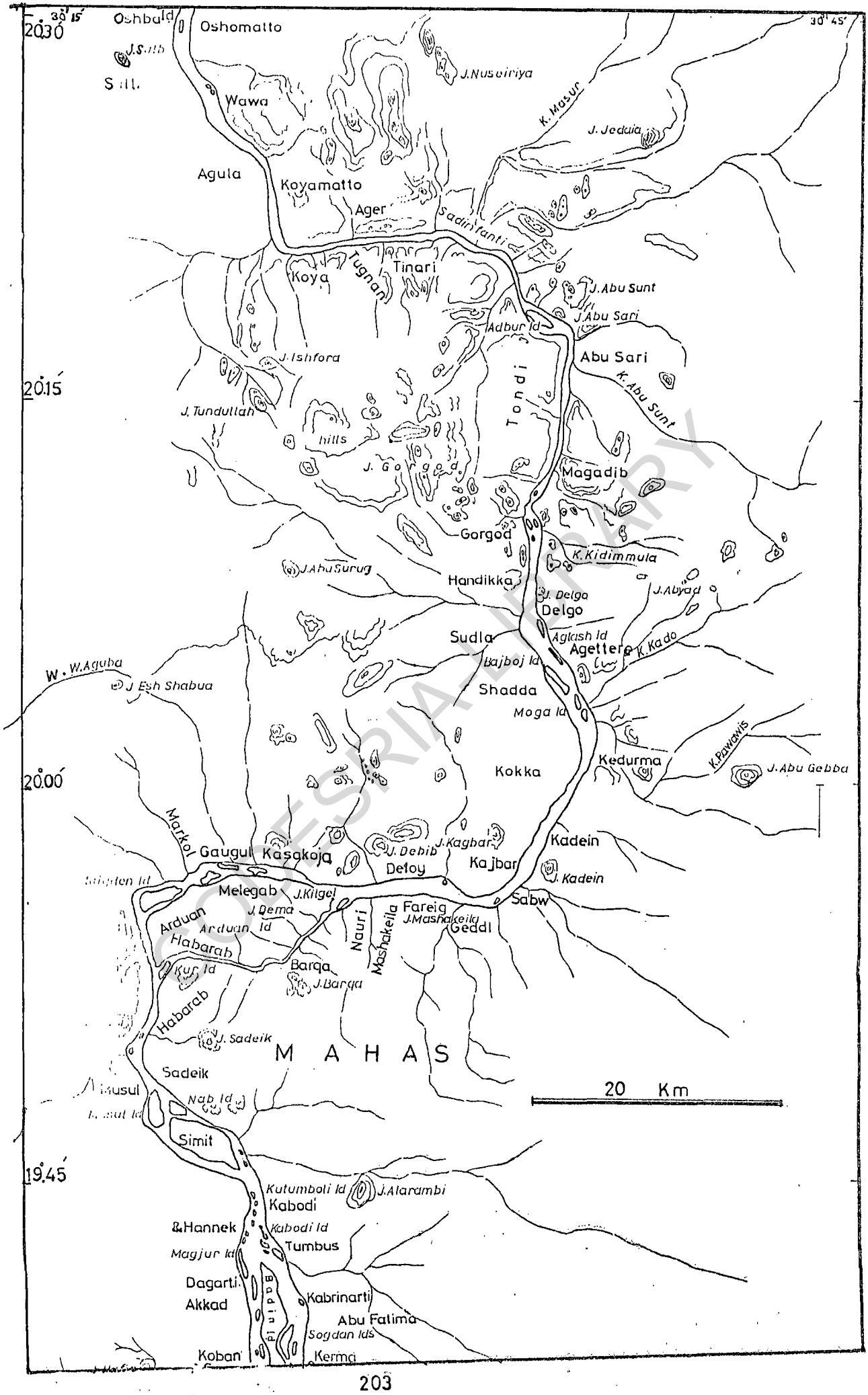
Zahāf : A heavy log drawn by animals and used for levelling the land.

SUDAN MAP
LOCATION OF THE MAHAS REGION

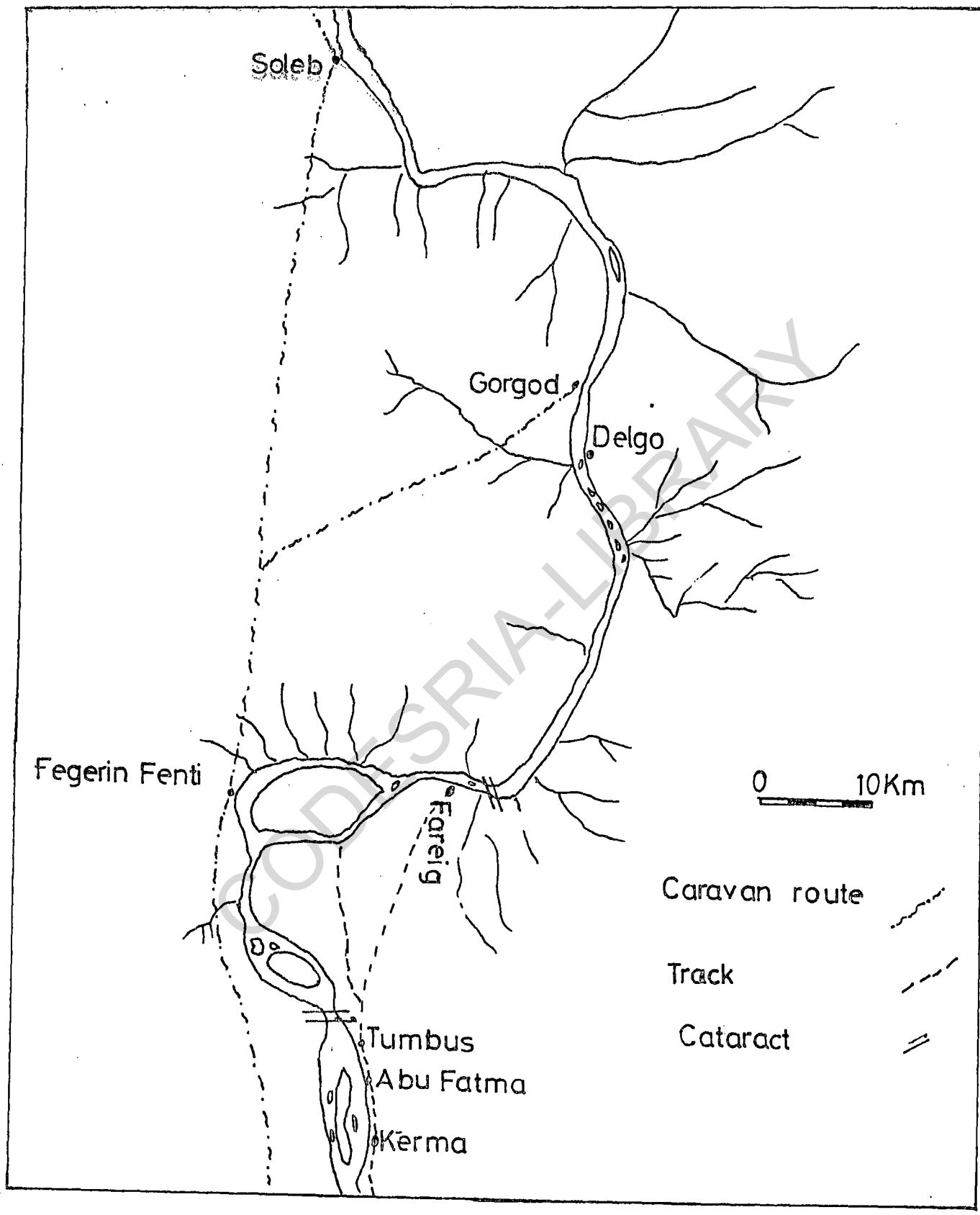
Map no. 1



MAHAS AREA

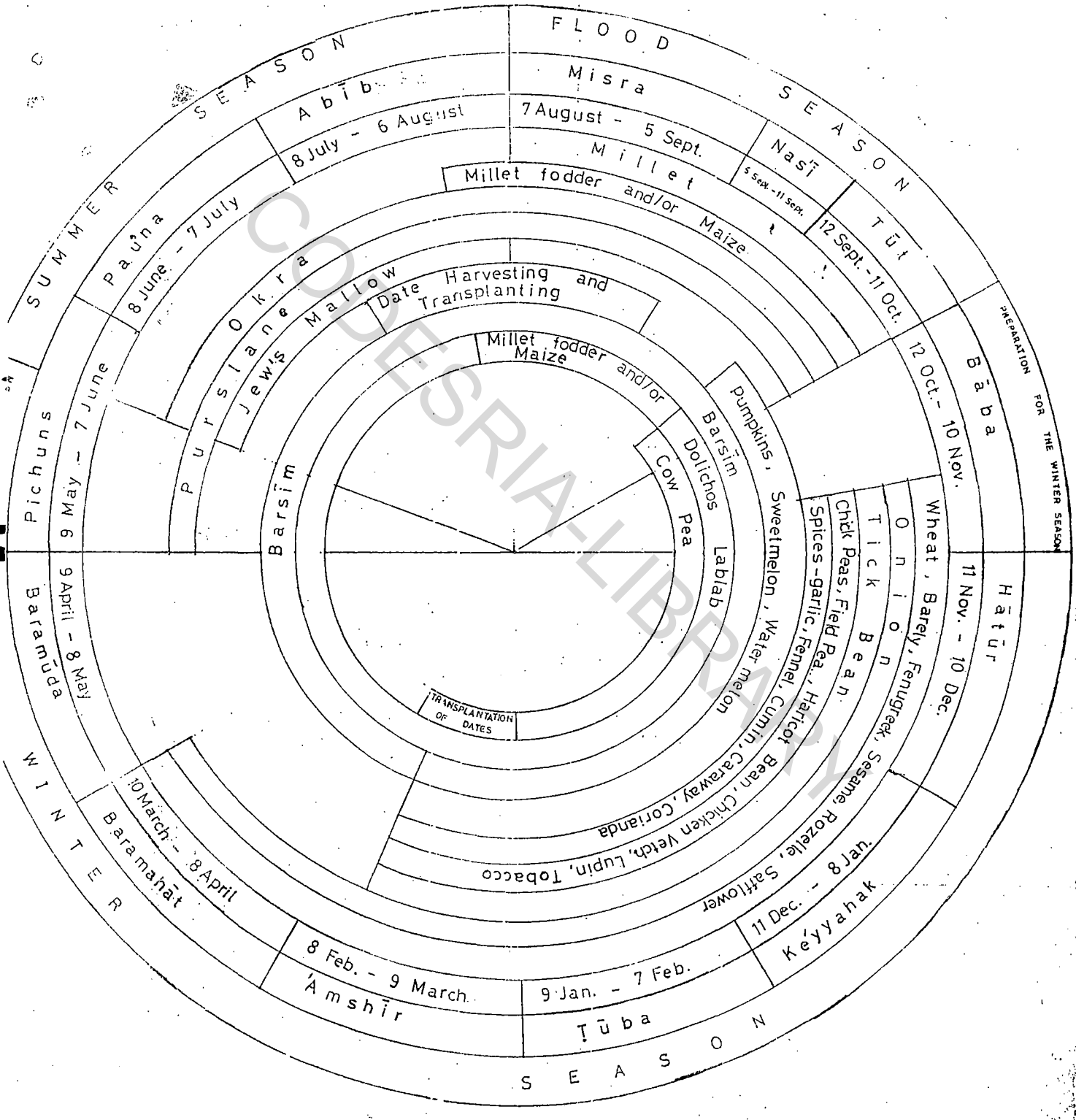


Map NO.III .



The Local and Intra-Regional Route System in The Mahas Region

The Nubian Agricultural Cycle



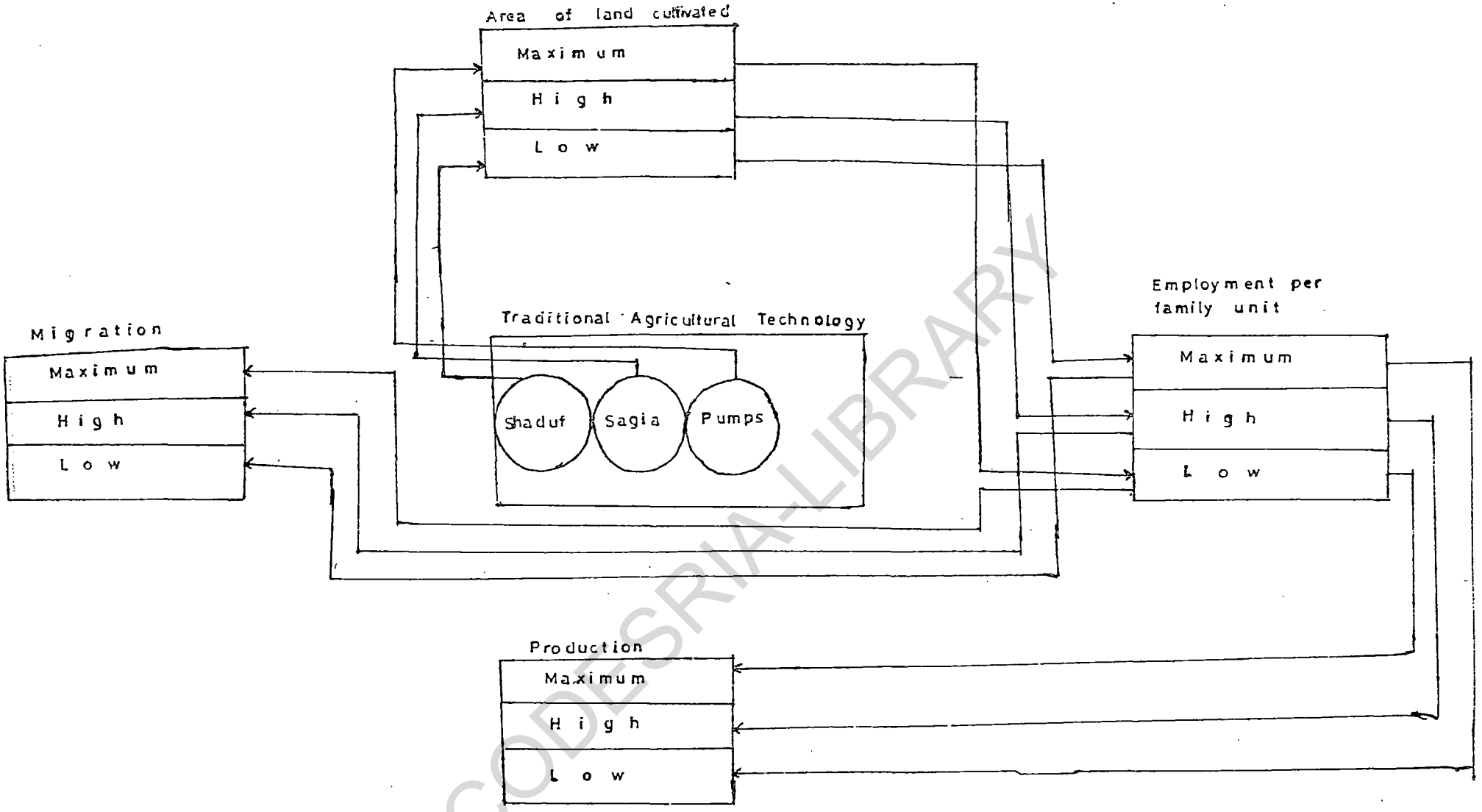


DIAGRAM II : THE SOCIO-ECONOMIC IMPACTS AND RELATIONSHIPS OF THE DIFFERENT FORMS OF TRADITIONAL AGRICULTURAL TECHNOLOGY IN THE MAHAS REGION

nowing	Grain Measurement	Grain storage	BELIEFS, PRACTICES AND TRADITIONS.	CULTURAL CHARACTERISTICS
			During the A-group period and the following cultural epochs until the beginning of the celestial era. There was a considerable concern with all anticipated happinings, in life after death. The belief in life after death was an Egyptian cultural characteristics. Signs of such beliefs during the A-group are the burial rituals and grave goods. Secondly, the bodies were wrapped in straw matting and halfa grass, in addition several baskets filled with unidentified seeds and fruits were also found. The C- group religion was probably not as yet associated with a dominant priestly class. Sacrificial animals were often buried within the later cemeteries. Kerma culture burial customs was characterized by bed burial, ram and human sacrifices and domed tumuli. The turmuls. was dome shaped. In many graves the encircling ring of stones is dark in colour, while the surface of the mound within the ring is covered with white or yellow pebbles. Napatan culture bears some major resemblances with Kerma culture especially in bed burial. The religion of the kushitic kindom was of two cults. The Egyptian cult of Amon Ra' and the indiginous cult of Appedamak persistent cultural traits are face cuts, still in use as decoration and as tribal marks. There is also the use of antimony. L.S. The introduction of christianity and Islam to Nubia was agreat departure from the earlier cultural complexes, simply because they are celestial. This resulted in a number of changes in Nubian religious life and cultural attitude. Yet a considerable number of belifes and traditions of earlier periods are persisting now. During this period, traditions, connected with agricultural systems e.g. torba system, toddan and tati systems and faz'a became established. M.S The beliefs and traditions connected with life crisis rituals are mostly persistent cultural traits mainly connected with river Nile e.g precession to the river Nile, throwing food and gifts into it, washing with Nile water as a mean of purification in addition to the concept of Mushahara. * The use of incense for protection from evil eye, and metal (copper dish, to chase away evil spirits. * The use of green things in the form of palm fronds green boughs as symbols of fertility, prosperity and continuity. * The use of date as symbols of general goodness, affluence, wealth and health in themselves. * The use of grain especially durra which signify growth and fertility. * The use of white colour which signify purity. * Animal sacrifice (karama) is performed as a token of gratitude to God, or for the bestowing of mercy and blessing, from him. * Commensal eating of ceremonial food is common Nubian practice which associated with communal solidarities, generosity and good will. * Birth rituals , the process of tahnik, burying of the boy umbilical cord beneath the wheel of the sagia. * Death rituals, visiting of cemeteries to level the grave and cover them with Nile pebbles, the custom of putting of palm fronds and setting them on the graves to ease the dead person's torture, the custom of putting food and drink on or beside the grave. In spite of the customs connected with Nile river, now, all other customs have acquired Islamic characteristics and interpretation. There are Islamic practices e.g. placing of Quran near the threshing floor, calling the adhan during the aman usar the recitation of the name of God and praying for the prophet	1. Early evidence of complex societies 2. Early evidence of comoplex religious practices 3. Early evidence of complex centralized political activities. 1- Complex religious practices associated with large religious centres, e.g. Jebel Al-Barkat, El Nag'a and El Muswwarat. There are two religious cults. The cult of Amon Ra', and the cult of Apedamak. 2- A highly prosperous civilization. 3- Written language (meroitic language) 4- International trade relations. 1- Introduction of celestial religions, christianity and Islam. 2- Prosperous International trade and deplomatic relationship with Egypt and the Islamic world, most important is the treaty of the Baqt. 3- Extensive Urbanization especially during the christian period. 4- Indeginous written language, the Nubian language, and a lot of writtings in other language such as coptic - Greek, Latin and Arabic. 1- On going process of Islamization and Arabicization. 2- The emergence of the first Islamic kingdom such as kokka in the north, Funj in the centre and Fur in the west and the establishment of Islam as an official religion and Arabic as an official language. 3- The establishment of a central government and the appearance of urban centres and cities.
at-tray, pitch-fork Shovel	Mid Karaj Mashe Konte Mur	Galo Guse Shuna		

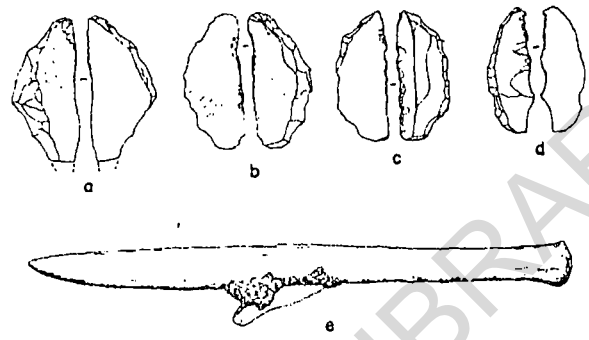


Fig. No. I.

The Flint-blade sickle

After Wendorf, F. 1968

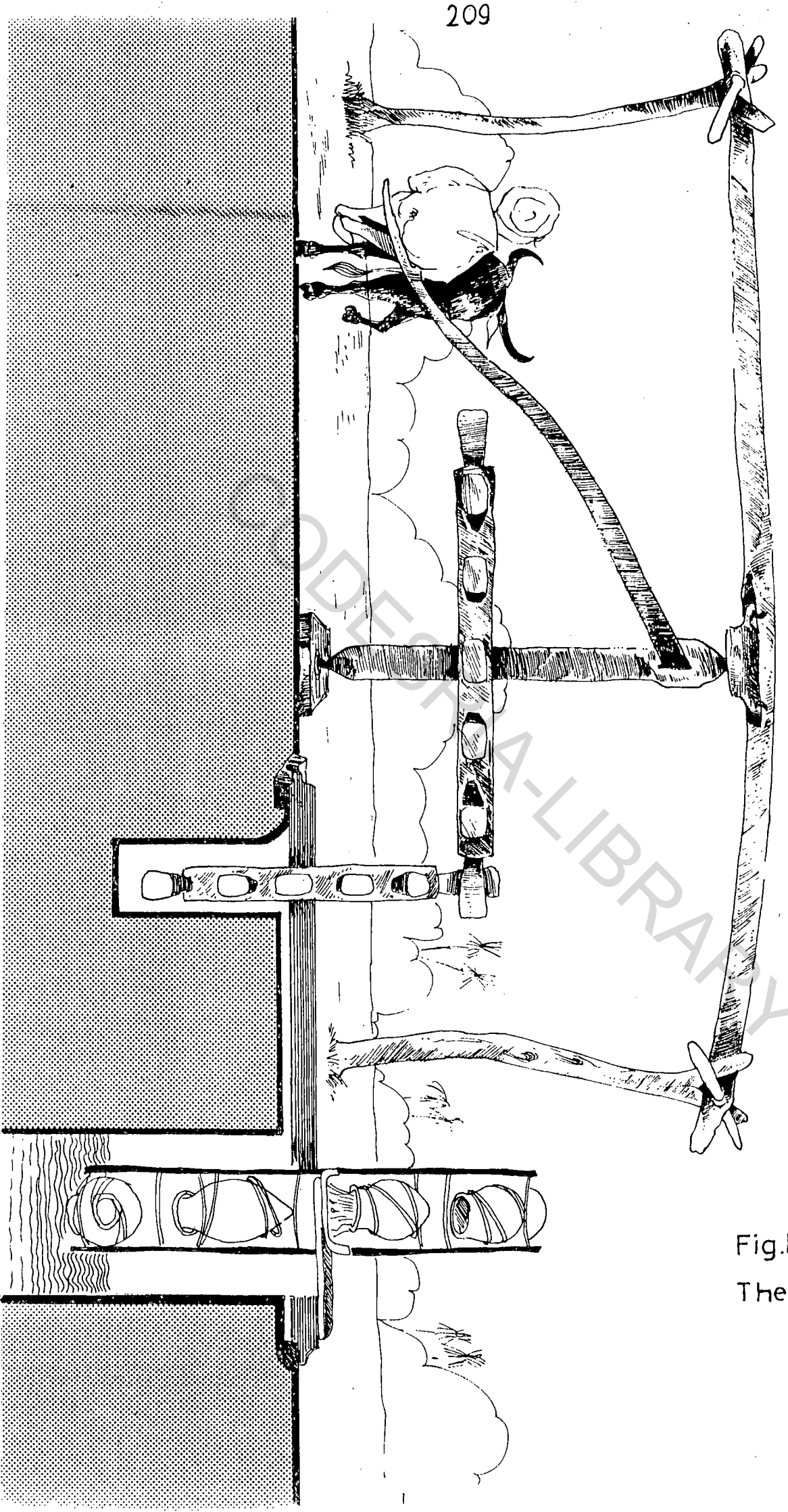


Fig.NO.11

The Sāgia.

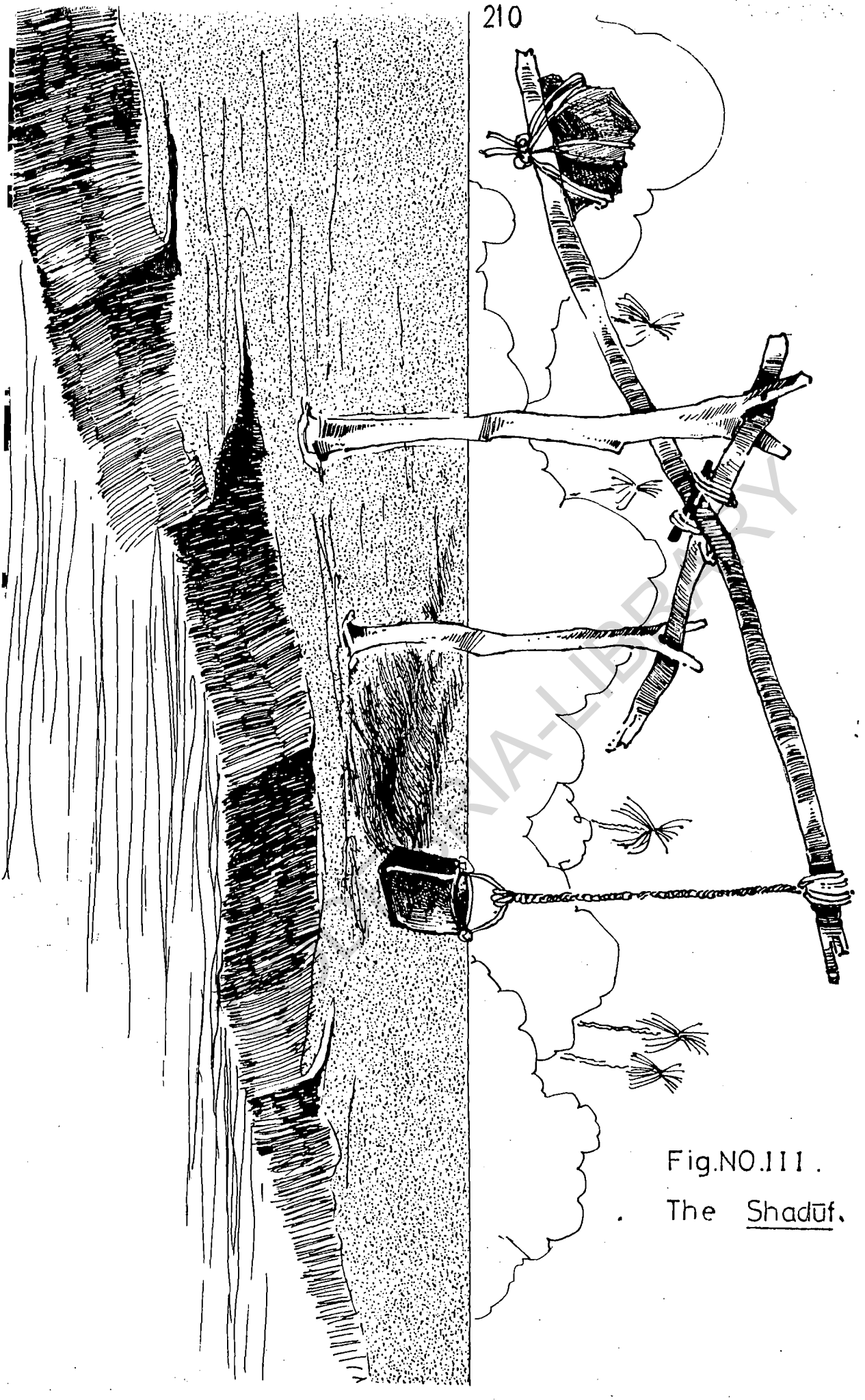


Fig.NO.111.

. The Shadūf.

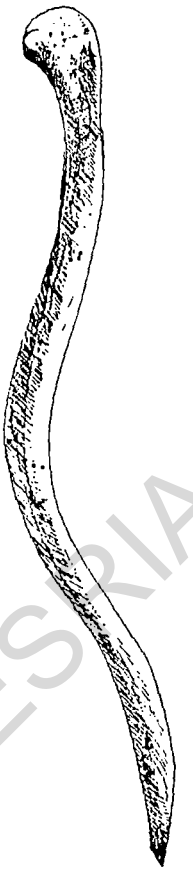


Fig. NO. IV.

The Sowing-stick.

Fig.NO.V.
The Manuring-Basket.

Fig.NO.VI .

The Galiba.

Fig. NO. VII.

The Scarecrow.

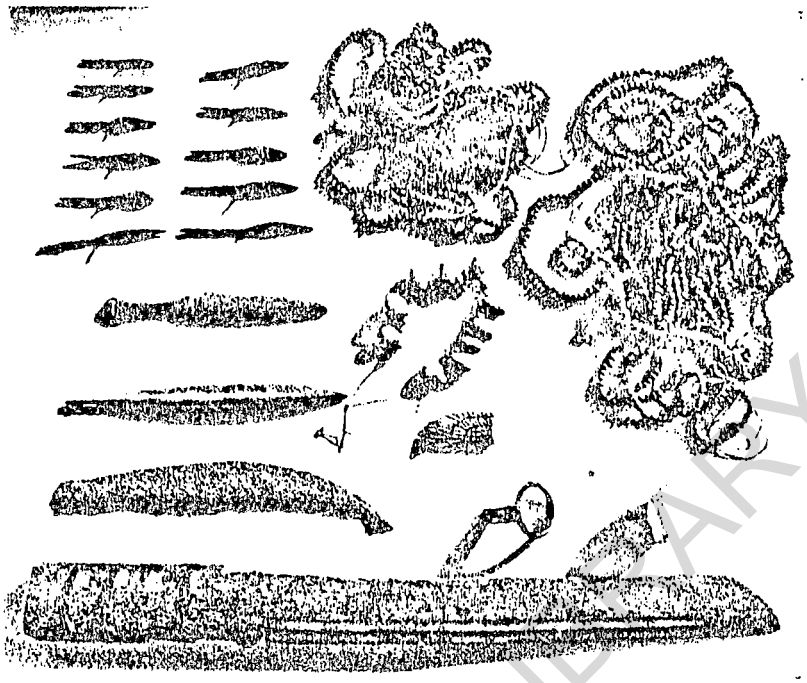


Plate No. I

An Iron Sickle dated to X-group period.

After Save-Söderberge 1968.

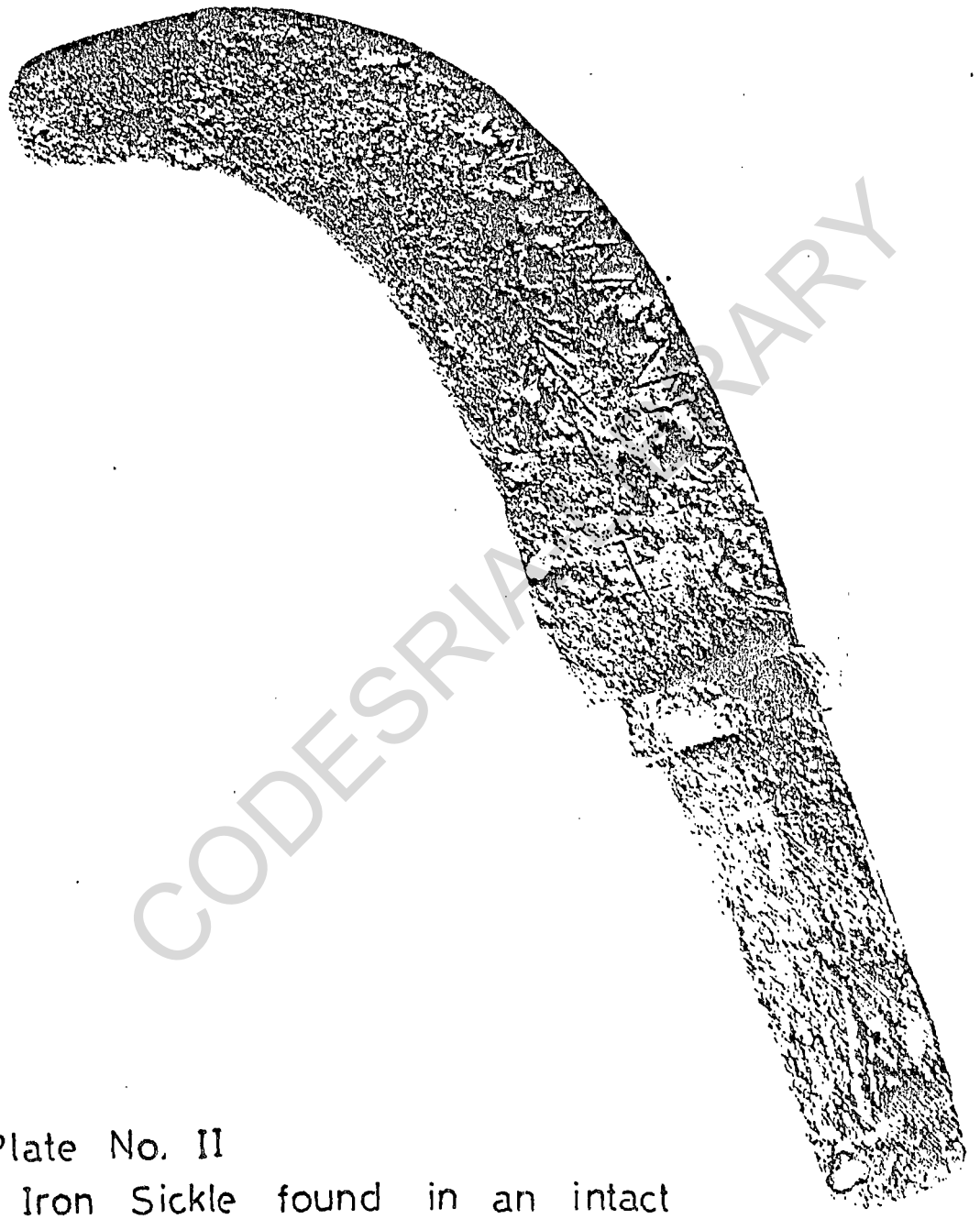


Plate No. II
An Iron Sickle found in an intact X-group tomb.

After Save-Söderberge, T. 1982.

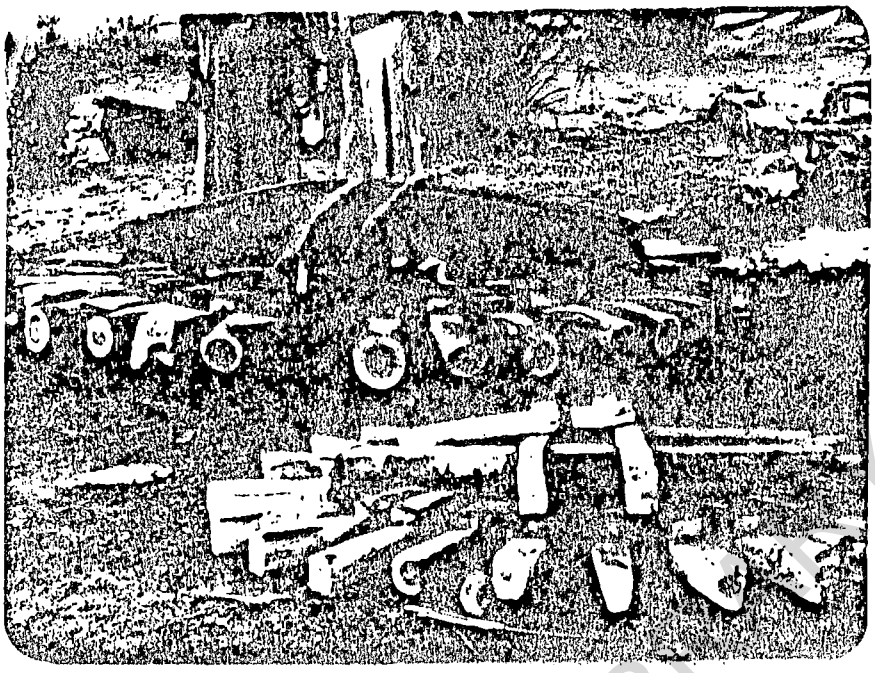


Plate No. 3 : The Wheels of the Sāgia.

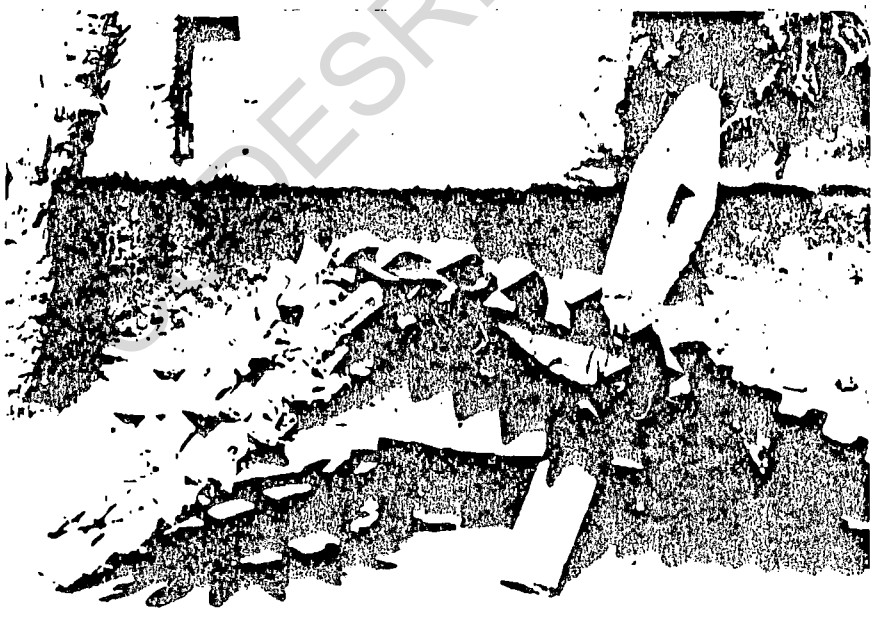


Plate No. 4 : The vertical axle of the Sāgia (mishi(

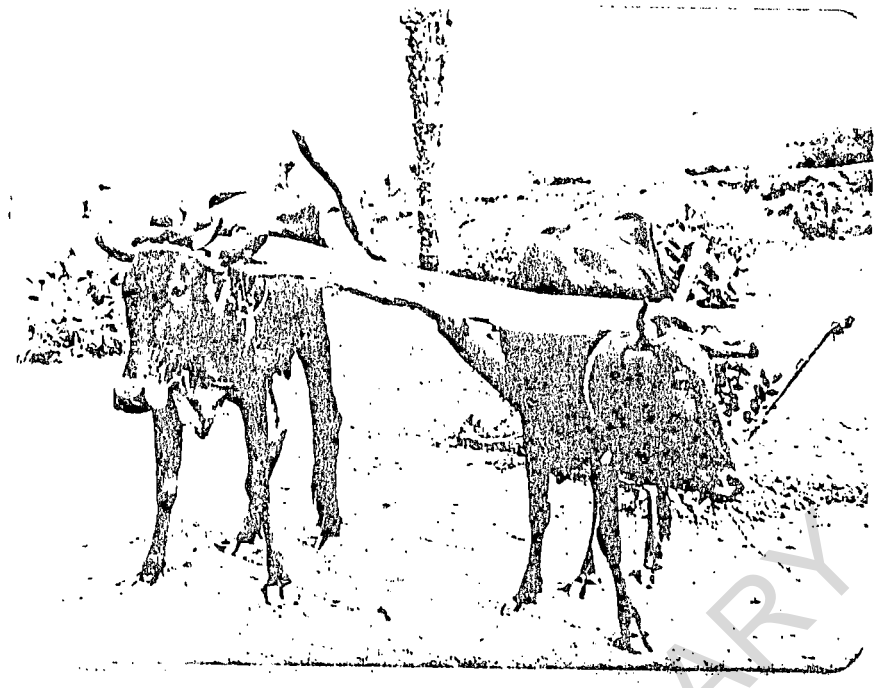


Plate No. 5: The yoke (islangī).

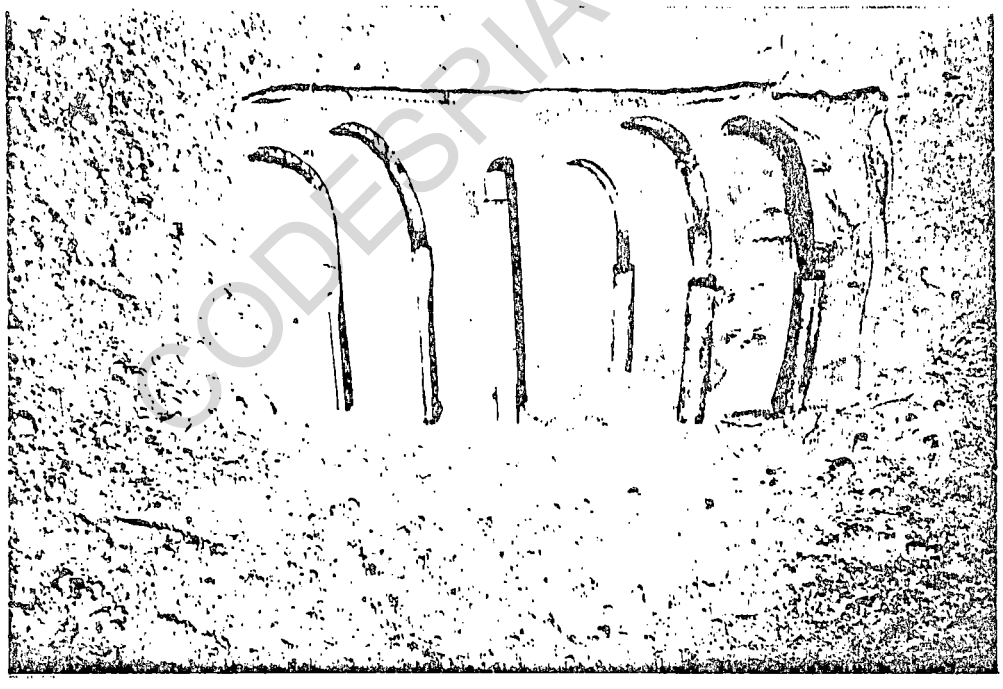


Plate No. 6.
The sickle.

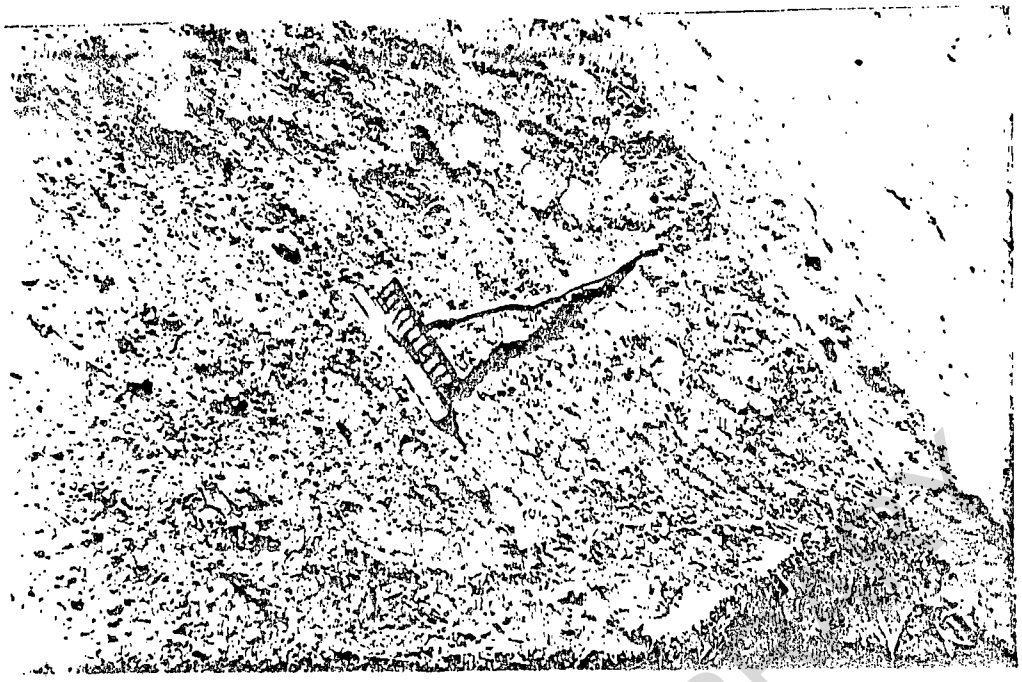


Plate No. 7.
The Rake.

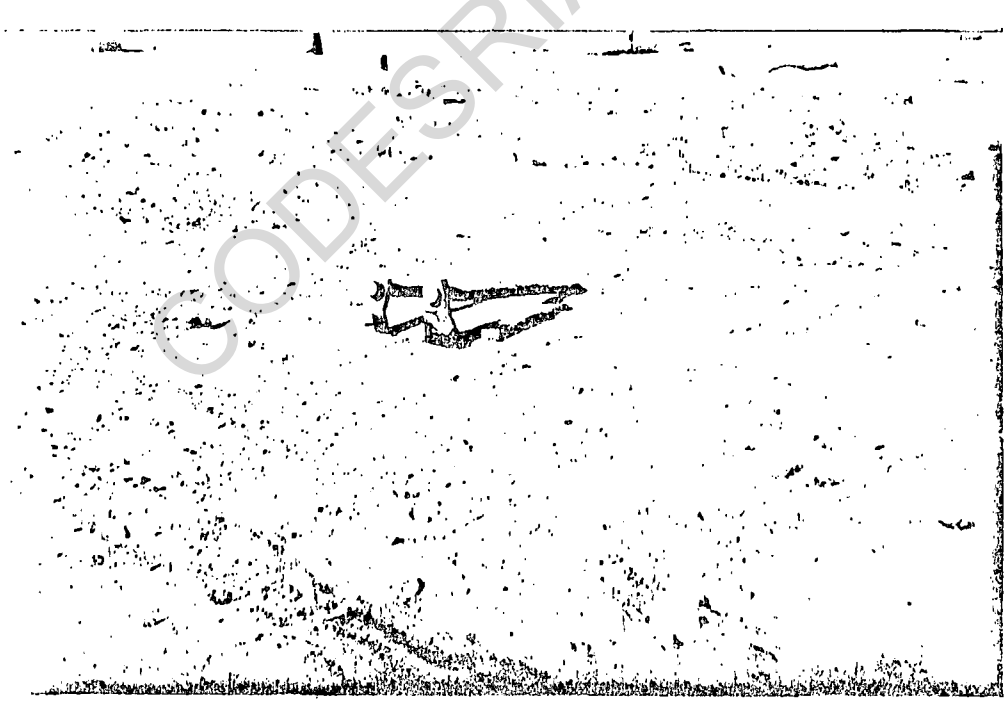


Plate No. 8.
The Local Hoe.

Plate No. 9.
The Imported Hoe.

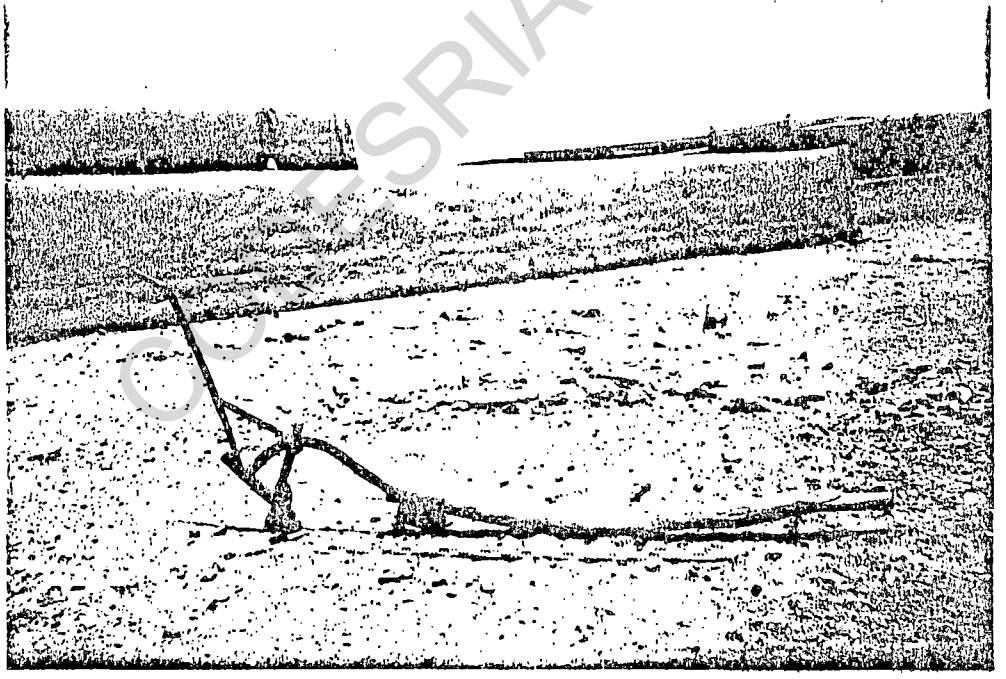


Plate No. 10.
The Plough.

Plate No. 11.

The Wooden Wāsū.

Plate No. 12.

The Iron Wāsū.

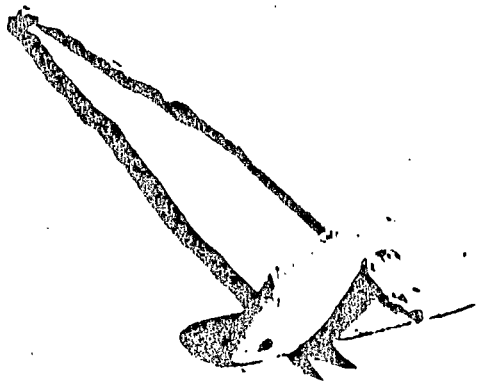


Plate No. 13.

The Wooden Urbir.

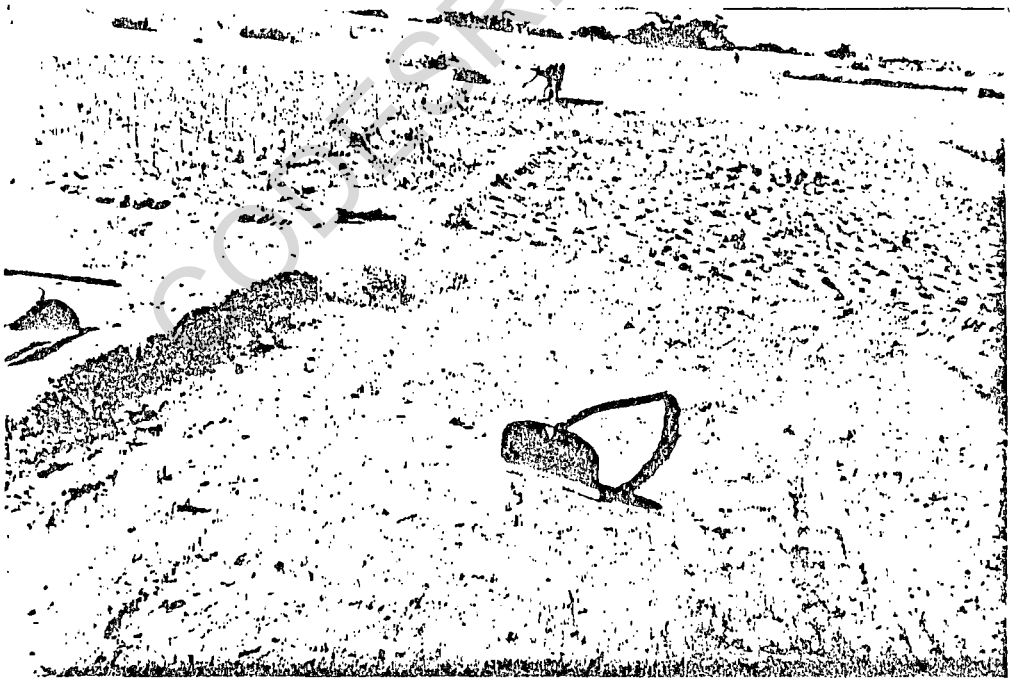


Plate No. 14.

The Iron Urbir.

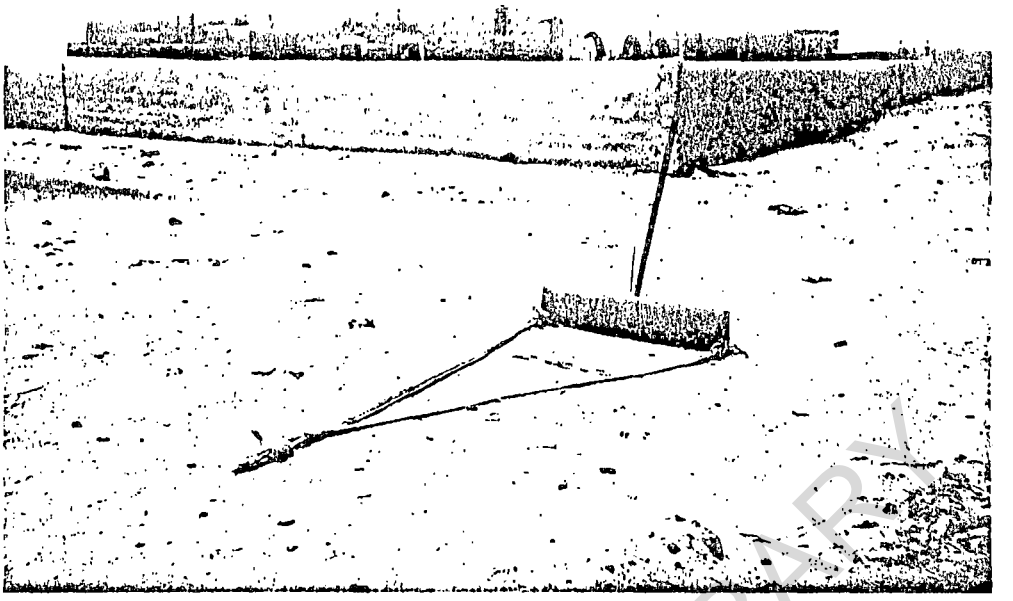


Plate No. 15.

The Zahāf.

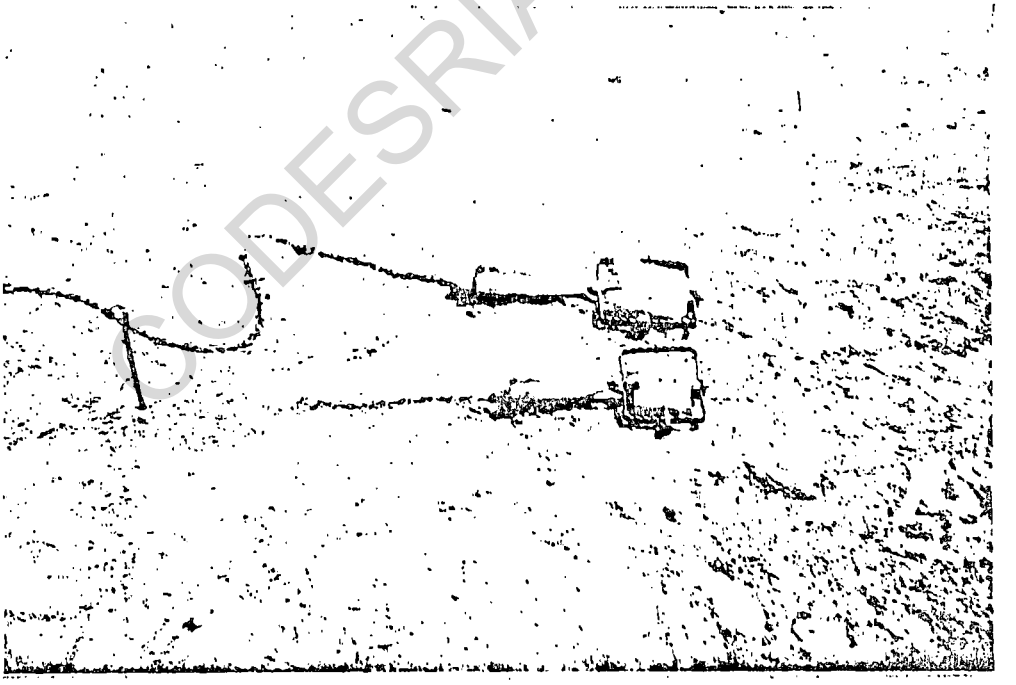


Plate No. 16.

The Imported Traps.

Plate No. 17.
The Local Trap (Kittatib).

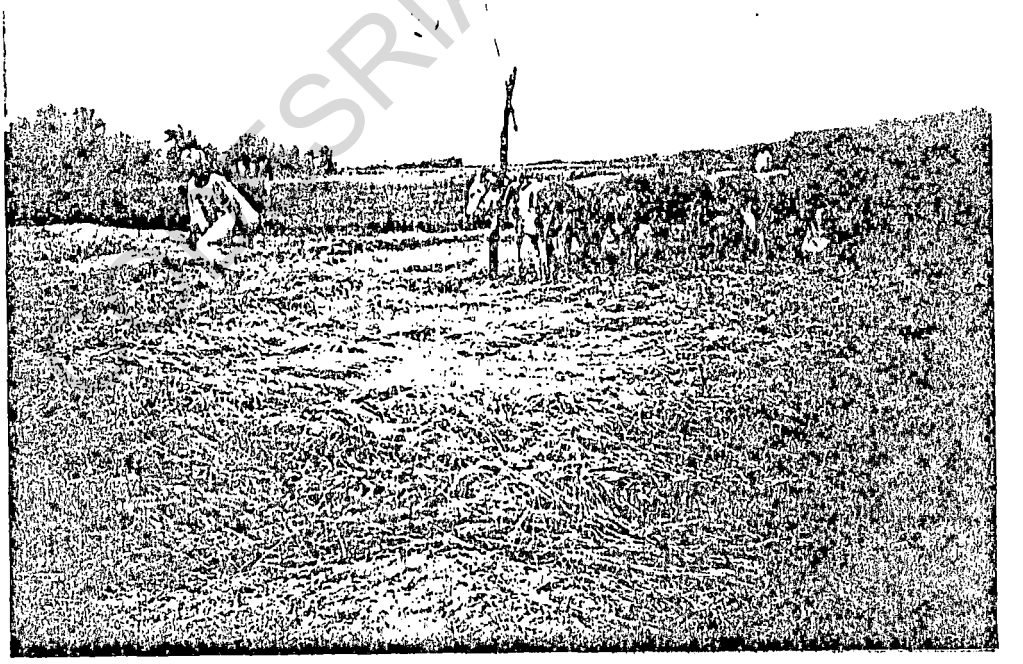


Plate No. 18.
Threshing by Donkeys.

Plate No. 19.

Threshing by noraj.

Plate No. 20.

Mat-trays used in winnowing.

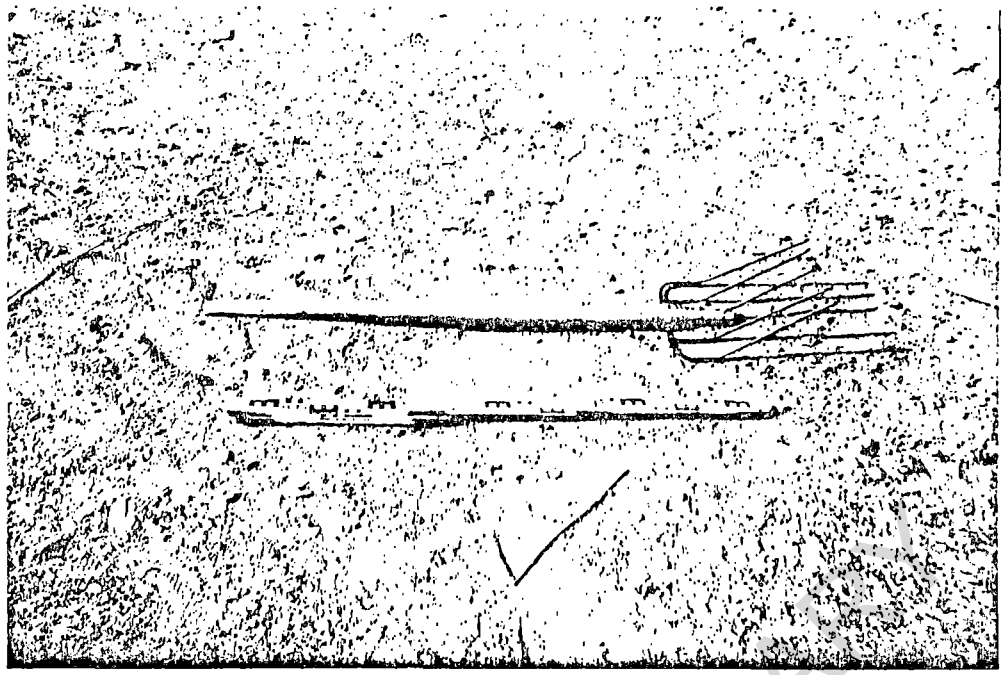


Plate No. 21.

The Iron Pitchfork.

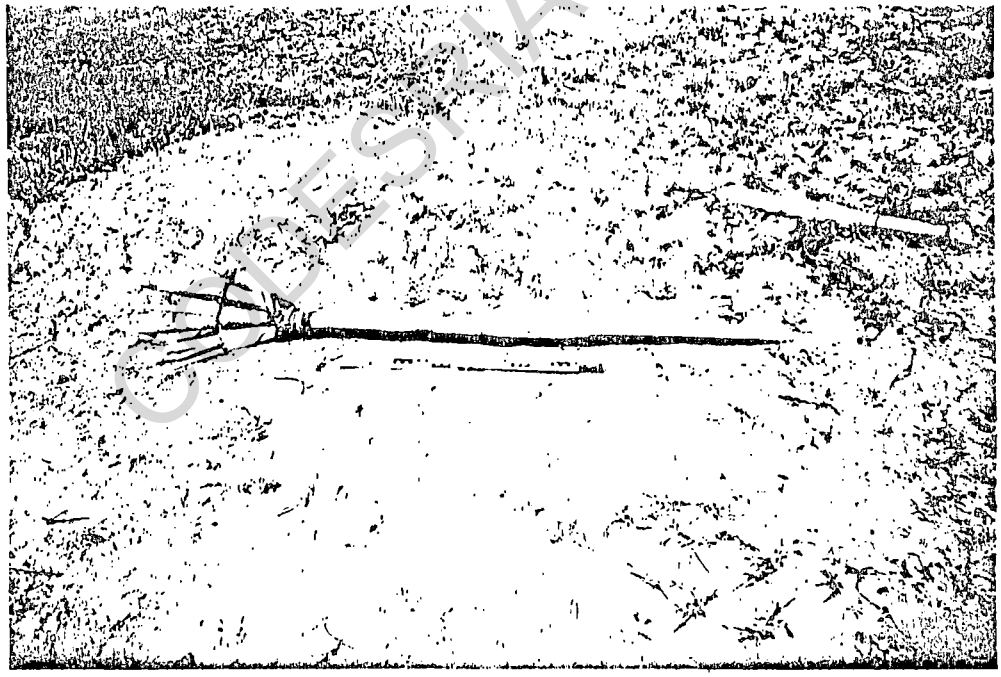


Plate No. 22.

The wooden pitchfork.

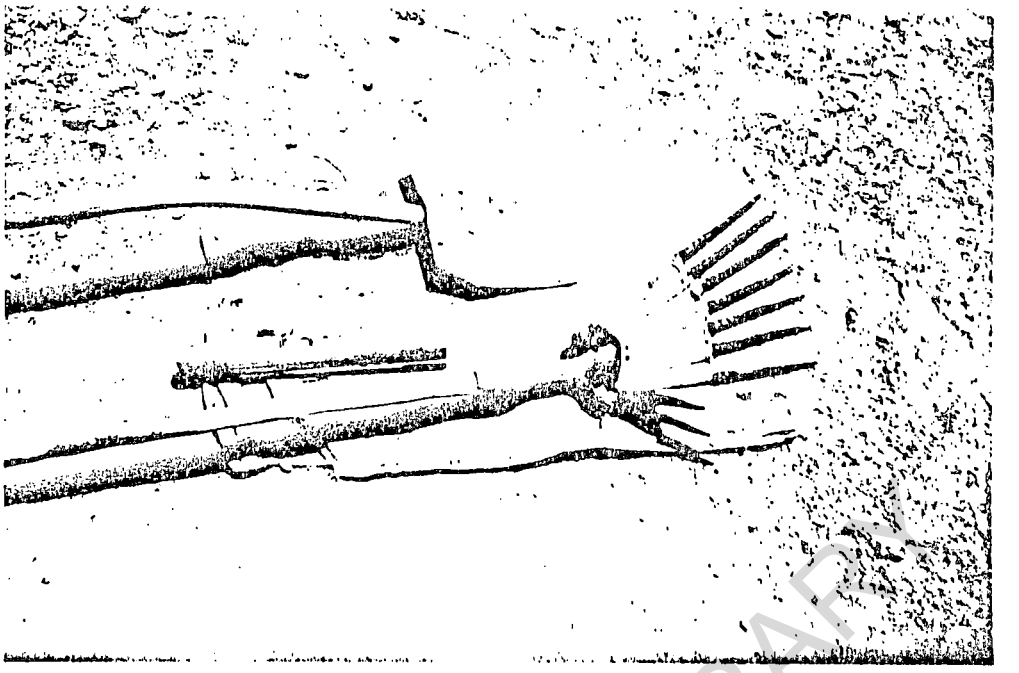


Plate No. 23.

The Shovel.

Plate No. 24.

Mud bins used for Grain Storage.

Plate No. 25.
Pottery jars used for dates storage.

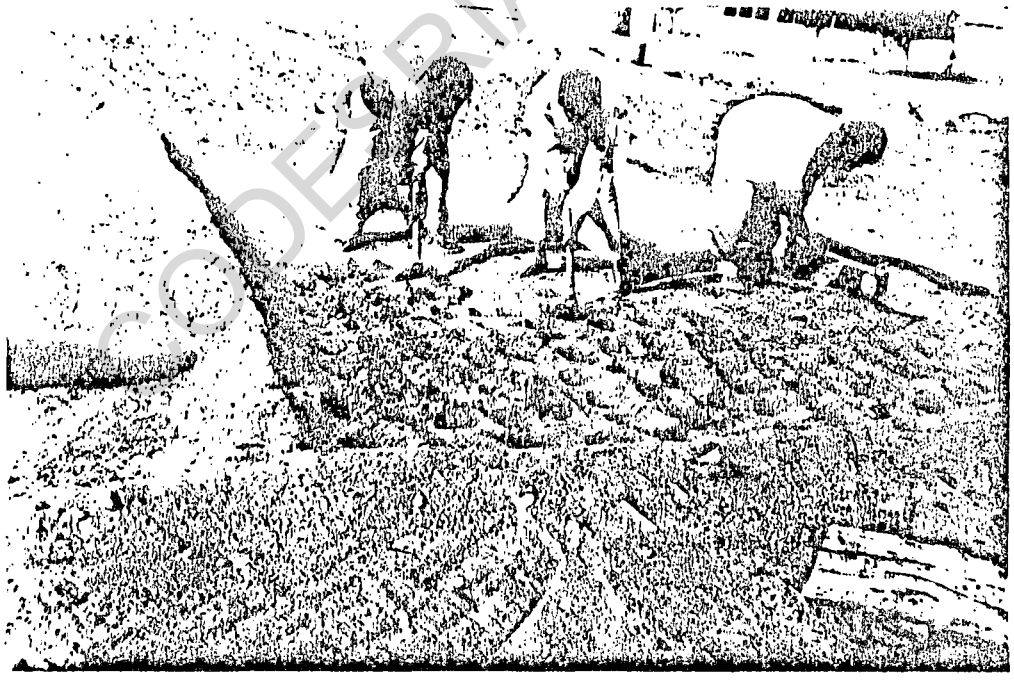


Plate No. 26.
The Land Hoing.

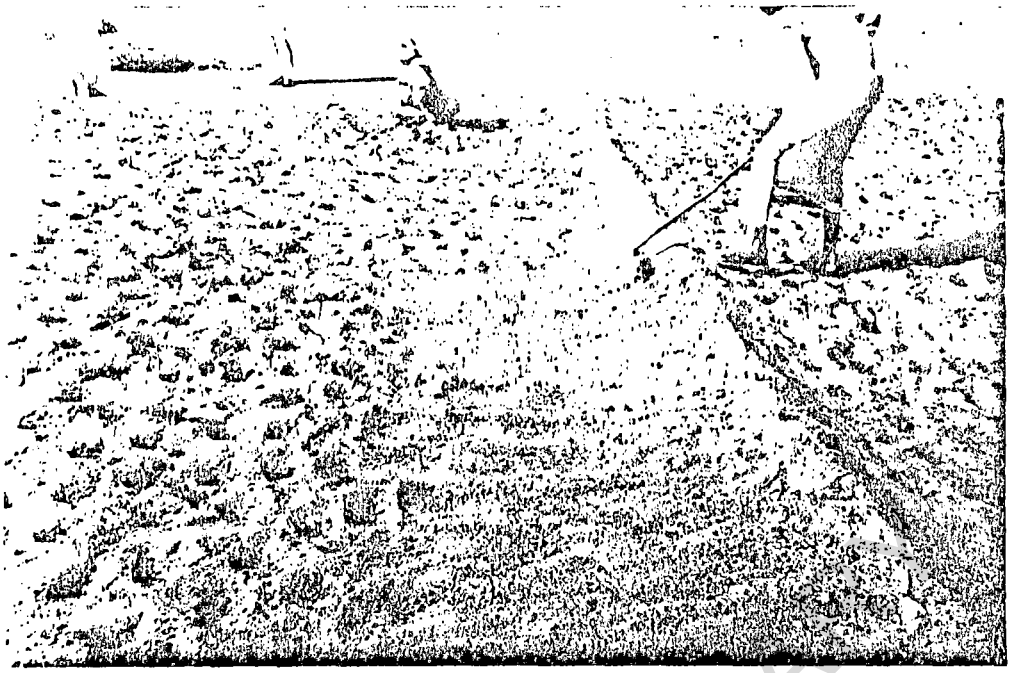


Plate No. 27.
Covering the seeds with a thin layer of soil.

Plate No. 28.
Turning the threshed mixture of products over.

Plate No. 29.

Winnowing by Mat-trays.

Plate No. 30.

Repeating of the threshing process after winnowing in smaller scale.

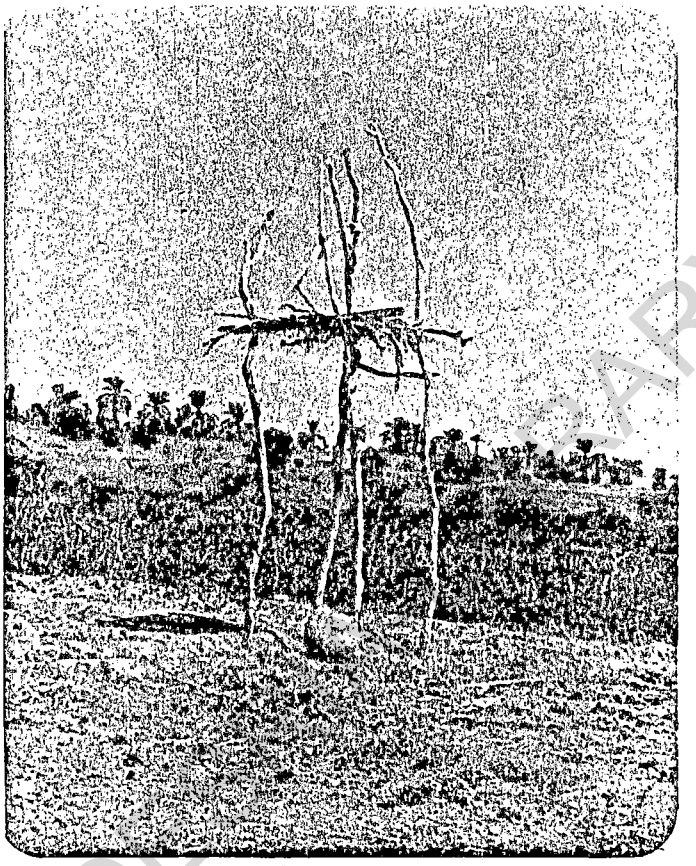


Plate No. 31.

The Helo.

List of Informants

Informants		Tape Number
Name Age Job Region Date of recording	'Abbas Ahmad Muhammad Khaīr . around 70 years old . Farmer . Sa'adin Kurta, Dalgo, Al Mahas Wednesday 25 of November 1987 . He worked as a farmer in his regionn for 65 years till this date .	IAAS/3330 IAAS/3331
Name Age Job Region Date of recording	'Abd Allah Khidir Nāsir . around 70 years old . Blacksmith . Dalgo, Al Mahas, The Market Thursday 26 November 1987 . He started to work with his father since he was a child. His family started the craft for four centuries ago.	IAAS/3332
Name Age Job Regiong	'Abbdin Salih Muhammad . around 75 years old . Farmer . 'Agola, soleb, Al-Mahas (west bank) .	IAAS/3325

Informants		Tape Number
Date of recording	Thursday third of December 1987 He started working as a farmer over fifty years now.	
Name Age Job Region Date of recording	Al-nūr Muḥammad Faḍl . around 80 years old. Farmer . Sudla, Al-Mahas (west bank) Sunday 22nd of November 1987. One of the semi-nomadic Arab who own camels and used them for transportation. He practised farming also.	IAAS/3329
Name Age Job Date of recording	Muḥammad Mursī Ṣabar . around 65 years old. The Sheikh of Jawgil village and a Farmer. 15th of March 1990. He started farming in 1936. Then he left to Egypt in 1940. He returned in 1950 and continued farming.	IAAS/3337
Name Age Job	Muḥi Al-ddin Nurī. around 75 years old Traditional especialist in wood	IAAS/3324

Informants		Tape number
	working.	
Date of recording	Thursday 26 of November 1987.	
Region	Kurm iri, Sa'adīn f'entī, Al-Mahas Started to work as especialist on 8th of June 1931. He worked with his grandfather and father since his childhood.	
Name	Saīdahmad Al-Haj Fagīr.	IAAS/3333
Age	around 70 years old	IAAS/3334
Job	Farmer.	
Region	Dalgo Al-Mahas.	
Date of recording	Friday 20th of November 1987.	
Name	Salih Muhammad Salih	IAAS/3334
Age	around 75 years old.	IAAS/3335
Job	Farmer.	IAAS/3336
Region	Mashākila, Al-Mahas.	
Date of recording	Wednesday 9th of December 1987. He started to work as a farmer since his childhood. He left his village for the period between 1927-1940. Then he settled and started farming again.	

Informants		Tape Number
Name	'Uthman Khaīry	IAAS/3327
Job	Farmer.	IAAS/3328
Age	around 65 years old.	
Region	Dalgo, Al-Mahas.	
Date of	Tuesday 24th of November 1982.	
recording	Friday 27th of November 1987	
	He started farming with his family since his childhood.	

Written Notes

Name : 'Abd Al-Mut'al Dawood .

Age : around 62 years old .

Job : a farmer and the chief of Kajbar Agricultural Co-operation Project.

Region : Kajbar, Al-Mahas, (west bank) .

Date of Interview : Thursday 10th of December 1987 .

Name : Hamid Muhammad Sālih .

Age : around 68 years old .

Job : a farmer and a merchant .

Region : Mashākīla, Al-Mahas (east bank) .

Date of Interview : Friday 13th of November 1987.

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