TOWARDS STRATEGIC PLANNING IN FOOD-GRAIN WAREHOUSING:

THE ROLE OF LARGE-SCALE GRAIN WAREHOUSE FACILITIES ON MARKETS' MECHANISMS AND IMPACT ON FOOD SECURITY






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Preface

The overall objective of this study is to understand the role of large-scale warehouse facilities on markets' mechanisms and impact on food security in order to enhance strategic planning in food-grain warehousing.

This study initiated by SIFSIA as part of the research fund component, was coordinated by a technical group represented by the Strategic Reserve Corporation (SRCo), Agricultural Bank of Sudan (ABS), Ministry of Agriculture and the Food Security Technical Secretariat. The study covers the 15 Northern States including all Government and private sector owned warehouses.

The assessment elements and the key questions therein were defined by a structured survey questionnaire which incorporated all the specificities and conditions of the required/standard warehouse(s) and its physical and environmental context. This analytical basis was made to provide information on the general situation of the grain warehouses; identify gaps and shortages in order to set out plans.

The findings are expected to support the food security policies and strategies of various decision makers including the Government, donors, UN agencies, NGOs, etc. by providing information on the capacities and whereabouts of grain warehouses.

Acknowledgement

The result of this study is a collaborative effort of many individuals and institutions which all deserve to be thanked for their direct or indirect contribution to this report. The national consultant, Dr El Fadil Ahmed Ismail, who coordinated the major part of the study and did the final reporting, deserves special thanking. The SRCo, ABS and FSTS of SIFSIA N need to be appreciated for their tremendous support during the field survey assessment which made all this assessment a reality. The study has benefited from the views and expertise of WFP in warehousing and avail training needs for enumerators and team leaders. Mr. Siddig, a freelance consultant, and a sampling expert and statistician, has made profound contribution to the study at the initial and data entry phases, and conducting a final data analysis, without whom the analysis would have been very difficult, if not impossible.

Particular acknowledgements go to *Mr. Saddig* Elamin, *Mrs Sara* ElSafi and *Mr. Yahia* AwadElkareem who contributed extensively in the whole phases of the study including data entry, cleaning, other logistics, and GPS training.

Last, but not least, thanks goes to the Technical Group's individual contribution and knowledge on the subject enriches the whole study and deserves a special acknowledgement.

Contents

List of Tables

List of Figures

List of Glossary, Acronyms and Conversion Factors

ABS	Agricultural Bank of Sudan
AOAD	Arab Organization for Agricultural Development
ARP	Agricultural Revitalization Program (ARP),
CAS	Cereal Availability Study
CBS,	Central Bureau of Statistics (Sudan)
CTA	Chief Technical Advisor
FAO	Food & Agriculture Organization
FSTC	Food Security Technical Secretariat
GPS	Geographical Positioning System (coordinates)
MoA	Ministry of Agriculture
MoFEP	Ministry of Finance and Economic Planning
MT	Metric tonne
NGOs	Nongovernmental Organizations
SRCo	Strategic Reserve Corporation (SRCo)
SSCCE	
TG	Technical Group
ToRs	Terms of Reference
ToTs	Trainers of Trainees
UKWA	United Kingdom warehouse Association
WC	Warehouse Corporation (previously dismantled)
WDRA	Warehousing Development & Regulation Act
WFP	World Food Programme
WIS	Warehousing Information System (WIS)

1. INTRODUCTION AND BACKGROUND

In Sudan, cereals particularly sorghum, millet and wheat are among the most important staple foods. These cereals are produced on a seasonal basis and in many places there is only one harvest a year. In such a case, most of the production of sorghum, wheat and millet must be held in *storage* for periods varying from one month up to more than a year in order to play a role of arbitrage.

The *market* for food grains is characterized by fairly stable demand throughout the year, and widely fluctuating supply and variable prices. The main function of storage in the economy is to even out fluctuations in market supply, both from one season to the next and from one year to the next, by taking produce off the market in surplus seasons and releasing it back onto the market in lean seasons. This is usually made by the Strategic Reserve Corporation (SRCo), which is the main public (parastatal) body responsible for maintaining food buffer stock for the country and simultaneously retains fair prices for both producers and consumers.

Storage is a component within a farming system, a trading enterprise, or a government policy, and may be undertaken because of its contribution to other activities or objectives within these broader contexts. Due to demographic changes in urban population in Sudan, the country is experiencing massive increases in consumer demand in urban areas and intensive animal production, thus creating large markets for feed grains that require precautions in terms of storage capacity, location and accessibility at all times. The desire to *stabilize prices* of basic food stuffs is one of the major reasons why governments try to influence the amount of storage occurring and often undertake storage themselves. This warrants understanding where the warehouses are located as well as their capacities and qualities to be known for any further actions.

According to the recent Cereal Availability Study large-scale traders and flourmills store more than 90% of grain in Sudan (CAS 2010). At the farm level and despite the desire to store food grains in order to cover food requirements and future cash needs, small farmers often sell a large proportion of their produce at harvest when prices are low[1] to meet urgent needs. The recent food and nutrition security assessment study (CBS, SSCCE, and FAO-August 2010) has also confirmed that increasing proportion of grain production is destined for the market rather than subsistence use, increasing storage requirements at the farm level and elsewhere in the marketing chain.

The study focuses on relatively larger storage facilities (more than 500 MT) capacity in many urban/rural areas to meet the primary purpose of this study which is to understand the role of large scale warehouse facilities on market mechanisms and how they can be used for strategic planning purposes.

Previous studies (according to the 1997 warehouse study) estimated an overall grain storage capacity of 9.4 million MT[2] in all the 15 Northern States of Sudan, out of which, 8.5 million MT capacity stores are labelled as modern and 210,000 MT capacity as silos and the rest as traditional store structures. These stores are widely dispersed across the country but Khartoum and Red Sea

[1] Farmers release their grains early for various reasons, including debt and economic dependence on others. They sell because they regard storage as too costly (in terms of time), and they consider storage as too risky or unprofitable in relation to other investments such as cattle.
[2] This includes liquid and solid warehouses.

have been taking the largest share (with 1.2 million MT and 4.8 million MT respectively) that is almost 70% of the total modern stock in the 15 northern states of the country. Another study conducted 25 years ago (1988) also showed similar results. However, it needs to be updated in order to match with current changes in the storage sector.

1.1 Main Objective of the Study

The overall objective of the warehouse study is to provide information that help in understanding the role of large-scale warehouse facilities on market mechanisms and also how they could be used for strategic planning purposes. The information provided will strengthen policy decisions and improve their understanding of the complexities associated with current cereal/grain warehouses along the supply chain. This will ultimately allow to develop effective operational strategies that maximizes the benefits from the storage services provided and simultaneously ensures accurate issuing of normal deliveries as well as emergency ones.

The study addresses the following specific objectives:

- Estimate the capacity of warehouses in the 15 northern states of Sudan at the time of study;
- Assess status of warehouses in terms of both capacity and quality;
- Assess grain warehouse capacities held by the different market participants and identify locations, owners and their general status;
- Analyse the existing and potential warehouse capacities and opportunities;
- Identify the possible types of food and non-food materials that could be stored; and
- Recommend effective warehouse management procedures that should be followed for the years to come.

1.2 Scope of the Study

1.2.1 Study Scope

Warehouses in Sudan are broadly classified as modern and traditional. Among these categories there are different types of storage facilities which include silos, traditional and conventional go-downs, open-air shunna, underground pits, and granary bins. However, these categories are open-ended types and the study incorporates only categories of well-structured warehouses with main focus on physically accessible areas. The focus thus will be on types of warehouse facilities starting from 500 MT. The criteria for selection was discussed in detail and verified by Technical Group, which represents the SRCo, ABS, the MoA, FAO-SIFSIA, FSTS, and WFP. Policy issues in relation to food security and warehousing are not dealt with in this study and are expected to be dealt with in another separate study.

1.2.2 Geographic Scope and Coverage

Geographically, the study covered the entire fifteen Northern States at three levels namely, the state, locality and administrative unit level. A pre-assessment survey has determined the number and location of more than 550 warehouses within the prescribed capacity, type and structure of warehouses. The actual number of surveyed warehouses reached 773 warehouses of above 500 MT in capacity. Access was a constraint in some areas, especially in Darfur and remote areas in Northern state and South Kordofan. The distribution of the initial assessment survey was presented as Annex. Although major focus was on the State capitals, all localities with warehouse capacity of more than 500 MT (approximately >5000 sacks) were included in the study. The study provided some indicators on road accessibility to warehouses, road conditions and their suitability to run all year round. However, additional transport and other functional parameters were not covered at this stage and might be included in future studies.

1.3 Expected outcomes of the Study

The expected outcomes as related to the survey objectives will include, but not limited to the following:

- The capacity of warehouses (more than 500 MT) in the 15 northern states of Sudan estimated;
- The status of warehouses in terms of both capacity and quality assessed;
- Warehouses locations, owners and related market participants identified;
- General status and warehouse conditions assessed;
- Types of food and non-food materials stored/could be stored identified;
- Effective warehouse management procedures for food warehouses recommended;
- GPS coordinates for warehouses identified and digital camera photos for warehouses greater than 5000 MT taken.

1.4 Organization of the Study

The warehouse study consists of five main chapters. Chapter I provides an introduction and background to the crop warehousing system in Sudan with particular focus on food grains. The main objectives of the study and expected outcomes are illustrated in this chapter**.** Chapter II explores the conceptual framework of the study and overviews the warehouse role and concept in rural and urban concentrations. Methodological approach and technical frameworks for performing the assignment are given in chapter III. The results, discussions and analysis are elaborated in chapter IV. Chapter V gives the conclusions, recommendations, warehouse study implications and highlights the way forward.

2. THE CONCEPTUAL FRAMEWORKS OF THE STUDY

Currently there are three models of warehousing around the world, some of which might be applicable in Sudan. These models involve a) warehouses/stores of private traders being licensed to hold stocks for third parties including farmers, b) warehousing model, which store all sorts of merchandise – not just agricultural commodities, and c) the private trader model where private trading company provides farmers with services without any regulatory framework for this activity. This involves, of course in one way or the other, modern warehouse or silo type facilities suitable for holding cereal grain for long periods under the prevailing climatic conditions.

2.1 Overview of the Warehousing Role and Concept

2.1.1 The Concept of Warehousing in Urban Concentrations

It has been well acknowledged across the globe that, the basic storage functions in any traditional warehousing is receiving, pre-packing, put-away, storage, order picking, packing and or pricing, sortation, packing and shipping and cross-docking (Frazelle 1996). In Sudan, however, warehousing does not exist as a distinct concept in regional planning in most of the states, including the federal level, still are traces of the concept on the ground. The ministry concerned with issuance of large warehouses is usually the Ministry of Investment, which has very limited database for those willing to invest in warehousing sector and has no efficient follow up system to assure whether these licences were established, under establishment or not. Despite the information on number of warehouses available by the ministry, it usually discovers that plenty of licences remain just on paper and few of them went into being real warehouse establishments.

On the other hand, land allotments for warehouses were made exclusively far from transport (rail, roads and rivers) facilities and they start looking for these services post establishment. In fact, as in many areas around the globe, local authorities usually make much focus on land allotments for residential, commercial and industrial development services and rarely look for services such as logistics and warehousing[3].

The concept of integrating warehousing with efficient transport systems (rail and road) tends to bring about significant cost savings while adding automation (which automatically means bulk storage) to grain warehouses will help to reduce the labour cost. Labour covers less than 20% of overall variable costs and almost 13% of fixed costs in Sudan (Ismail 1996). As a matter of fact, warehousing and the logistics industry in Sudan as a whole is continuously hampered by lack of adequate skilled manpower for lack of training and capacity building programmes. The fact that, some of the warehouses are of poor construction standards and are by no means compatible with the concept of green warehousing which is currently prevailing in other countries. Siddiqui (2009)

[3] If warehousing industry is to develop, land for it should be given at concessional rates to promote this vital sector than to be given at commercial rates through auctions.

stated that, the key aspects of effective warehouse planning[4] include concept and designing, use of appropriate storage types, adoption of right architecture, use of proper structural and electrical systems, proper roads and yards, installation of surveillance and security systems, etc.

2.2 The Evolution of Food Warehousing in the Sudan

The evolution of food warehousing in the Sudan is well known since the colonial period, where proper documentation and warehousing system exists. After independence, warehousing was allotted for the Department of Stores attached to the Ministry of Finance and/or Trade. Despite this long history of record, most of food grain warehouses by private sector were not systematically assessed and some of the existing ones do not comply with international standards. Most of large warehouses are made out of zinc (which maintains high temperature) that might affect the stored food.

Ministry of Finance –through Agricultural Bank of Sudan (ABS) has followed the strategy 'think big' building large concrete silos one in Gedaref (of 100 thousand metric tons) and another in Port Sudan (of 50 thousand metric tons) in the mid-sixties and both silos maintain stocks to a level required by international standards. ABS also built warehouses during the late 1970's and early 80's to strengthen the food grain warehousing with the larger goal of creating buffer stock, but the warehousing soon extended its operations to cover industrial goods as well. The private sectors did not enter into this type of business for lack of strategic orientation and for the high capital intensity needed. Commercial Banks and financial institutions have made their own warehouses to receive food grain (*'salam')* from farmers as a refunding mechanism for their farm loans. Other than this, the warehousing business is limited in its scale for private sector participation to the minimum.

Currently, the warehousing landscape has changed as many states began to think of having their own storage to meet both lean and surplus years' demands. The major objective of the ARP [Agricultural Revival Programme] to boost production and food security slogans by the government have created, at least on paper; favourable conditions for private investments which can bring the storage issues to focus.

2.3 The Demand for an Efficient Warehousing in the Sudan

It has been acknowledged by policy makers that, well-equipped warehouses will serve not only as a safe and hygienic place for food grain reserves but also provide a first line of defence in the event of a food emergency. However, and as has been mentioned earlier, the question of food grain warehousing goes beyond the facility itself to include the policy options and the need to maintain stocks of grain in years of good harvests to guard against widespread hunger in those years when

[4] There are softwares designed specifically for managing the movement and storage of materials throughout the warehouse [the Warehouse Management Systems (WMS)] and are often set up to integrate with data collection systems (David 2007). Of course, in Sudan not all warehouses need WMS but some large ones as silos really do in order to increase the storage capacity, reduce inventory and labour costs and improve customer services. Warehouse Management monitors the progress of products through the warehouse. It involves the physical warehouse, infrastructure, tracking systems, and communication between product stations.

production falls short of needs (Evans 1997). This is why policy makers feel a need for an efficient food warehousing system in Sudan.

Therefore, this study will make an assessment of current facilities and their conditions in order to find answers to strategic questions as the necessity of establishment and maintenance of strategic grain reserves or food security reserves. The seriousness of the question(s) comes to highlight on the preparedness of food grain warehouses for answers to questions as: whether current facilities are able to provide sufficient space in case of bumper crop harvest or should we depend on imports in order to ensure adequate availability of food for populations and the development of national food security strategies.

The determination of current capacities would allow policy makers to cope with emergency situations and also provide the basic needs until alternative supplies are arranged for, particularly in the States where urban concentration are solely market dependent and the rural population could retain sufficient stocks on its own.

The need for this study arises from the fact that, there are no up-to-date information/studies –and for decades- to identify or assess the demand for food grain warehousing. Most business entrepreneurs in most states avoid investment in warehousing for the risks associated with low capacity utilization, low stocks turn over and the high capital and overheads involved. In such circumstances, it is often difficult to focus on food grain warehousing in isolation of other non-food, cash crops and other non-food products all situated in the same warehouse. The intention in here is not to undertake a demand assessment for efficient warehousing services but rather to assess the general situation of the available warehouses across the 15 northern states and provide recommendation for improvement. However, it should be noted that much progress in the demand for warehousing has taken place since the liberalization programmes in the early 90's but even this progress needs to be verified.

3. METHODOLOGICAL APPROACH AND TECHNICAL FRAMEWORKS

a) The survey sample and approach

Following the guidelines prepared by the inception report[5]of the warehouse assignment, a preliminary assessment survey was conducted to assess the types, sizes and locations of warehouses in 15 Northern states in January 2011 (see formats in Annex 3.2-a). The primary templates of the pre assessment were designed to obtain the initial information (necessary for the analysis of the situation on warehouses) to be used as a base for food security database. Teams conducting the pre-assessment surveys were trained and were also requested to train (as ToTs) their local counterparts at the states' level. The information obtained from the pre assessment survey were analysed and results were used for the main survey.

During the planning phase, about 550 warehouses were registered as number of warehouses to be assessed. However, the actual numbers of warehouses assessed turn out to be 773 which responded to a well-structured questionnaire (Annex 3.2-b.). Nine teams were formed (Annex 3.2-d) headed by team leaders with qualified experts. A team of three were selected at each state/region to cover the state/region. People of different institutions/ backgrounds across departments were selected to achieve the objectives of the survey and increase transparency and participations. The teams were classified to cover the Northern, Eastern, Central, Kordofan and Darfur regions/states.

Following the action plan which was made during the planning phase (and also learning from the limitations of the pre-assessment survey), a short training module for team leaders (ToTs) and also budgets were prepared for each team[6]. Guidelines for enumerators (Annex 3.3-3.5) were developed and training materials utilized on how to conduct the survey which took two days. This includes training on geo-referencing (GPS) of warehouses to identify storage locations, especially of warehouses of bigger size.

b) The Tentative Work Plan And Time Frame

To assist the team leader (consultant) in keeping a tight project timeline of 9 weeks, the following work plan was depicted in Figure 3.2 listing the main project activities and their estimated duration for completion. Practical constraints pushed the project ending period from February to May 2011. Most of the delay relate to reasons beyond the control of the project. However, this has given enough lead time for reviewing and documenting technical requirements related to the assignment plan and vision as well as identifying the information that support those requirements

[5] The inception report introduced the overall framework for warehouses assessment study initiated by SIFSIA N & SRC, including the public formal, semiformal, and privates' sector warehouses in the 15 Northern states.

[6] Enumerators (9 team leaders) were trained to make a pre assessment survey (which took about three weeks) to avail necessary information. The comprehensive survey took place (from the fifth to twenty third of March 2011.

(questionnaire templates, training the enumerators on GPS and measuring systems, logistics, etc.). The pre-assessment, which was launched for selecting and prioritizing specific warehouses, based on their characterization to meet the ToRs, has taken about three weeks. Irrespective of these delays, the assessment mission has completed the data collection in five phases (Table 3.1). Most of the steps in phase I and II were finalized[7] within the time frame and the following phases were completed according to the revised plans (Table 3.1).

3.1 Information Assessment and Analysis

A set of activities were planned to be undertaken to achieve the study objective. In addition to the surveys for 15 states to assess important information on warehouses capacities, conditions of transport modes and other related information were looked for. Secondary information from different states were taken from reports (by state/federal ministries) and few interviews for more information (on transport > road & rail conditions) were made. The overall activities include but not limited to:

- Undertaking a detailed warehouse information assessment in 15 states. Main issues include (refer to Annex 3.1-a&b)
  - Capacity of warehouses, major indicators of conditions of warehouses, strengths/ weakness, and opportunities in warehousing
  - Key institutions involved in warehousing systems, their role and function
  - Existing food distribution planning structures (like committees and councils and their performance) in relation to food grain warehousing,
  - Situation of stocks distribution and the like,
  - Efficiency and effectiveness of food warehousing information, handling and distribution to concerned authorities.

- Undertaking limited queries on road and distribution conditions (accessibility and road condition, etc.) in 15 states (Annex 3.3).
- Undertaking limited queries on market condition as related to warehousing (accessibility, impact on storage, etc.) in 15 states (annex 3.4).

Other issues which are closely related to warehousing as transport availability and accessibility to warehouses has also been identified (Annex 3.1 through 3.3-3.4). The summary of the questions involved are meant to achieve information on the following aspects:

- Place (State, Locality, Admin Unit, Other specific location)
- Ownership status (own, rented) and if owned by whom (owned by (government, public organizations (specify – farm/trader associations, SRCo, Zakat, ABS, etc.), NGOs, WFP, other donor, companies, private traders, etc.)
- Length, Width, height to estimate the capacity (given by the owners or expert estimate)
- Road accessibility and condition of the road (road type, condition, length, etc.)

[7] This includes reviewing and documenting technical requirements related to the assignment plan and vision as well as identifying the information that support those requirements (questionnaire templates). This goes further to selecting and prioritizing specific warehouses based on their characterization to meet the ToRs objectives.

- Warehouse construction material (stone, hollow block, corrugated iron zinc sheet …)
- Roofing material, floor material (concrete, earth, etc.) and the ventilation (if it has, how many and type)
- Doors types and conditions (how many, and type: sliding, fixed etc.)
- Present state (in good condition, needs renovation, which part needs renovation….
- Availability of utilities (telephone, power supply, etc.)
- Security (vulnerable to theft, etc.)
- If more than 5,000 MT capacities, GPS and digital picture camera is to be provided.

The desk reviews and the preparation of questionnaire and templates design started during the planning phase. Two sets of information were prepared: development of survey questionnaire and market templates (Annex 3.2-a) and the development of guidelines for enumerators and preparation of training material on how to conduct the survey (Annex 3.2-b). A separate, but simple template was made for the pre assessment together with primary information on warehouses (Annex 3.1). GPS and digital cameras were assigned for mapping and geo-referencing of warehouses by state teams in order to identify storage locations, owners, capacities and general status efficiently.

The total numbers of warehouses covered during the survey were 773 across the whole 15 Northern states. Table 3.2 shows that 62% are located in four states - Gedaref (15.6%), Red Sea (15.7%), Gazera (15.7%) and White Nile (14.9%). Fewer numbers of warehouses were chosen in Darfur for security reasons as most of them were inaccessible. However, the study in Darfur covers WFP warehouses which are not permanent structures.

Table 0.1: Number of questionnaires (warehouses) by State

State Code	Name	Frequency		Cumulative	
		Total	Percent	Total	Percent
	Total	773	100	-	-
11	Northern	16	2.1	16	2.1
12	River Nile	14	1.8	30	3.9
21	Red Sea	121	15.7	151	19.5
22	Kassala	62	8	213	27.6
23	Gedaref	122	15.8	335	43.3
31	Khartoum	59	7.6	394	51
41	Gezira	121	15.7	515	66.6
42	White Nile	115	14.9	630	81.5
43	Sinnar	88	11.4	718	92.9
44	Blue Nile	19	2.5	737	95.3
51	Northern Kordofan	14	1.8	751	97.2
52	Southern Kordofan	8	1	759	98.2
61	Northern Darfur	4	0.5	763	98.7
62	Western Darfur	6	0.8	769	99.5
63	Southern Darfur	4	0.5	773	100

Source: FAO-SIFSIA and FSTS, Warehouse Study Field survey, February 2011.

4. WAREHOUSES SURVEY RESULTS, DISCUSSION AND ANALYSIS

This part of the study covers the results, analysis, and findings of the assessment survey made in 2011. Such assessment has not been conducted since 1988. The results of this empirical analysis will provide extensive information for decision makers. The same data and information can be used by policy makers and warehouse entrepreneurs to orient warehousing business needs which will further support the national food policy preparations. The main idea behind this analysis is provision of technical information on warehouses and the organizational settings in which the warehouses operate so as to help integrating food warehousing into existing overall storage business processes.

4.1 The Results, Discussion and Analysis

This section provides analysis of the results obtained through the assessment survey which covered 773 stores spread over the 15 northern states (Sudan N). The results and discussion are presented in the same order of questions laid in the questionnaire. General information to identify the warehouses owners, types and capacities as well as their general conditions are also given. However, GPS information on location, are covered elsewhere in the database. The road conditions and accessibility to stores is not covered. The section further elaborated the status of crops stored and their storage condition and duration.

4.1.1 Warehouse General Identification, Information and Analysis

General information on warehouses is classified by state with some details at the level of locality /municipality and administrative units, where applicable. Personal information[8] in relation to the warehouse owner/company/firm or individual is kept in the database system (using CSpro EXCEL and SPSS) together with information on warehouse location (GPS Coordinates, altitude and digital pictures for warehouses of more than 5000 MT, name of closest market and the distance from major markets.

Results in Table 4.1 shows that 37% of the warehouses belong to the individual private sector traders, 23% to private companies while 29% belong to public or parastatal institutions. International and local NGOs covers only 3.1% and 0.7%, respectively, share of the overall warehouse capacity. Growers tend to use other warehouse facilities rather than using their own warehouses. State or big commercial farms have only a share of 2% out of the total warehouse capacity. Cooperative sector is also weak in terms of its own warehouses designed for storage purposes (Table 4.1). This might indicate the low financial capacities of such organizations since warehousing requires large capital for its establishment.

[8] Street address, or physical location, telephone contact (s), e-mail address / website, etc.

Table 4.1: Type of organization and institutions involved in the warehousing sector

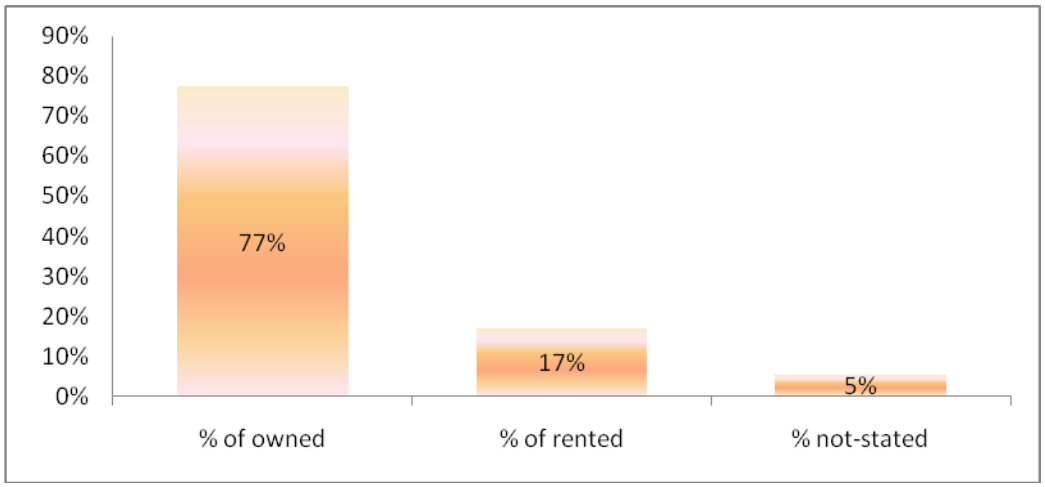
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	International NGO	22	2.8	3.1	3.1
	Local NGO	5	0.6	0.7	3.7
	Cooperative Society	2	0.3	0.3	4.0
	Higher Level Umbrella Org.	4	0.5	0.6	4.6
	Private Company	163	21.1	22.6	27.2
	Out Grower Scheme/Contract Farming	15	1.9	2.1	29.3
	Public Sector	208	26.9	28.8	58.1
	Private Sector	267	34.5	37.0	95.1
	Other	35	4.5	4.9	100.0
	Total valid cases*	721	93.3	100.0	
*Missing	System	52	6.7		
Total of all cases		773	100.0		

The valid cases constitute 93% of all cases.
Source: FAO-SIFSIA AND FSTS, Warehouse Study field survey, February 2011.

Organizations other than the well identified ones comprise only 5% of the valid cases which can be logically labelled as private sector and the sector's share will rise to 65%. This 65% share of private sector in warehouses shows a relative decline in public sector share compared to previous studies where a 35% share of private sector was known in mid-eighties till early nineties.

Most of the warehouses across the 15 states are owned by their respective organization (77%) compared to 17% rented where only 5% in the survey were reporting ownership status unknown. (Fig. 4.1). Table 4.2 gives a more general and detailed description of warehouse ownership by state.

Figure 4-1: Type of warehouse ownership



However, the reverse of this situation was found true in North Darfur where most institutions tend to rent the warehouse facilities as opposed to using their own warehouse facility. This is mostly due to the case that most NGOs and other international organizations are not able to have their own permanent structures[9] (Table 4.2).

Table 4.2: Description of Warehouse Ownership by State

	Warehouse ownership (Numbers)				% of	% By State		
	Totals	Owned	Rented	Not stated	Total*	of owned	of rented	Not-stated
Total	773	599	132	42	100%	77%	17%	5%
Northern	16	12	4	-	2%	75%	25%	-
River Nile	14	14	-	-	2%	100%	-	-
Red Sea	121	90	14	17	16%	74%	12%	14%
Kassala	62	54	7	1	8%	87%	11%	2%
Gedaref	122	99	14	9	16%	81%	11%	7%
Khartoum	59	37	20	2	8%	63%	34%	3%
Gezira	121	87	34	-	16%	72%	28%	-
White Nile	115	99	14	2	15%	86%	12%	2%
Sinnar	88	64	14	10	11%	73%	16%	11%
Blue Nile	19	15	4	-	2%	79%	21%	-
Northern Kord	14	10	4	-	2%	71%	29%	-
Southern Kord	8	8	-	-	1%	100%	-	-
Northern Darfur	4	1	3	-	1%	25%	75%	-
Western Darfur	6	5	-	1	1%	83%	-	17%
Southern Darfur	4	4	-	-	1%	100%	-	-

Source: FAO-SIFSIA AND FSTS, Warehouse Study field survey, February 2011.
*Figures and percentage are rounded to integer decimals.

In River Nile state all warehouses are of private ownership and are of very small in capacity (Table 4.3). Table 4.2 shows the states of Red sea, Gedaref, Gezira, White Nile and Sinnar. The percentage share falls in the range of 74-89% of total numbers of owned warehouses.

4.1.2 Estimates of the Storage Size and Capacity

The assessment survey results shows a total estimated grain holding capacity of 3.61 million metric tons warehouses exist in the 15 Northern States. The average warehouse capacity per State is about 4800 MT (Table 4.3) with a minimum of 300 MT. The facilities are found as large as 30,000 MT

[9] The World Food Programme (WFP) has numbers of temporary warehouses in Darfur but not in compliance with the requirement of this survey assessment that targets well structured permanent warehouses. These portable temporary structures, which are of good storage standards, store good amounts of food grains for relief purposes though remain out of the scope of this study assignment.

and as small as 300 MT. The measures of dispersions (measured by coefficients of variations) vary considerably across and within states (Table 4.3). According to the survey, there is no consistent pattern of warehouse sizes in a predetermined architecture – the owners use their own criteria for the size of the facility to build. The largest warehouse sizes were found in Red Sea and Khartoum a state which goes as high as 30,000 in Red Sean and 28,800 in Khartoum. Big milling companies, such as *Syga, Wheata and Seen* use these large warehouse facilities to store wheat and wheat flour imports.

Table 4.3: Storage capacity, average size of facility by states

Code/State		Quantity in metric tons				
		Average	Standard Deviation	Coefficient of Variation (SD/Avg)	Maximum	Minimum
All 15 states		4,798	5,000	1.04	30,000	300
11	Northern	1,345	1,073	0.80	4,410	400
12	River Nile	2,281	1,767	0.77	6,000	320
21	Red Sea	11,865	4,205	0.35	30,000	800
22	Kassala	3,151	3,692	1.17	16,000	400
23	Gedaref	3,096	2,911	0.94	13,500	450
31	Khartoum	5,392	5,171	0.96	28,800	500
41	Gezira	4,848	5,022	1.04	19,250	400
42	White Nile	2,574	2,894	1.12	16,000	450
43	Sinnar	2,839	3,698	1.30	17,600	300
44	Blue Nile	4,120	4,063	0.99	15,000	364
51	Northern Kordofan	3,735	4,425	1.18	16,000	345
52	Southern Kordofan	3,269	4,189	1.28	12,000	720
61	Northern Darfur	8,125	3,750	0.46	12,500	5,000
62	Western Darfur	1,960	953	0.49	2,500	300
63	Southern Darfur	3,600	2,990	0.83	7,500	400
Total storage capacity						3,607,839

Source: FAO-SIFSIA AND FSTS, Warehouse Study Field Survey, February 2011.

Sizes of warehouses in main sorghum producing areas (Gedaref, Sinnar, White Nile and North and South Kordofan) are averaging between 2500 MT and 4000 MT. The minimum averages were found in the Northern, River Nile and Western Darfur states with average capacities of 1345 MT, 1960 MT and 2281 MT, respectively (Table 4.3). For the Northern state, this is correlated with low potential for production, not a terminal market and not a route to the port and hence less demand for storage facilities indicating low storage capacities. Despite the small number of warehouses assessed in North Darfur, the average sizes of facilities in Northern Darfur are almost four fold to that of western Darfur and more than double that in Southern Darfur. This might indicate tendency of large warehouses (probably NGOs) to focus on Northern Darfur as affected area by civil unrest (Table 4.3).

Table 4.4 shows an average warehouse dimension of 60 meters length by 25 meters width with an average of 6 meters in height[10]. However, one can find lengths of warehouses to range between 12 meters to 200 meters length, whereas the width ranges between 7 meters and 75 meters (Table 4.4). The coefficient of variation of length and width is seemingly high as it reaches almost 50%. Table 4.4 shows that, almost 50% of warehouses in Sudan ranges between 50-100 meters in length, 20-40 meters in width with an average height of 5 meters.

Table 4.4: Storage dimensions, computed capacity, and utilization (%)

		Dimension Length	Dimension Width	Dimension Height	Computed height	Computed Capacity	Utilized area
N	Valid	752	753	753	753	752	325
	Missing	21	20	20	20	21	448
Mean		59.12	24.87	6.06	5.10	4,797.66	56.21
Std. Deviation		29.124	13.753	1.380	1.16	5,000.5	34.049
Range		189	68	11	5.00	29,760	99
Minimum		12	7	1	3.00	300	1
Maximum		201	75	12	8.00	30,000	100
Percentiles	25	40.00	15.00	5.00	4.00	1,376.00	25.00
	50	50.00	20.00	6.00	5.00	2,500.00	50.00
	75	100.00	40.00	6.00	5.00	7,500.00	100.00

Source: FAO-SIFSIA AND FSTS, Warehouse Study Field Survey, February 2011.

Information in Table 4.4 shows that most respondents were inconsistent in determining the efficient usage of their warehouses in terms of space/area utilized compared to the total size of the warehouse. This is mainly due to lack of proper information system and lack of training on how to keep warehousing data. The results given by Table 4.3 show a relatively low utilization percentage (56%).

4.1.3 Types, Status and Physical Conditions of the Warehouse

The well structured warehouses of more than 500 MT suitable for food crop storage are the prominent types of grain storage structures covered by the survey of 2011. This includes concrete, brick and corrugated zinc metal warehouses with adequate roofing and ventilation system. Answers to questions on availability of fire extinguishers, ventilation, heat insulators and windows protection are also quoted and results as full compliant, partial and non-compliant with are summarized in Table 4.5. Focus was made on the most important parameters as steel structure, elevation above ground, whether concrete floor is used or not and the type of walls and heat insulators.

Generally, most of the surveyed stores (84%) are in full compliance with the required steel/concrete structures with reasonable elevation above ground (81%) and almost three-quarters of them are with concrete floors that permit no contamination with earth or rodents penetration. However, almost less than half (48%) of the warehouses are provided with heat insulators while 43% are having fire

[10] This can be reduced to 5 meters as effective height. This can accommodate 20 sacks one over the other.

extinguishers, with good windows protection and ventilation systems (Table 4.5). The level of partial compliance with the above basic requirements as establishment material, concrete floor (10 centimetres thick) is minor and falls within the range of 7-11%. However, non compliance with fire extinguishers, windows protection and ventilation systems reach 17-22% compared to a level of 21-31% partial fulfilment.

Table 4.5: The general Physical conditions of warehouses in 15 Northern states

Requirement	Total N	Full Compliant	Partial	No Compliant	Not Stated
Steel Structure	773	649	57	16	51
Above ground	773	625	82	13	53
Concrete floor	773	579	76	58	60
Walls	772	482	88	94	108
Heat insulator	772	373	261	41	97
Fire extinguisher and ventilation	770	330	239	134	67
Windows protection	771	328	162	172	109
		Compliance in % terms			
Requirement		Full Compliant	Partial	No Compliant	Not Stated
Steel Structure		84%	7%	2%	7%
Above ground		81%	11%	2%	7%
Concrete floor		75%	10%	8%	8%
Walls		62%	11%	12%	14%
Heat insulator		48%	34%	5%	13%
Fire extinguisher and ventilation		43%	31%	17%	9%
Windows protection		43%	21%	22%	14%

Source: FAO-SIFSIA AND FSTS, Warehouse Study Field Survey, February 2011.

A further break down of results by state is rather intricate to depict in one table, therefore results are shown in figures (Fig.4.2, a-g). The figures show that, most of the warehouses in major producing or storage areas fulfil the basic requirements to store food grains at varying levels of fulfilment. However, few warehouses in Gezira, Sinnar and Gedaref state are of partial fulfilment to steel structure and ground level but remain potentially suitable for storage (Fig. 4.2-a).

Figure 4-2a: The level of compliance of warehouses to steel structures by state

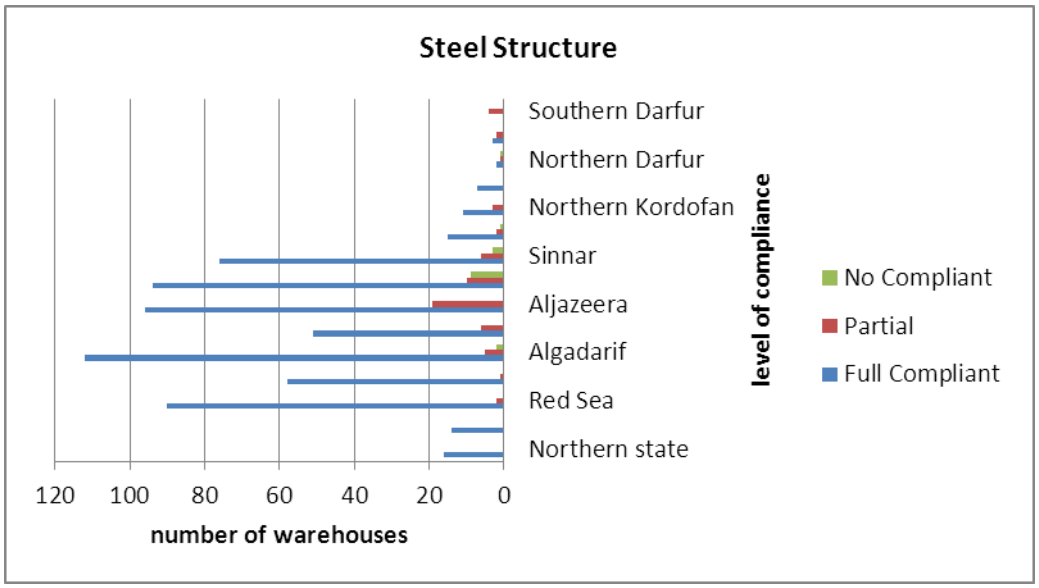


Fig.4.2-b: The level of compliance of warehouses to be above ground by state

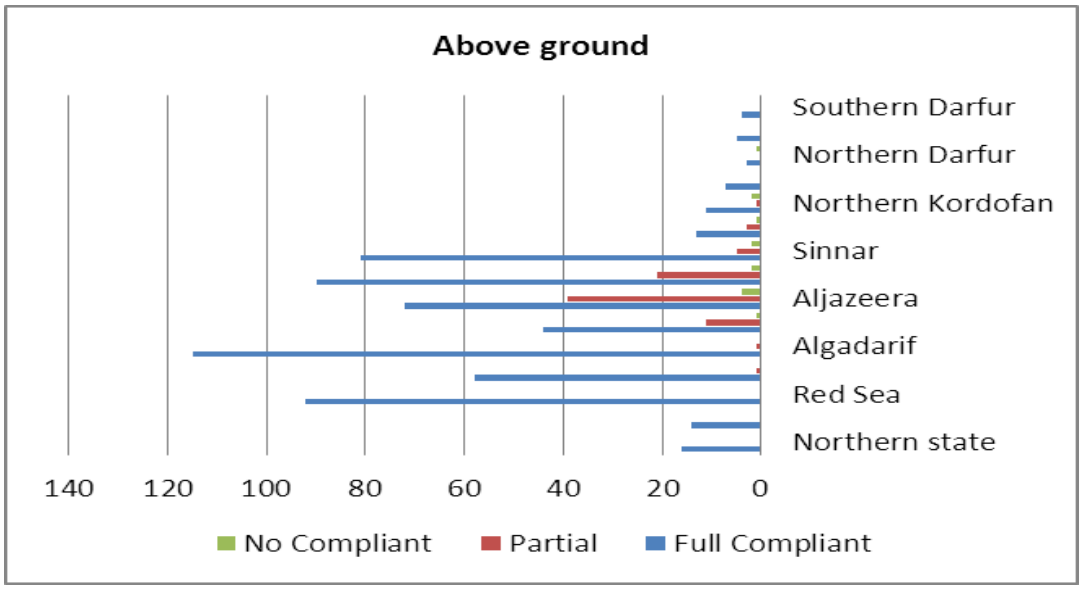


Fig.4.2-c: The level of compliance of warehouses to concrete floor by state

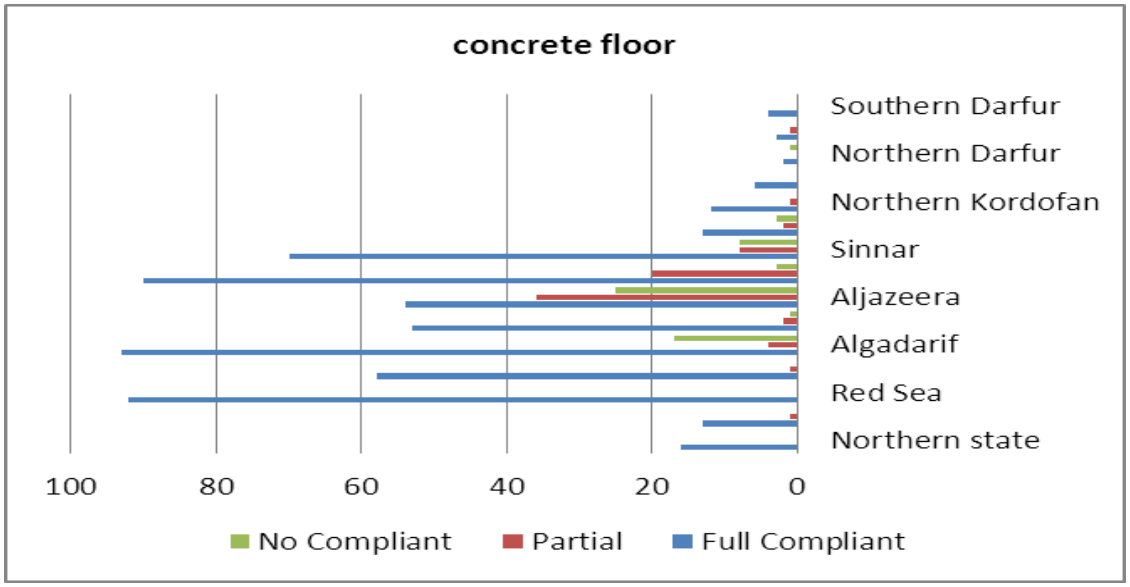


Figure 4.2-c shows high compliance with concrete floor by warehouses in major storage areas, with few warehouses of partial fulfilment to concrete ground floors. Some typical examples on non-compliance to concrete floor ground are given by Gezira and Sinnar states (partial fulfilment).

Fig.4.2-d: The level of compliance of warehouses to walls surrounding warehouses

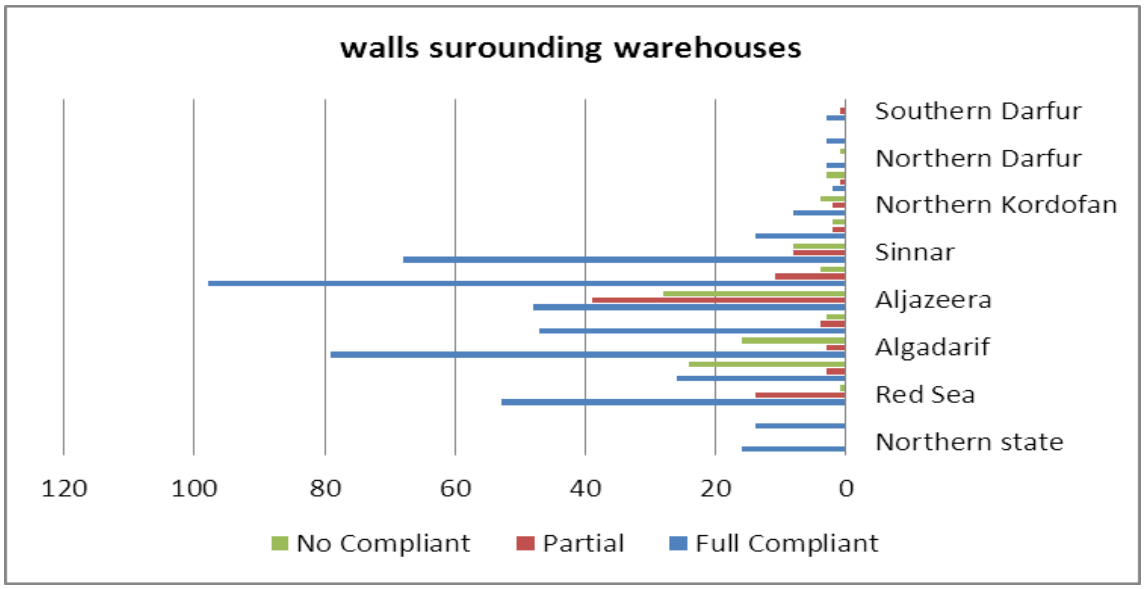
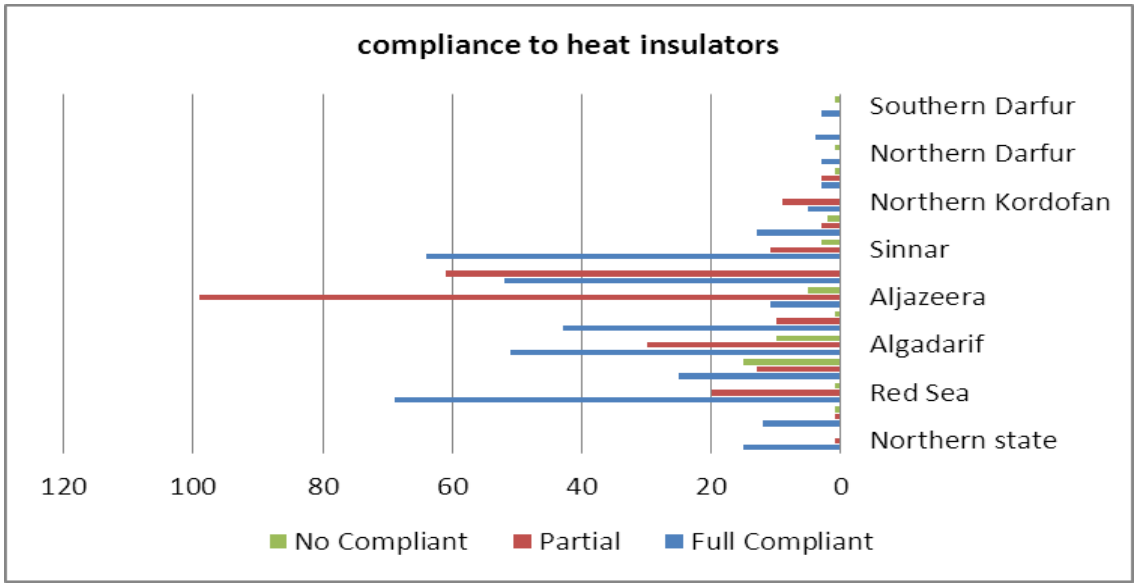


Fig.4-e: The level of compliance of warehouses to heat insulators



Most of the warehouses show partial fulfilment in compliance to heat insulation as some of them are made up of corrugated zinc or roofed with metallic zinc (Fig. 4.2-e and f). Despite limited incidents of fire, some warehouses lack extinguishers for fire fight (Fig. 4.2 e and f). Compliance to windows protection against winds, natural and manmade hazards as theft is observed (Fig. 4.2-g).

Fig.4.2-f: The level of compliance of warehouses to fire extinguishers

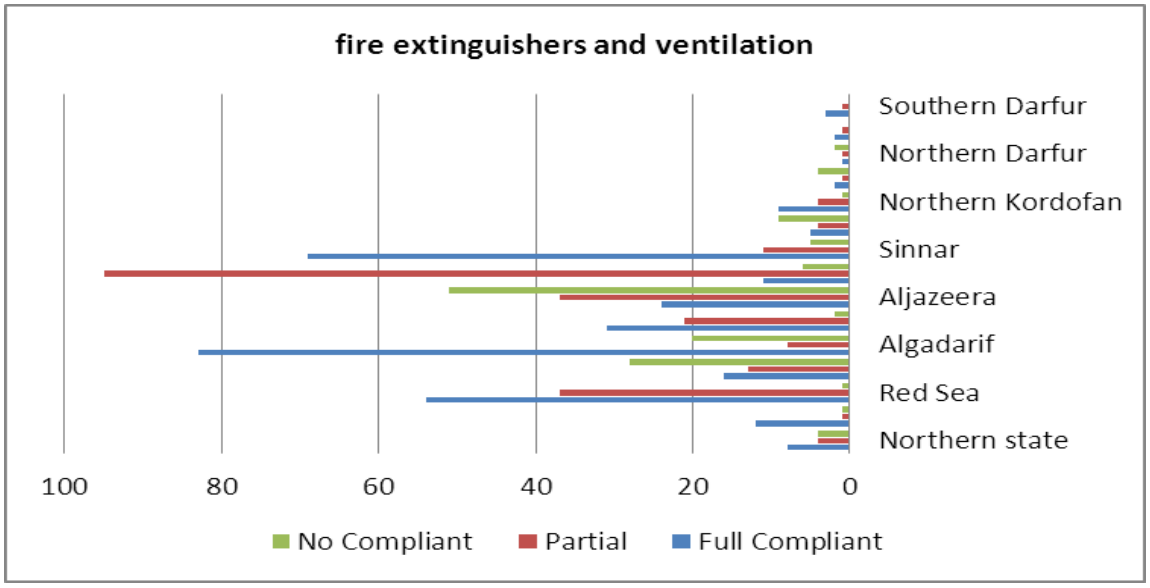
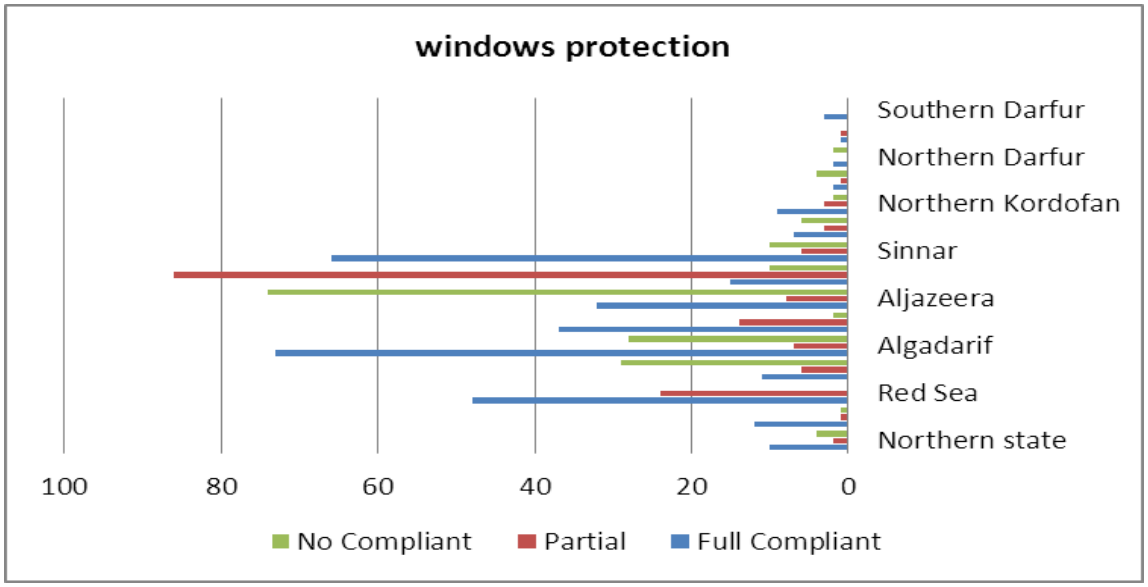


Fig.4.2-g: The level of compliance of warehouses to windows protection



4.1.4 Types of items Stored by Warehouses

The types of storage items stored in the warehouses during the cropping season 2010/2011 are illustrated in Table 4.6. The results show that grains as most popular items stored by these warehouses, averaging to almost 30% of total warehouses and almost 37% of those who do have items in their stores. However, about 22% store items other than grains while only 6% use different mixes. About 5% of store owners reported storage of fertilizers. At the time the survey was made (in February 2011), about 23% of the surveyed warehouses were found empty. This means that, either the stored items were sold before the survey started or there was no storage at all along the period until the survey is made.

Table 4.6: Types of items Stored by Warehouses during the season 2010-2011

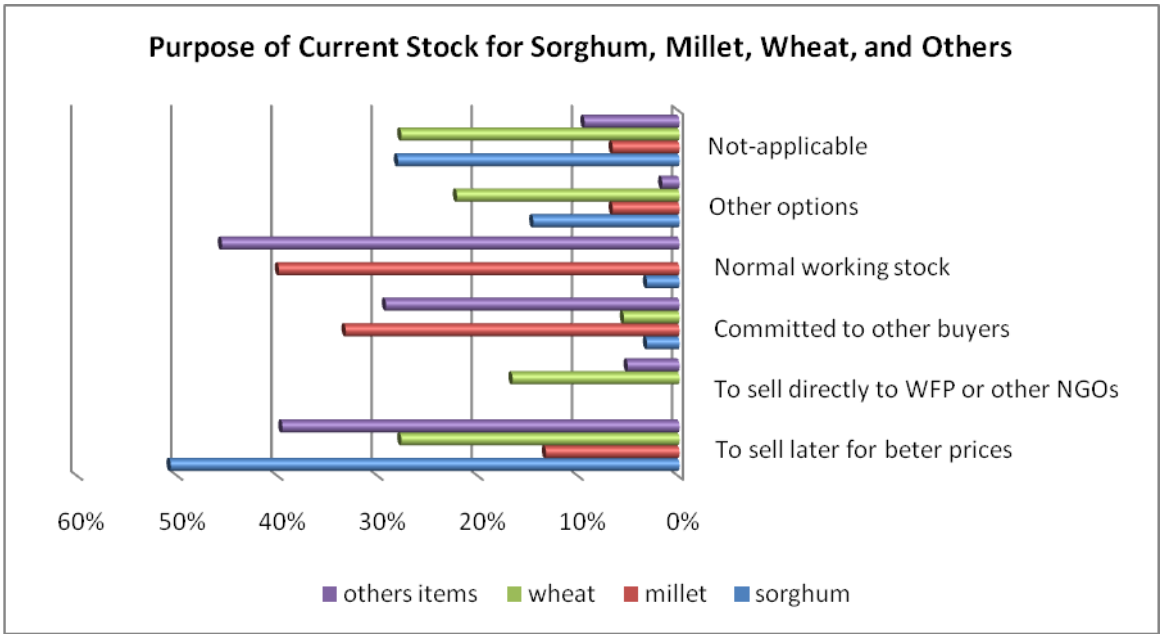
	Yes	No	% of item stored as of total warehouses	% of usage as of total Yes
Grains	234	1	30%	37%
Fertilizers	41	13	5%	6%
Different	44	1	6%	7%
Empty	150	2	19%	23%
Others	172	2	22%	27%
Totals	**641**	**19**		**100%**

Source: FAO-SIFSIA AND FSTS, Warehouse Study Field Survey, February 2011.

4.1.5 The Purpose and Duration of Storage Period by Commodity Type

The purpose of storage of current stocks is assessed with respect to each particular item stored and a list of options are given in the questionnaire and results are shown by Fig. 4.3-a. The analysis went further to assess the quantity of stock stored by warehouses as of today; the storage period of current stocks; and the storage period the crops are usually used to be stored in normal circumstances and the intended period to keep the current stock in storage, if willing to do so. Fig. 4.3 shows that most of storage for sorghum (50%) is to sell for better prices in upcoming months, while same purpose for wheat drops to less than 30%. Stored items other than the food grains (almost 40%) wait till prices become better. For millet, the purpose of storage ranges between commitment to other buyers (35%) and normal working stocks (45%) as shown by Fig. 4.3.

Figure 4-3 : Purpose of Current Stock for Sorghum, Millet, Wheat, and Others



Note: the number of non-applicable cases is considered as part of the analysis to avoid confusion with other causes.

As shown on Table 4.7, sorghum occupies the largest share compared to other crops (532 thousand tons), whereas wheat shows small quantity mounting to 47 thousand tons. Other items stored come next to sorghum and comprise almost 355 thousand tons.

Millet takes the longest storage period for current stocks (11.1 months) while sorghum is found to have the minimum storage period (2.2 months). This indicates the quick turn over of

sorghum in relation to high demand whereas millet show tendency to storage waiting for prices to rise.

Table 4.7: Statistics showing the duration of storage period by commodity Type

Statistics*	Sorghum	Millet	Wheat	Others
Quantity in stock as of survey date (MT)	531,901	125,696	46,612	354,727
Average storage months of current stock	2.2	11.1	4.2	4.2
Std deviation(months)	1.6	9.6	3	4.8
Range (months)	0--->12	2--->24	1--->9	0--->40
Average months intend to keep the current stock	5	8.3	4.4	6
Std deviation (months)	3.1	4.9	2.9	5.7
Range (months)	0--->24	1--->12	1--->12	0--->36
Means of usual storage s under normal circumstances(month)	7.4	7.5	6.9	7.3
Std deviation (months)	3.3	6	4	5.4
The range (months)	0--->24	0--->18	2--->12	0--->36

Source: FAO-SIFSIA AND FSTS, Warehouse Study Field Survey, February 2011.

*Fore detailed information see Annex 4.1 (a-c)

The tendency to store millet has the widest range (2 - 24 months) compared to sorghum (0-12 month storage period) and wheat (1-9 month's storage period). Although the study did not go for prices determination for stocks, the intentions to store more time for prices to improve is shown for millet and wheat followed by sorghum (Table 4.7) as reflected by average storage period and the related measures of dispersion. In general, sorghum usually shows less storage period but may also reach 2 years storage period. Other items, which include various things showed a relatively longer storage period that may reach 3 years.

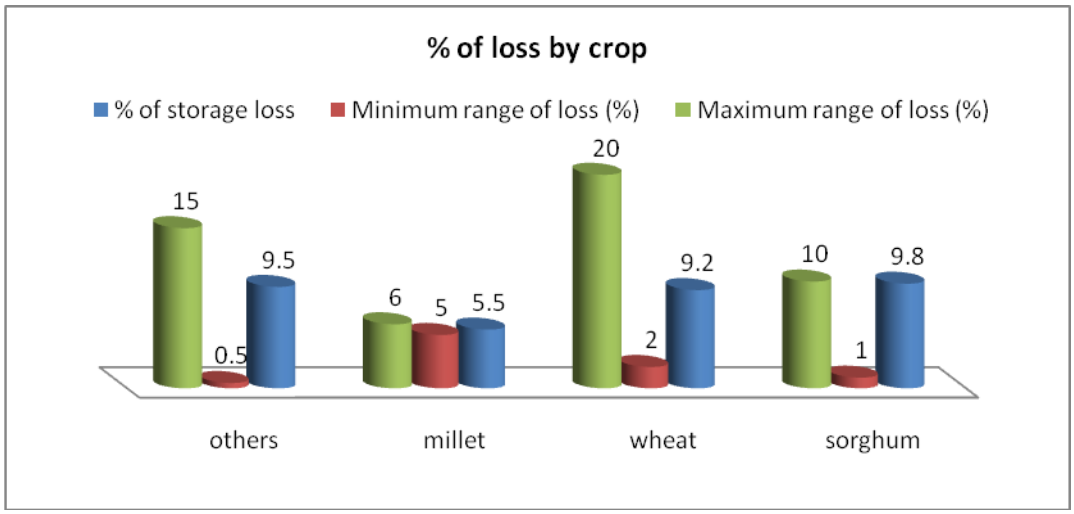
4.1.6 Estimate of storage losses

The types of grain damage or losses in crops stored in warehouses include change in taste, colour and odours, pest infestation and physical loss. The damage often results from pest/insect infestation, structural failure, variation in climatic conditions, micro – organisms among others. However, most of these types of loss could not be assessed just by a questionnaire as some require laboratory investigation. Despite this fact, a rough estimation of apparent physical loss is investigated and results were depicted in Fig. 4.4.

Study in Sudan showed the losses in grain and economic values are in the range of 4– 10% during a storage period of 4 months to less than a year (Ismail 1996). However, physical losses may show extreme variations among states/regions and this is attributable to the country's different environmental, ecological and biological conditions; which have a direct and indirect impact on the losses incurred. High rain showers give rise to high moisture that favour insect infestation in some parts of the Central and Eastern regions; excessive temperature, poor handling, storage type and structure can also aggravate loss (Ibid 1996).

The current statistics confirmed (Fig. 4.4) a consistent result of physical loss for sorghum and millet with minor differences compared with previous studies. However, wheat showed a high percentage loss compared to all other items but exact reasons were not identified. (Fig. 4.4).

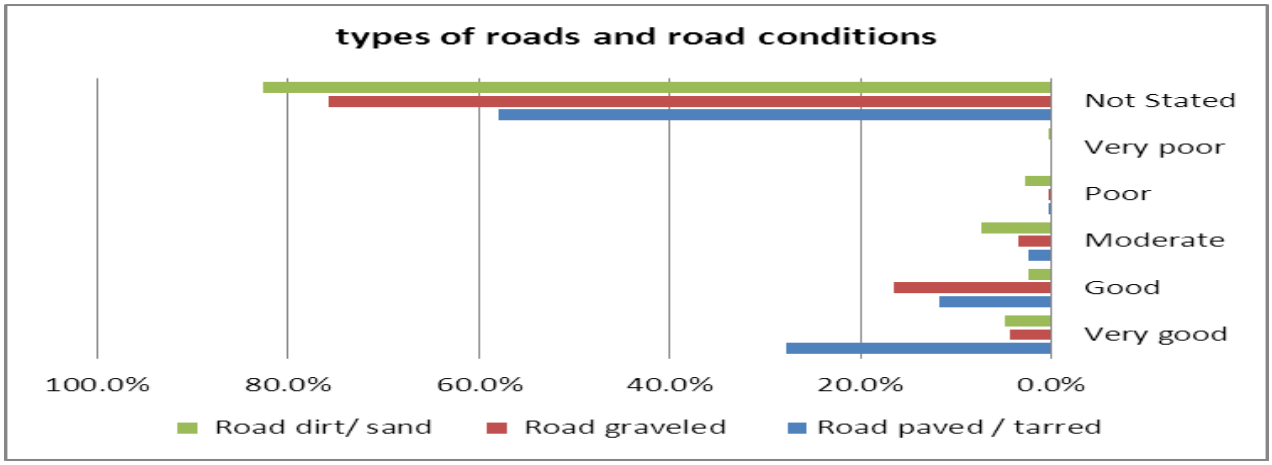
Figure 4-4: Average estimates of storage loss by crop (%)



4.1.7 Road Condition and Accessibility of Warehouses to Markets

The road condition is an important factor for accessing the warehouse whether in normal or rainy season. Fig. 4.5-a shows that almost 40% of tarred/paved roads to warehouses are in a condition that ranges between good to very good while only 3% claim poor or in moderate road conditions (see also Annex 4.2-a-c). This indicates that almost high percentages of warehouses are connected with accessible roads during the rainy season (i.e. all weather roads). The accessibility percentage may even increase to 60% when adding passable gravelled roads during the rainy season.

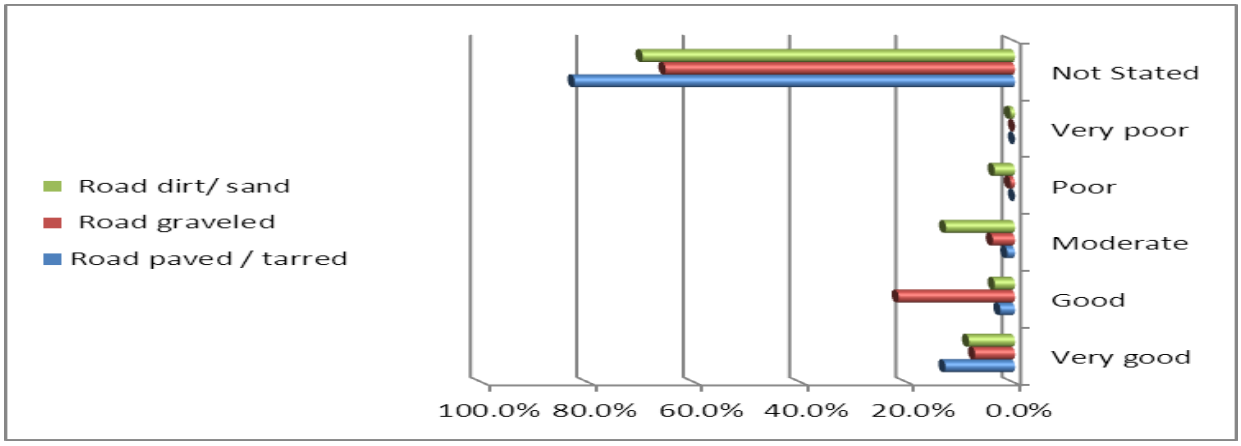
Figure 4-5-a: Road conditions and access to warehouses



Although large number of respondents did not state the condition of roads or entrance to warehouse –for one reason or another - the results obtained give a good indication for describing the road conditions to warehouses. Dirt or sand roads cannot be judged as passable during rainy season, however, only 3% warehouses shows they are poor to very poor during these rainy times. This may be due to the fact that, trucks pass only when roads are dry even during the rainy season, or they move short distances at relatively low speed, much fuel and higher costs.

However, it is not only the road condition which is important to warehouses but also the condition of the entrance way to the warehouse itself in terms of truck manoeuvrability to help the truck to download the stocks in the warehouse. Results in Fig. 4.5-b give more clear view of access of trucks to warehouse entrance. It is clear from the results that, almost 47% of warehouses have fairly good to very good entrance to warehouses whether road is paved or gravelled while 65 and 1% showed that trucks have moderate and poor manoeuvrability, respectively (Fig. 4.5-b) (Annex 4.3-a-c).

Fig. 4.5-b: Road condition at the entrance of the warehouses



Again the high number of unstated answers may thought to through some doubts of accuracy of these results, actually they do not, and can be considered as 'avoid answer' cases. However, the obtained results can be used as indicators with caution.

4.1.8 Modes of Transport and Accessibility to Markets

Information on distance from warehouses to the nearest main market is important parameter in warehousing. This is because distance may affect access to markets and hence the value of purchases. The overall statistics of warehouses distance to markets is shown in Table 4.8 and indicates an average warehouse distance of 8.7 km away from markets. However, the extraordinary average distance to markets is mainly due to the fact that some warehouses are as far as 225 km from main markets which gives a false indicator to average distance while others are closer to the markets. Some warehouses are closer to the main markets (few meters apart from the market) as in

most sorghum producing states (Gedaref, Sinnar, White Nile, Gezira and Blue Nile) compared to distance of remote warehouses as Halfa in Northern state or Rashad in South Kordofan. The percentile results (Table 4.8) show more accurate comparisons where 25% of the warehouses fall within two km distance from main market, 50% fall within 3 km distance while 75% of them are within 5 km reach.

Table 4.8: Warehouses distance to main markets (km)

Statistics		Distance to market (km)
N	Valid	764
	Missing	9
Mean		8.67
Std. Deviation		22.087
Range		225
Minimum		Few hundred meters
Maximum		225
Percentiles	25	2.00
	50	3.00
	75	5.00

Source: FAO-SIFSIA AND FSTS, Warehouse Study Field Survey, February 2011.

As shown in previous sections, most of the warehouses are located in such a way to be road accessible, few rail accessible and almost 3 warehouses are river accessible (Fig. 4.5-c). However, warehouses which are rail or river accessible can be reached by road (Fig. 4.5-c).

Fig. 4.5-c: accessibility of warehouses to markets by three different transport modes

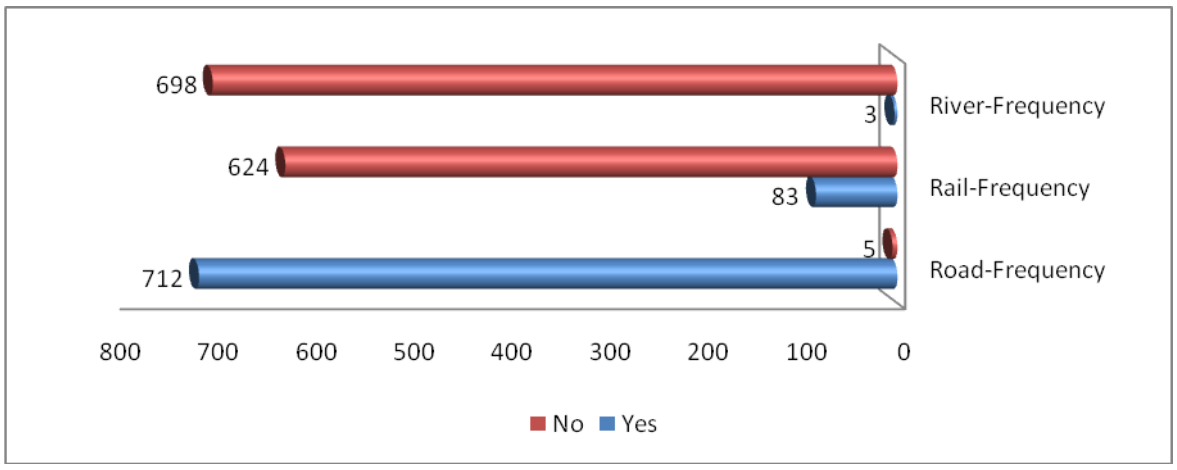
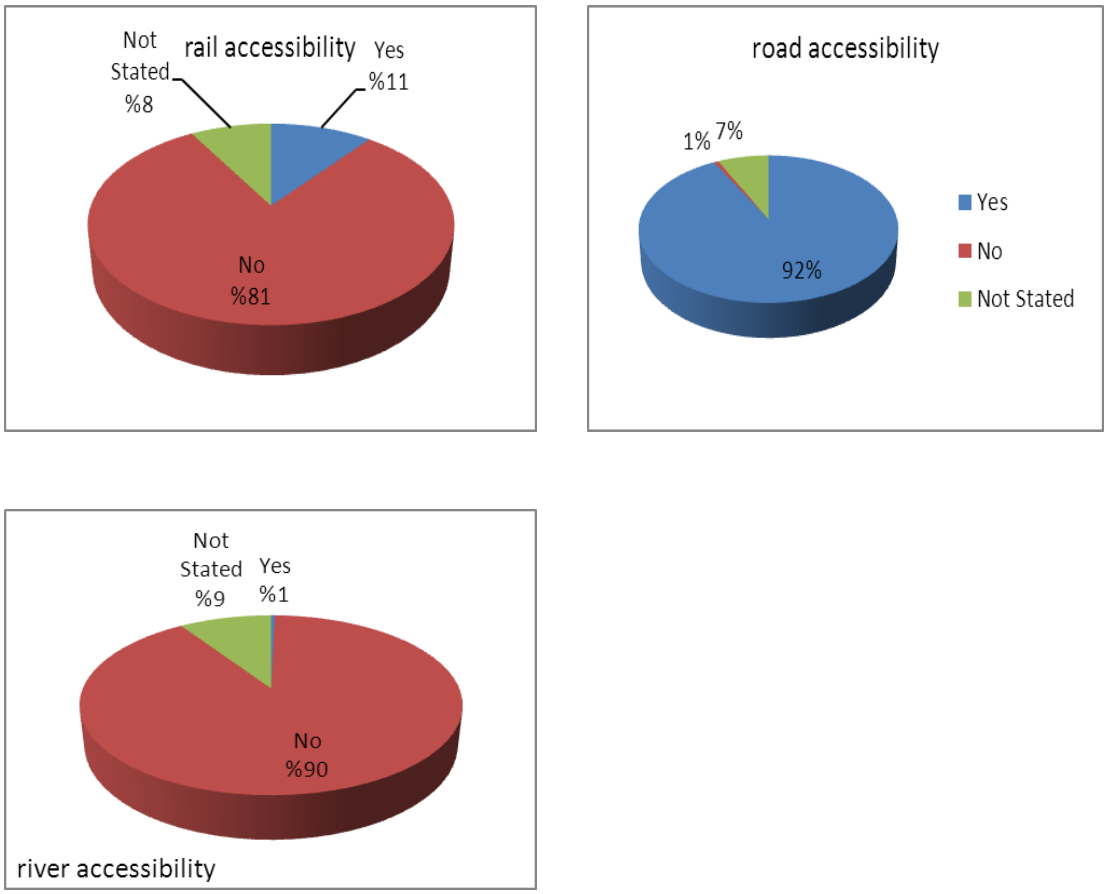


Fig. 4.5-d: responses of warehouses to different transport modes



4.1.9 Security and Hazards by Warehouses

Information on security status and hazards by warehouses are outlined below (Fig.4.6-a, b). Almost 89% of respondents claim a good security status by warehouses compared to 11% who think it is only marginal. Most of these claims are found in Gezira, White Nile Sinnar and western Darfur states respectively.

Figure 4-6-a: security status by warehouses

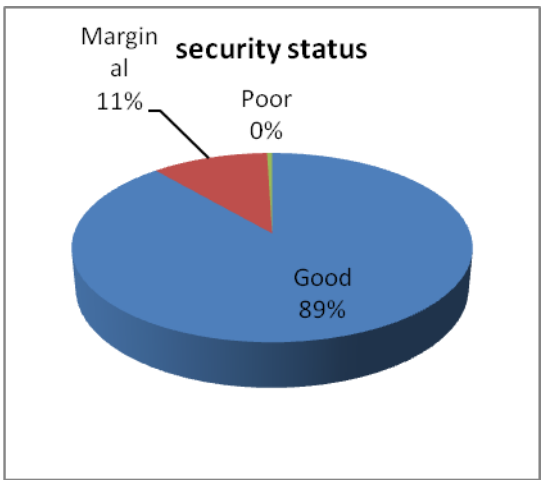
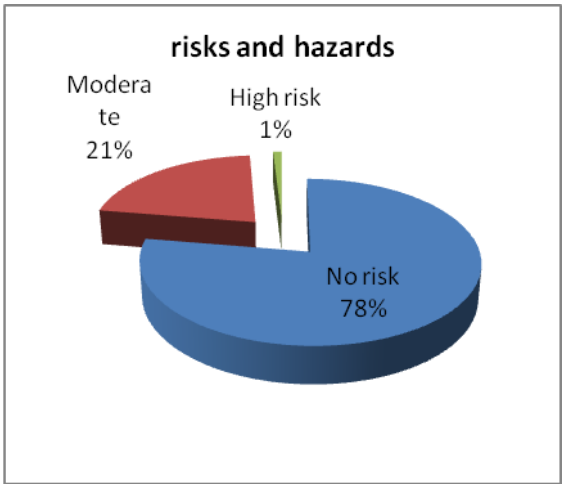


Fig. 4.6-b risks and hazards by warehouses



Risks and hazards by warehouses gain the same importance as security status or indicator. Whereas 78% of respondents claim no risks for their storage, 21% showed a moderate risk in warehousing. Overall, high risk that endangers the storage/warehouses seems to be minor (1%). This information would be quite useful for warehouse managers to deal with insurance companies within this range of probability of risk occurrence. However, the detailed type of risks might require special type of study to evaluate and compute their values and costs scientifically.

4.1.10 Main Storage Problems and Mitigations

The main warehouse and storage problems are identified by state and prioritized in order of importance and laid in a matrix shown by Table 4.9. Of all cases, the poor road conditions were found to be the major problem across the entire country (16%) followed by local taxes imposed by local authorities on stored items (13%) -accompanied by market tax (8%) - and the poor quality of warehouses (11%) in terms services/ facilities availability. Infestation by insects comes in fourth place accounting for 10% of warehouses while 6% of warehouses complained from rats and rodents (Table 4.9). Lack of access to bank credit and lack of adequate truck rental services are not serious problems, which account for 2% surveyed warehouses. (Annex 4.4).

Table 4.9 shows that Gedaref, Gezira, Red Sea, and Sinnar reported most problems in terms of frequency of occurrence. The less frequencies obtained by other states are either due to fewer problems or due small number of warehouses covered by the study, say in Darfur region.

Table 4.9: Main storage problems by State

Main problem	% to total	States by code and name from 11 to 63															
		All	Northern	R. Nile	R. Sea	Kassala	Gedaref	Khartoum	Gezira	W. Nile	Sinnar	B. Nile	N. Kordofan	S. Kordofan	N. Darfur	W. Darfur	S Darfur
Frequency of problems		11,561	240	210	1,799	926	1,829	885	1,814	1,717	1,316	285	210	120	60	90	60
Lack of storage rental services	5%	63	5	2	1	1	2	19	2	14	3	-	2	5	3	2	2
Poor quality of stores	11%	123	3	2	-	-	-	4	71	20	5	2	5	5	3	1	2
Lack of access to credit	2%	23	-	1	-	-	1	10	-	6	-	-	3	-	-	-	2
Lack of adequate truck rental services	2%	26	1	-	-	-	-	-	1	15	2	1	4	1	-	1	-
Poor road conditions	16%	182	1	-	-	-	75	-	67	19	11	-	4	2	-	2	1
High transport tariff	5%	58	2	-	2	-	-	6	-	38	5	-	3	-	1	-	1
Poor quality of grain	4%	46	-	-	-	-	-	-	-	46	-	-	-	-	-	-	-
Food aid distribution	3%	34	-	-	-	-	-	-	-	33	-	-	-	1	-	-	-
Lack of buyers	8%	94	8	7	2	-	-	-	-	71	1	-	2	3	-	-	-
High tax	6%	71	1	-	1	-	7	6	3	51	2	-	-	-	-	-	-
Local tax	13%	147	3	-	3	1	37	1	5	86	5	-	4	2	-	-	-
High market tax	8%	95	4	1	1	-	7	-	2	71	3	-	4	2	-	-	-
Rats	6%	71	8	5	2	2	7	3	-	19	11	5	8	-	-	1	-
Insects	10%	114	11	7	5	2	26	9	-	29	10	7	5	3	-	-	-
Theft	1%	17	1	-	3	-	1	-	9	-	-	1	2	-	-	-	-

5 SUMMARY, CONCLUSIONS AND THE WAY FORWARD

5.1 The Summary of Findings

The report provides food policy-makers with information that facilitate design of strategies for the development of warehousing systems in the country. Although comprehensive, the study did not exhaustively cover existing legal, institutional, administrative and technical infrastructure on warehousing and hopes to be intensively covered by subsequent studies. The bulk of the effort is to assess the capacity and whereabouts of food grain warehouse and archive and avail database.

The findings of the study are summarized as follows:

- The grain storage structures in the 15 states are variable ranging from brick-made traditional stores to modern warehouses of more than 500 metric tons. There are other structures of less than 500 MT but seem poorly made and this includes underground pits, go-downs, *shunas* and earthen pot and small warehouse storage.
- The major items stored are grains occupying almost 30% of total warehouses. About 22% stores are items other than grains while only 6% use different mixes. About 5% of store owners keep fertilizers in these warehouses, particularly in areas where irrigated agriculture is common. The grains stored in warehouses include sorghum, millet, wheat, sesame, groundnuts, chicken peas, etc.
- The results show that 37% of the warehouses belong to the individuals or private sector traders, 23% to private companies and 29% to public (parastatal) institutions. This indicates that more than 60% of warehouses in the Sudan are owned by the private sector (with storage capacities of more than 500 MT). International and local NGOs share only 3.1% and 0.7%, respectively, of the reasons that these institutions are not allowed to have their own land and permanent warehouse facilities**.**
- The results revealed that only 2% of farming communities store in their own warehouses. Cooperative sector is weak in terms of having its own warehouses for purpose of storage, which is an indication of low financial capacities of such organizations since warehousing requires large capital for its establishment.
- Most of the surveyed stores (84%) are in full compliance with the required steel/concrete structures with reasonable elevation above ground (81%) and almost three-quarters of them are with concrete floors that permit no contamination and rodents' penetration. However, only 48% of the warehouses are provided with heat insulators while 43% are having fire extinguishers, with good windows protection and ventilation systems.
- Total estimated capacity of warehouses with more than 500 MT is found to be **3.61 million metric tons** with an average of 4800 MT per state. The facilities are found as large as 30,000 MT and as small as 300 MT.
- Major cereals found in the storage include sorghum, millet and wheat with few pulse crops. Sorghum shows less storage time though the maximum storage period can reach as much as 2 years. Other items, which include various commodities showed a relatively longer storage period that may also reach a maximum of 3 years.
- Almost 40% of tarred/paved roads to warehouses are in a condition that ranges between good to very good while only 3% are poor or in moderate road conditions. The accessibility

percentage may even increase to 60% by adding the gravelled roads to be passable during the rainy season.

- With regard to storage problems, poor road conditions were found to be frequently stated problem across the entire country (16%) followed by local taxes imposed by local authorities on stored items (13%) -accompanied by market tax 8%- and the poor quality of warehouses (11%) in terms services/ facilities available. Infestation by insects comes in fourth place, accounting for 10% of warehouses while 6% of warehouses complained invasions from rats and rodents.
- The results showed inadequacy in record keeping, limited specialization, inaccuracy in weighing, stacking, store hygiene, use of pallets (dunnage), pest control, and fire safety arrangements to the international standards but still acceptable.
- The warehousing industry as a whole is constrained by high Musharaka/ Murabaha/ Mudaraba rates equally with other services and introducing tax holidays might attract private equity players to the industry. The farmers' might show some willingness in adopting new storage techniques provided such structures are cheap and affordable.

5.2 Recommendations and the Way Forward

The practical recommendations of this study are intended for use by all who have responsibility for the warehousing policy. Some recommendations cover specific elements that contribute to good warehousing performance together with general and broad recommendations on the policy and legal framework while others are problem specific.

An appropriate Warehousing Information System (WIS) need be established which will serve as a good database and an early warning system in case of emergency and structural and development issues. Second, a Warehousing Development and Regulation Act (WDRA) is needed to oversee and monitor standardization of the warehousing activities in the country. Such a law –in the existence of proper food reserve and buffer stock policy- will help not only in keeping food grain reserves but would also facilitate efficient price discovery for stored commodities, which is fundamental feature in market competitiveness. To achieve both recommendations, the study suggests a consistent link between warehousing/storage and transport information systems.

The transport information system is important for availing data and information on roads condition, pass ability; number of trucks, types and companies providing transport services transport authorities in addition to information on bridges, allowable truck heights, peak-lanes; and road customs and duties if necessary11. It will also be good if information on probable road blockages; probable events (festivals, football matches, etc.); risks and probability of incidents is obtained from traffic authorities. It is not far from being realized if information on traffic management (through SMS messages or radio for re-routing, closings, etc.) is kept on a unique database accessible to everybody interested in such type of information. Overall, transport

[11] No particular mode of transport are attached to transport foodgrains. Various modes of transport have been reported to contribute in grain transport of which road, rail, and river and marine transport are common. The use of any; depends on the availability of the means and the suitability of the envirnomental conditions which permit a particular mode to prevail in any location.

infrastructure, whether used for assembly or distribution of food, is an essential endeavour to development that will enhance and foster economic growth.

To thoroughly understand the storage sector capacity intake, it is important that, the results of this study should be read in line with information on on-farm storage and storage vessels of less than 500 MT, which include many conventional and traditional methods of storage. Although most of the on-farm storage has been stored to be used for the household consumption, yet a large proportion of it is directed towards the market when farmers are in bad need of cash.

Additional recommendations which relate to the standards of a warehouse have already been mentioned in the annex. Recommendations in relation to technical improvement of warehouses with respect to the construction materials, elevation and the loading/unloading facilities and the like should be considered.

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ANNEXES

Annex 1: The warehouses study schedule

Phase I	Project Plan and work packages	October 20-27
Phase II	Desk review and primary Data Collection and Analysis	28-October-15 November
Phase III	Survey and Data Collection	4 February-23 February 2011
Phase IV	Data entry, cleaning, processing & primary Analysis	March-May 2011
Phase V	Report writing	15 May 2011 to 06 June 2011
	Workshop	Date to be determined

Annex 2.1: The Standards of Food Warehousing

The standards and specifications of warehousing, which have been compiled in this study follow the international standards of how should warehousing standards be and thus remains indicative and adaptive to the environment and the context of Sudan. In this connection, however, these standards remain only advisory12 to those who intend to undertake thorough warehousing assessment particularly for food items. In this regard, eleven main criteria are to be taken into consideration13 so as to improve the quality and efficiency of food warehousing facilities in Sudan.

There is no doubt that a proper structure of a warehouse is the one primarily designed (or be suitable) for use as a warehouse. In this case, it should be wind and water- tight and maintained to a reasonable standard of construction and decorative order. Windows and roof lights should be in good condition and intact. Roofs should be watertight and gulley kept clear of debris and leaves. Floors are to be with adequate traffic and pedestrian routes and in clean condition free of obstructions to allow easy loading and unloading with movable paths (and walkways) for racking and forklift trucks. Moreover, it should be known that any warehouses should have adequate light fittings located as high as possible (2 meters from commodity) and out of the way of any likely damage from stacking and vehicles and to prevent damage to stock by fire and flammable materials. The traction battery charging points should be clearly marked and in a safe, well-ventilated place. Fuel or chemical materials are not allowed to be stored with food for safety and health reasons as insurers will not insure buildings with such hazards. (UKWA standards (2006))

The standards requires that large warehouses are to be (and usually are) equipped with doors passable by the traffic involved such as forklift trucks carrying pallets/sacks as well as adequate, properly positioned personnel doors. All external doors (whether for loading or personnel) should be as close fitting as possible. Locking arrangements should be to a standard approved by the insurers and Fire Brigade. To avoid overheating, the building should be adequately ventilated and the structure should preferably have some form of insulation. Staff facilities - lavatory, washing and mess room accommodation should be provided in or preferably adjacent to the warehouse building.

The site and perimeter of any warehouse should have a loading area that allow an adequate turning circle for vehicles, ideally, sufficient turning space to accommodate a truck and 13.6 meter trailer is acceptable for good manoeuvring, if the warehouse has vehicle parking place that would be excellent. Perimeters are required for security purposes (fence of a minimum height of 2.4 meters) against unauthorized entry of animals and the like. The standards tell that warehouses are to have office and administration facilities for management. Standard office should be well furnished and equipped with a visitors' book, an accident book and site rules should be maintained in addition to a thermometer for heat measurement. The office provides information on stock control and goods

[12] This list is compiled from various sources and is by no means has statutory obligation thus remained only indicative for best practice rather than legal requirements.

[13] a) warehouse buildings, b) site and perimeter, c) office and administration facilities, d) statutory notices, e) handling and storage equipment, f) specialised storage, g) fire protection measures and equipment, h) health and safety, i) insurance, j) pest control and k) environmental factors.

inwards and outwards documentation (whether manually or computerized otherwise) as well as necessary accounting procedures.

It is extremely important that, any warehouse should have statutory notices be displayed as required by law for the health and safety information for employees' regulations. Additional information as safety signs, fire exits, eyewash stations, fire fighting equipment positions, first aid facilities in accordance with the health & safety including emergency procedures and evacuation is also needed. Handling and storage equipment should be regularly serviced and maintained by competent engineers as required by law with up-to-date statutory inspection certificates and detailed maintenance records. Other small equipment should be tested every six months with test certificates (or a copy) retained on site. Where food or materials related to the manufacture of food are stored, forklift trucks and other vehicles used within the warehouse should be battery driven or otherwise equipped to prevent contamination by fumes or fuel (Ibid 2006).

On the other hand, more strict obligatory standards are required for specialized storage facilities[14]. Worth to note is that, there are numerous kinds of specialized storage, but remain out of the scope of this study. Fire protection measures and equipment has obligatory standards, which should comply with the legal requirements. Most of the stores should carry a fire risk assessment. Fire escapes and fire doors with hydrant points should be clearly marked and kept clear and free from obstruction both inside and outside the building. The quantity, nature and positioning of fire fighting equipment (e.g. fire extinguishers, hose reels, sprinklers, etc.) should be established in consultation with the local Fire Authority and the building insurers, and conform with any relevant local and national statutory requirements.

All equipment should be regularly and professionally maintained and maintenance records kept; fire protection systems should be checked and tested weekly. If sprinklers are installed, regular testing and maintenance procedures should be in place and a stock of replacement bulbs should be available on site. Guards and staff must be trained periodically in the use of fire fighting equipment. Strict NO SMOKING rules should be enforced in all warehouse buildings, in and around other storage installations. Clear signs should be exhibited to this effect. A gap of not less than one meter should be left between commodity stored and the walls to allow easy access and to assist fire fighting.

Health and safety standards are obligatory in warehouses and the provisions of the Health and Safety procedures and other relevant recommendations must be complied with, including the publication, implementation and display of a Company Safety Policy Document. The warehouse or store owners should be aware that failure to do so could carry heavy penalties for the individuals as well as the warehouse owners.

All warehouses require compulsory insurance as obligatory standards as this is desirable commercially as well as being a prudent business practice. Apart from the insurance of assets, these should include public liability and legal liability (having regard to the conditions of trading in use). In food warehouses, pest control and environmental hazards should be adequately considered and

[14] Hazardous goods stores (e.g. chemicals, fertilizers, fuels, explosives or radioactive materials, bonded stores, high security stores, stores with controlled environments, tank storage (liquids and powders), bulk storage in warehouses or silos (e.g. grain or animal feeds), food and food materials, and intervention storage.

measures must be taken to prevent and control pests etc. especially where food and other vulnerable commodities are stored. The warehouse should also make correct waste disposal arrangements (that is to be environmentally friendly) and obtain transfer documents from waste disposal contractor (nafayat) to verify waste has been disposed of correctly.

Quality Setting for Making Warehousing More Efficient

The problems of grain storage differ largely from one place to another within the state and across the regions/states throughout the country and they depend mostly on the climatic conditions of the area where the harvest is stored. The quality of grains stored also vary by types of warehouse facility and duration of storage and this is why we made our focus on well-structured warehouses for grain storage in order to maintain quality of the produce for a longer period of time to meet the next season demand. As the basic requirement of any grain storage structure or system is to protect the food grains from insects, rodents and prevent deterioration of the grains by the activities of micro-organisms quality standards must be met (Adejumo and Raji. 2007). Again, as deterioration of stored grains results from the interactions between the physical, chemical and biological factors, it is essential to keep the grains cool and dry during the storage period and simultaneously develop action plans that make an effective control and management of these factors for safe storage.

However, it is not only the warehouse which can affect the quality and price of the stored products and other market factors also exist and make significant impact. For instance, there are constraints causing most African grain marketing systems to remain weak, notably for the poor and costly mechanisms for financing storage, such as performance and payment risks associated with transactions, lack of forward contracting and lack of standardized quality and grading (FTR 2000). At the same time, there were unexploited opportunities for developing warehousing as a partial solution to these problems, particularly in view of the existence of large numbers of former parastatal stores which remained underutilized (FTR 2000).

Requirements, Responsibilities and Institutional Arrangements

As the study is a joint effort of Strategic Reserve Corporation, Agricultural Bank of Sudan and Ministry of Agriculture and SIFSIA N lead by FSTS, institutional arrangements were deemed necessary to ensure success of the study assignment. The role and responsibility of each partner was specified, assigned, and issued by the Technical Group members (TG). Needless to mention is that, the Technical Group (TG) was established to manage and technically backstop the warehouse study.

a) The institutional set up of TG

Almost 10 members from the Strategic Reserve Corporation; Agricultural Bank of Sudan; Ministry of Agriculture; the Food Security Technical Secretariat of M of the Ministry of Agriculture (MoA); FAO (SIFSIA N); and the WFP/Procurement Services meet regularly to:

- oversee the implementation of the study;
- manage the consultant tasks and activities;
- provide technical backstopping;

- ensure that the study maintains operational relevance;
- ensure that the findings are disseminated effectively, and
- report back progress to the SRCo, ABS and MoA.

Although planned, it worth to mention that, the contribution of the similarly state level consultation groups were not adequately formed across the entire states and the facilitation of the assignment was, therefore, confined to the institutions represented by the Technical Group at federal level. However, it will useful if the TG went ahead to gather feedback information on the technical and also policy aspects of the study which were not covered at this stage so as to assist in future coordination. This includes field work facilitation (as facilitating logistics), sharing progress updates, and dissemination of information at state level. Focal persons at state and federal level deem important to be responsible for the smooth flow of information between the different levels of information users and among the Technical Group members as well.

The SRCo/ABS/MoA/FSTS are the primary government bodies, as has been envisioned, in terms of institutional responsibility for the study and facilitation of any administrative impediments related to data collection, analysis and dissemination, with support of the other members of the Technical Group. In a nutshell, the TG -with the help of the national consultant- has undertaken most of the important responsibilities in planning and coordination. With the help of statistician, the common roles, responsibilities, and representative tasks for all five-task mission forces were also specified and organized. Additional tasks for the TG included:

- participate in review of templates and questionnaires.
- identify candidates for the mission to conduct surveys and data processing and analysis needed including:
  - Tabulation and coding of the templates.
  - Conduct of the assessments surveys, interview and meetings.
- develop and recommend schedule plan for implementation based on warehousing technical needs; and also coordinated across concerned institutions (annex 3.2).

It has been assumed that the TG will assist in developing a workshop plan (after final report is delivered) for synthesis of results and findings.

b) Team-Group-specific Roles, Responsibilities and Tasks

From above discussion it seems that on-going responsibilities will also follow for the TG to ensure that the project outcome and impact will be sustainable. For this purpose, and beside the activities assigned to other work groups, the TG will also be responsible for the following *group-specific* activities:

- confirm technical platform for corporate data warehouse,
- identify and initiate implementation of specific data warehouse project(s**),**
- identify probable networks, warehouse operating system, development tools, hardware and software standards, etc.,
- approve the plan of work prior to the next TG board meeting,
- authorize expenditures for specific surveys where appropriate,
- resolve inter-institutional plan conflicts,
- identify and encourage inter-institutional collaborative projects,
- facilitate project activities and schedules,

- establish and communicate warehouse project roles and responsibilities with states,
- formally accept warehouse project deliverables, and
- serve as liaison and assistant to plan for further warehouse policy analysis.

Annex 2.2: Evolution of Warehouses in Sudan, Strategic Reserve Corporation Achievements

Facility	Location	Capacity in MT
Silo	Rabak	100,000
Warehouse	Rabak	5,000
Warehouse	Nyala	10,000
Warehouse	ElFashir	5,000

Source: information from Ismail, 1996. Published Ph. D thesis, Germany

Annex 3.1 Major Variable and Fixed Cost Components in % Terms

Major Variable Cost Components in % Terms SDG/ton/year		Major Fixed Cost Components in % Terms SDG/ton/year	
Capital tied up	41.1	Capital invested	49.5
Loss value	30.2	Permanent labour	33.4
Labour cost	18.6	Depreciation	13.5
Insurance on crops	4.3	Maintenance	3.2
Fumigation	4.3	Insurance	0.4
Others	1.5		

Source: information from Ismail, 1996. Published Ph. D thesis, Germany

Annex 3.1-a: Outlines of the Action Plan

Sudan Institutional Capacity Programme: Food Security Information for Action (SIFSIA-N)
The Food Security Technical Secretariat of the Ministry of Agriculture
ACTION PLAN PROPOSAL
Large-Scale Warehouse Facilities and Impact on Markets' Mechanisms and Food Security

This ACTION PLAN describes the overall framework, activities, tasks and responsibilities for team(s) assigned for the warehouses assessment survey (intended by SIFSIA N, SRCo, and ABS) to collect information on public and privates' sector warehouses in the 15 Northern states. Following the pre-assessment survey results, which have been described elsewhere, this action plan gives details on methodology and procedure of doing the survey (learning from pre-assessment survey) and provides an initial budget and costs involved. An initial budget for the short training module for team leaders (ToRs) is prepared and budgeted including the team of Khartoum state. From the methodology (Fig. 1), the action plan indicates implicitly the way the survey will be undertaken together with cumbersome details of budgets as assigned by duties of the central team(s) and sub teams at the state level and their responsibilities. Highlights on the logical framework (objectives and activities and expected outcomes) on how to carry out the fieldwork and the execution of the survey (steps from data collection to synthesis and final report writing) are also incorporated.

It should be very clear that, this action plan is envisioned -at this stage- to cover 15 states including some focal areas in Darfur wherever possible. Besides the implementing vision, assigned responsibilities and estimation of costs, the action plan reflects a view of a comprehensive program of monitoring and evaluation of warehouses to understand any required revisions for future works.

Expected Outcomes as Related to the Survey Objectives

- the capacity of warehouses (more than 500 MT) in the 15 northern states of Sudan estimated;
- the status of warehouses in terms of both capacity and quality assessed;
- locations, owners and market participants identified
- general status and warehouse conditions assessed ;
- types of food and non-food materials stored/could be stored identified
- effective warehouse management procedures for food warehouses recommended.
- Digital camera photos and GPS coordinates for warehouses > 5000 MT taken

Framework for the action plan

The work sheet packages describes the detailed planning sessions that will be conducted to complete the activities in Phase I throughout III of the assignment[15] mission. This comprehensive plan (Table #1) is established and scheduled for completion by end of March, 2011. The plan will include:

- an assessment of warehouses' current situations based on interviews and questionnaires with shareholders and other essential stakeholders (Fig 1).

[15] The pre assessment results were shown in a separate report. The intention here is to focus on the assessment mission by making use of pre-assessment survey results.

- an organized methodology for choosing warehouses, based on availability, distribution, type and capacity parameters (already determined from pre-assessment results)(see annex A).
- an improved management overview of warehouses environment, based on the current data and information obtained through secondary assessments and pre-assessment.

Focus is on selecting specific warehouses (500 MT or more), not necessarily of public nature (i.e. privates, NGOs, cooperatives, etc.).

The inception and Planning Phase

- desk reviews as shown by inception report
- development of survey questionnaire and market templates
- development of guidelines for enumerators and preparation of training material on how to conduct the survey
- pre-assessment (done and results obtained) mapping and geo-referencing of warehouses by state teams, their logistic needs in order to identify storage locations, owners, capacities and general status efficiently,
- inception report to show guidelines.

IMPLEMENTATION MODALITIES

Implementation Plan

This phase is basically to put the outputs of the planning phase into practice and involves but not limited to the following critical areas:

- Assigning tasks and activities from the generated assignment master plan with clear assignments and deadlines.
- Training modules for enumerators and follow-up modalities on survey sites (see Annex B & E, also shall be translated into arabic). This will also include operational manuals and guidelines for implementing the survey.
- Meet concerned authorities at the state (Ministry of Finance, Agriculture, etc.) and compile primary and secondary information on warehousing
- Move to field for Identification of target facilities and fill in questionnaire (Annex C, also shall be translated into Arabic)
- Visit one or more crop market(s) and fill in form templates
- Meet trade unions, farmer's union for information on storage investments, capacities, problems and prospects
- Any other issues related to warehousing, transportation of food grains

Monitoring, Report Writing and Evaluation Phase

- Ensure effective monitoring of enumerators surveyor by team leader
- Process data in spread sheet for analysis
- Tabulation and Analysis of data
- Consultant report
-

Annex 3.1-b: Schedules

Table 1: schedules for implementing the action plan

The duration of the action plan is considered as nine weeks, extendable if needed.

	Phases by weeks									
	phase 1			Phase II				Phase III		
Activity	1	2	3	4	5	6	7	8	9	Implementing body
Inception phase:										Consultant
Project Plan and work packages	x	x								Consultant
Desk review	x	x	x							Consultant
Brainstorming and Induction meetings			x							Consultant
Set up coordination system				x	x	x	x			Consultant
Orientation training					x					Consultant
Baseline data collection					x	x	x			Surveyors (state teams)
Mapping				x	x	x	x			Surveyors (state teams)
Warehouse identification				x	x	x	x			Surveyors (state teams)
Outcome 1										surveyors
1.1 Teams/groups formed				x	x	x	x			TG
1.2 guideline ToTs manual developed		x	x	x						Consultant
1.3 Technical training conducted				x	x					Consultant + team leaders
1.4 Survey team plans approved										TG
1.5 cars & logistics prepared				x	x	x	x			FSTS + team leaders
1.6Templates tabulated and coded				x						Statisticians
1.6 questionnaires tested				x						Surveyors
1.7 Lessons learned				x						All
1.8 Training materials distributed to teams				x						FSTC
Outcome 2										Surveyors
2.1 survey conducted over 15 states				x	x	x	x			Surveyors
2.2 data entry and tabulation						x	x			Surveyors
2.3 data processing and management						x	x			Surveyors
Outcome 3										
3.1 data analysis							x	x		Analysts & Consultant
3.2 results obtained and discussed							x	X		Consultant
3.3 report written								x	X	DACAAR
Outcome 4(M&E)										
Survey activities monitored					x	x	x	x	x	TG
Workshop organized									X	FSTS
workshop (after final report is delivered) developed								x	x	Consultant

Annex 3.1-c: Table 2: Interviewees, and stakeholders in the Warehouse Field Survey by Region

	Regions				
Interviewees	**Eastern**	**Central**	**Kordofan**	**Darfur**	**North**
a) owners and mangers:	✓	✓	✓	✓	✓
Warehouse owners	✓	✓	✓	✓	✓
Traders/ private sector	✓	✓	✓	✓	✓
Warehouse mangers	✓	✓	✓	✓	✓
b) Ministries and institutions:	✓	✓	✓	✓	✓
Warehouses by State Ministry of Agriculture	✓	✓	✓	✓	✓
Warehouses by State Ministry of Finance	✓	✓	✓	✓	✓
Warehouses by State Ministry of Trade	✓	✓	✓	✓	✓
Warehouses by Zakat Chamber	✓	✓	✓	✓	✓
Warehouses by Agricultural Bank of Sudan	✓	✓	✓	✓	✓
Warehouses by Strategic reserve Corporation	✓	✓	✓	✓	✓
c) Trade Unions, Producers & NGOs:	✓	✓	✓	✓	✓
Warehouses by Farmers Union/Farmers	✓	✓	✓	✓	✓
Warehouses by Agricultural	✓	✓	✓	✓	✓
Warehouses by NGOs	✓	✓	✓	✓	✓

Annex 3.1-d: Distribution of warehouses and respective teams by states

	State	Number of Warehouses(Capitals)	Number of Warehouses (Localities)		SUB TOTALS	number of days required for assessment	Team Nos.
East	Red Sea	16	2	55	18	10	T1
	Kassala	10	12		22	9	T1
	gedaref	62	9		71	16	T2
Region-subtotal					111		
Central	Gezira	23	57		80	15	T3
	Sinnar	18	69		87	15	T4
	B. Nile	20	2		22	7	T4
	W. Nile	15	70		85	15	T5
Region-subtotal					274		
North	Northern	6	15		21	3	T6
	River Nile	2	18		20	4	T6
Region-subtotal					41		
Khartoum	khartoum	18	76		94	15	T7
Kordofan	N. Kordofan	5	6		11	4	T8
	S. Kordofan		4		4	3	T8
Region-subtotal					109		
TOTALS		**195**	**340**		**535**		
55**(belongs to sega, wheat and seen), data obtained from headquarters in Khartoum							
Darfur							
	S. Darfur					3	T9
	N. Darfur					2	T9
	W. Darfur					2	T9

Annex 3.1-e: Technical committee

Technical Committee

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Annex 3.2-a: Warehouse Pre Assessment Format

State, ---------- assessor's contact number (mobile) ---------- E-mail (if available) ----------

Warehouses >500 MT by state capital & locality capitals	Name of Locality	List of warehouses>500 metric tons	Number of warehouse>500 MT	Ownership of warehouse (e.g. private sector, public, NGOs	Location (Where are they – !)	Accessibility (all-weather roads, seasonal, etc.)	Distance from the Centre of the state capital (km)
a) State							
1)							
2)							
…..							
20							
Warehouses >500 MT by state capital & locality capitals*[16]		List of warehouses>500 metric tons	Number of warehouse>500 MT	Ownership of warehouse (e.g. private sector, public, NGOs	Location (Where they are!)	Accessibility (all-weather roads, seasonal, etc.)	Distance from distance from the Centre of the state capital (km)
b) Locality							
1)							
2)							
3)							
….							
20							

[16] Specify the name of the state capital, and the name of the locality capital. If there are warehouses at lesser administrative level, specify the administrative unit where applicable.
[17] If there are warehouses at lesser administrative level, specify the administrative unit where applicable.

Annex 3.2-b: Baseline information on current condition of cereal warehouses in 15 northern states

A. Warehouse Identification

1	Enumerator's name:	A1	
2	Date (DD/MMM/YYYY)	A2	
3	State	A3	
4	Locality/Municipality	A4	
5	Administrative unit:	A5	
6	Market	A6	
7	Interviewees name	A7	
8	Name of company/firm or individual	A8	
9	Interviewees position	A9	
10	Street Address or Physical location	A10	
11	Telephone contact (s)	A11	
12	Email address / website	A12	
13	Type of organization (Ownership status): 1. International NGO 2. Local NGO 3. CBO 4. Farmer Group 5. Cooperative Society 6. Higher Level Umbrella Org. /Association 7. Private Company 8. Out grower Scheme/Contract farming 9. Other (Specify)	A13	
14	GPS Coordinates and digital picture*	A14	**1. X =** **2. Y =** **3. Altitude (m)=**
15	Name of closest Market	A15	
16	Distance from major	A16	

* GPS coordinates and digital pictures are required if estimated warehouse capacity exceeds 5,000 MT.

** One questionnaire will be used for one warehouse interview. If owner has more than one, or if owner uses more than one facility, it should be handled separately (in another questionnaire). If warehouses have similar structure, characteristics and capacity, the exact numbers of warehouses should be indicated and be properly entered during the data entry process.

B. Storage Capacity (MT)

1	Dimension	B1a		
		B1b		
		B1c		
2	Estimated Capacity	B2a	Owners Estimate	
		B2b	Evaluators Estimate	
3	Warehouse Ownership 1. Owned 2. Rented	B3 a b		
4	Utilized area (in %)	B		
5	Items stored in the warehouse 1. Grain 2. Fertilizer 3.different mixes 4. empty 5. Other (specify)	B5 a b c d e		

C. If owner has more than one functional warehouse, please list their numbers, location, and their estimated size

Warehouse	Location (State, locality) (codes)	1.Owned 2. Rented 3. Shared with (without cost)	Estimated Overall Capacity (**owner's estimation)**
	(C1)	(C2)	(C3)
No. 1			
2.			
3.			
4.			
5.			
6.			

Note that the questions below will be only on the current warehouse, not for the others

D. Type of storage facility (Modern Warehouse standards)

	Type	**Full compliant**	**Partial**	**No compliant**
		(D1)	**(D2)**	**(D3)**
1	Warehouse Steel structure (Columns, cables and rafters)			
2	Slightly above ground level and built in a levelled area			
3	Reinforced Concrete flooring(10cm)			
4	Cement blocks or red brick walls and plastered			
5	Corrugated zinc sheets with heat insulator roofs			
6	Window opening and fire extinguishers			
7	Silos (specify whether metallic or concrete)			
8	Well Ventilated			
9	Others, specify			
10	Other remarks (e.g. damaged, very traditional, not useful, etc.)			

E. Status of the Crops Stored

Please indicate in the following table, the type and quantity of cereals you stored (in MT) and periods in weeks or months

	Type of cereal 1. Sorghum 2. Wheat	Quantity you have in stock	How long did you keep the	How long do you intend to	How long do you usually keep under	Purpose of Current Stock 1 = To sell later for better price

	3. Millet 4. Other (specify)	as of today	current stock	keep the current stock	normal circumstances	advantage 2 = To sell directly to /WFP/Others 3 = Committed to other buyers 4 = Normal working stock 5 = other (specify)
		(E1)	(E2)	(E3)	(E4)	(E5)
1						
2						
3						
4						

F. Estimate of storage losses – How much do you lose under normal circumstances

	Crop name	Quantity in tons	% losses	Reason for storage losses
		(F1)	**(F2)**	**(F3)**
1	Sorghum			
2	Millet			
3	Wheat			
4	Other Crops, specify			

G. **Other Facilities**

	Items	Yes	No	Number (if Yes)	Type and condition (which part needs …check)
		(G1)	**(G2)**	**(G3)**	**(G4)**
1	Managers				
2	Is there an office (s)				
3	Store keeper				
4	Is it fenced				
5	Guards				
6	Permanent labour				
7	Casual Labour				
8	PC (computers)				
9	Extinguishers				
10	Chemical sprayers				
11	Power and lighting				
12	Water lines				
13	Vehicle or machinery				
14	Pesticides				
15	Other Equipment (specify)				

H. Road condition & accessibility to markets (1. Very good, 2. good, 3. moderate, 4. poor & 5. Very poor)

		Paved/tarred	Graveled	Dirt/ Sand
		(H1)	**(H2)**	**(H3)**
1	Road condition			
2	Store Inlet and outlets & maneuverability for trucks			
3	Store accessible by functional road only			
4	Store accessible by functional railways (1=yes or 2=No)			
5	Has waterway access (1=Yes or 2=No)			

I. Security and hazards status

		Security status	**Risks and hazards to flames and rains**
		1=good 2=marginal 3=poor	**1=No risk 2=Moderate 3=High risk**
		(Ia)	**(Ib)**
1	Warehouse		

J. What are the main storage problems? According to their order of importance

Main problems		
1= lack of storage rental services 2= poor quality of stores 3= lack of access to bank credit 4= lack of adequate truck rental services 5= poor road condition (specify_____) 6= high transport tariff 7= poor quality of grain 8= food aid distribution	9=lack of buyer 10=business tax 11=local fees 12=market fees 13=other	(J1)

Annex 3.2-c: Guidelines for warehouse baseline survey in the northern 15 states - December 2010 (Note for enumerators)

1. Background and Summary

The guideline principles enclosed in this note are prepared for the enumerators who will run the interviews for the WAREHOUSE BASELINE SURVEY in December 2010. The baseline survey is meant to provide information on warehousing of cereals but does not exclude other purposes/crops held by targeted warehouses.

The guidelines provided in this note sheet are supposed not to substitute the training module for enumerators who will do the task, rather; has been designed to help enumerators who will attend the module to keep in mind the fundamental concepts and techniques introduced in the warehouse study. The guidelines introduce relevant concepts on storage and warehousing, on which the questionnaire builds on, introduces some basic concepts in interview management, and gives a brief outlook of the questionnaire design and related templates.

The guidelines show further how to conduct the survey, the scope and coverage, and the role and responsibilities of the surveyors. Surveyors should be aware that, there is no intention -at this stage- to collect or discuss any policy information in this concern.

2. Objectives , Scope and Expected Outcome

a) The overall objective of the survey is to provide information that helps in understanding the role of large-scale warehouse facilities on market mechanisms and how they could be used for strategic planning purposes.
b) More specifically, the survey intends to estimate the capacity and quality of warehouses in the 15 northern states of Sudan; identify their locations, owners and their general status, their potential warehousing opportunities; and recommend effective warehouse management procedures for food warehouses.
c) The baseline information will be used to establish a warehousing database, which will help in turn in assessment of food security situation, introduces an overall framework for the warehouses assessment study initiated by SIFSIA N & SRC through collecting information on public, NGOs and privates' sector warehouses in the 15 Northern states and simultaneously help in food business plans.
d) Scope of the survey involves all the 15 states, municipality/locality levels wherever 500 MT accessible warehouses exist.
e) The survey time frame targets storage in season 2009/2010. If there are no current storage one can refer to previous season (indicate that on the sheet template or on a separate paper.
f) One of the main expected outcomes is to have consistent, reliable and relevant estimates of storage capacity and condition of warehouses for future storage plans.
g) Produce a complete statement of the situation of current warehouse and anticipate their requirements.
h) It worth to note that, the collaborative planning across concerned sister line ministries and institutions concerned with warehousing of cereal grains is needed in order to enhance capacity building, extend knowledge and expertise.

3. Definitions, Concepts, and Approaches

a) The concept of warehousing is not confined only to storage but includes besides storage, transportation (rail, road, and waterways), logistics, handling and other distributional aspects.
b) The term 'modern'[18] warehouse is used in contrast to 'tradition' and there should be a distinction to avoid confusion in methodology of data collection. For the purposes of this assessment, will confine to well-structured warehouses of more than 500 Metric tons.
c) Questions with reference periods indicate only the time the survey conducted and should refer only to that period of time (i.e. December 2010)
d) For the agricultural season, unless stated otherwise in this questionnaire, reference is to the period first December 2009 to end December 2010) and thus include the harvest from last year after November 2009 and the harvest of 2010 before December 2010.
e) Please note that (2010/2011 to be included)
f) For warehouse measurement we should be aware of the warehouse dimensions (length, width and height in meters) to decide on capacity and size of storage. Therefore following parameters are important:

i. Decide the total weight of the Grain to be stored in Tons. (W)
ii. Specify the specific Volume of Sorghum (grain) (v)
iii. Multiply (W) X (v) = (V) total Volume required.
iv. Divide(V) by (h- Height of the warehouse) = (A) floor Area
v. Other information include length, width and height of warehouse are also needed

* Increase the Area by 50% for Access area of small trucks and movement of workers!!

The framework for the assessment process is presented in below figure for clarity and understanding of objectives of the warehouse assessment survey (Fig 1).

4. Interview Management

- The Interview forms/templates provided along with this guide should be used as complete *reporting formats*, as they are structured as questionnaires.
- Incomplete or missing answers are to be organized and recorded after the interview, for proper time management.
- The templates are used during the interview as a checklist; therefore, make sure all the information is covered as per coding style.
- Explain to your assistants (from the states) what is required from them and let them see how you practically fill in forms/templates.

a. Important remarks when filling the questionnaire:

[18] Many warehouse promoters have realized the importance of adopting modern management tools. The adoption of automation and modern equipment will make a warehouse more efficient

i) Not all types of storage facilities are targeted by this survey. We only target modern warehouses of well-known structures. That is to say open air storage known as (shunas, underground pits, etc.) are NOT included by this assessment survey.
ii) Again, the main target is well structured warehouses of 500 metric tons or more

b. Of the most relevant issues for the enumerator is to establish a good relations with the interviewee/warehouse owner or manger. Therefore, and before diving into questions, make an informal introduction during the first minutes of the interview. This is to establish an informal relationship with the counterpart/ respondent to feel free and start responding to your questions.
c. Introduce yourself to the warehouse owner/manager.
d. explain the specific purpose of our study
e. The focus and content of the survey and even the questions should be sequential without disturbing the flow of interviewee response
f. You may need to explain that all information and the identity of respondents will be kept confidential (this is extremely important for private sector warehouses, fear of taxes, etc.) and that none but you and who will run the data entry will know the identity.
g. Finally, explain that the questionnaire will take about LESS THAN AN HOUR or so.

For the interviewer concern

h. Interview the ONWER or mangers only but allow others to be present and help the manger answer questions, which they know better (i.e. ask the main respondent, but also allow the person who knows more to help him/her.
i. Learn your interviewing style. Once you have learned and mastered the questionnaire, you will also achieve your own style of interviewing.
j. Trust in yourself to get the confidence of others.
k. Skipping Modules. If any modules cause concern/disinterest to the interviewee, it is also possible to skip them and return back later to fill them.
l. However, keep in mind that some parts of the questionnaire (i.e. list/roster) are connected to other sections of the module so it cannot be skipped in order to fill in the abovementioned sections.
m. Learn how to replace warehouse respondent(s) for he/they sometimes refuse to continue or participate in the survey for one reason or the other.

5. The Questionnaire

a. Important remarks when filling the questionnaire:

i) Allocate time in a good way and draw a plan to cover the targeted warehouses for they may not all be located in one place (scattered over larger area).
ii) Check with state authorities to have an idea about warehouses locations and approximate distances and travelling time
iii) Ask authorities if they can provide additional information on capacities, and their distribution (main target are warehouses of 500 metric tons or more)
iv) Not all types of storage are targeted. We only target modern warehouses of well-known structure. That is to say open air storage known as (shunas, underground pits, etc.) are NOT included by this assessment survey.

v) If there are substantial information on (shunnas or underground pits), write them as external note, where appropriate.
vi) Give information if windows are screened or not screened (for food hygiene)
vii) Differentiate between windows and proper ventilation system.
viii) Questions are always with reference to current (used to store) and little room for (intentions to storage)
ix) Take digital photos (internal and external) if warehouse is of 5,000 Metric ton or more
x) Take the GPS coordinates and refer to the digital pictures if estimated warehouse capacity exceeds 5,000 MT.
xi) Remember, one questionnaire will be used for one warehouse interview. If owner has more than one, or if owner uses more than one facility, it should be handled separately (in another questionnaire).

b. Questionnaire Coverage. Enumerators MUST fill the ENTIRE questionnaire.
c. Cover page: Remember to fill out all the information in the cover page including the complete name (name and surname) of the respondent, phone number and address), address, id code (from roster/list) and his/her telephone number. Write the time of start of the interview right before starting with the roster question as well as all the other information regarding the state/locality code, questionnaire number, etc. Don't forget to come back to the cover-letter to write down the finish time when the interview is over. This is important to measure efficiency and ensure that you will cover the entire state without affecting your time plan.
d. Filling the questionnaire: Fill all the blanks. When questions are skipped or do not apply, mark with a slash (/) or dash (---) the empty spaces. Respect the structure of the questionnaire by reading all questions and following the skips. Always specify by taking notes on the side when responses are "others"'.
e. Codes of questionnaire are important and you have to stick to the questionnaire
f. Remember that UPPER CASE INSTRUCTIONS are not meant to be read to the interviewee but are notes for the enumerator. Skips are indicated with ">>" and "=>" which means that if the interviewee answered in a certain way, some questions are skipped.
g. Words in brackets. Words in (brackets) may indicate your own guess about the answer in case of refusal or not knowing the answer.
h. What to do when respondent doesn't know (98 code): When the respondent doesn't know (i.e. about distances), include the code "98" instead of a slash (/) or a zero (0). In that way, the data entry persons will know that this person didn't know.
i. Responses should be in Arabic. Responses in the questionnaire should be in Arabic (or in the language the enumerator feels more comfortable with), as well as all the comments and notes. For numbers, they can be either in Arabic or Western numbers, but keep hold of them across the entire questionnaire.
j. Check list. When you have finished the interview, please check if you have completed all the modules of the questionnaire; haven't left blanks or skipped questions; have completed all the information in the cover page; have not made any mistakes. If any of elements in the check list is missing and the enumerator or you are still in the locality, go back to complete the information.
k. Finally, every night revise with your supervisor the questionnaires completed. Check more carefully for mistakes and correct them. It is important to do it on the same day of the interview as important information may be forgotten on the next day.

l. Id Code[19]. Every warehouse will be given an ID CODE in the Roster. The code will be the same for the entire questionnaire. Example: Mr Alamin (id code 3) has two warehouses, WH1 (id Code 3.1) and WH2 (id code 3.2). Those codes will be the same for the entire questionnaire.

[19] There are numerous types of codes (agricultural codes, profession codes (ISCO codes); industry codes (ISIC codes); local or standard units, etc. but we shall follow the one given by the questionnaire templates.

Annex 3.3: Warehouse Study Action Points as of 24 February 2011

Training – 01 – 02 March (Tuesday – Wednesday)

Field mission – 05 – 26 March 2011

Action Point	Responsible
Training	
Training materials – Guideline and checklist to be duplicated	Alemu to provide to Rihab/Amira
GPS gadgets and training	Sadig/WFP
Admin related expenses – coffee, note book, pen/pencil, etc.	Mary/Fatima
E-mail reminders to be sent	Alemu
Field mission	
Checklist to be duplicated (No. of checklists to be given to each	Alemu to forward the materials to
Camera preparation	SIFSIA will provide 4, FSTS 2, and we
Meters	Mary/Rihab
Letters to be given to Field mission – MoA (FSTS), ABS, and	Rihab/ Fatima/Amira
Money to be given to each team leader - This depends on the	Mutasim, Mary, Yahia, Fatima, Rihab,
After field mission	
Data entry training	Siddig – Rihab to organize with Siddig
Organizing the collection of checklists after field mission	Rihab/Amira/Fatima
Data entry and analysis-	Siddig/FSTS/Fadil
Final analysis and reporting	Siddig/Fadil

Annex 3.4-a: Templates for Warehousing and Transport Information System

Checklist of information needed

- Information on roads conditions, pass ability; (see questionnaire)
- Number of trucks, types and companies providing transport services in the state
- Transport companies and authorities
- Bridges, allowable truck heights, peak-lanes;
- Road customs and duties, (indicators)
- Probable road blockages; (roughly)
- Probable events (festivals, football matches, etc.);
- Risks and probability of incidents (estimates)
- Information on traffic management (through SMS messages! or radio for re-routing, closings, etc. if any).

Annex 3.4-b: Templates for Warehousing and Market Information

Checklist of information needed

- Common types of crops traded
- Market supply and demand (volumes in 000 MT)
- Market prices and variability
- Accessibility to markets (roads conditions)
- Brief information on market structures,
- Brief information on market conduct and
- Brief information on market performance
- Condition of marketplace (available utilities, & services as banks, electricity, water etc.)

Annex 4.1-a: Months for Sorghum stored

Annex 4.1-a: Months for Sorghum stored

	Frequency		Cumulative	
	Total	Percent	Total	Percent
Storage Months	185	100	0	0
0	6	3.2	6	3.2
1	51	27.6	57	30.8
2	37	20	94	50.8
3	38	20.5	132	71.4
4	9	4.9	141	76.2
6	1	0.5	142	76.8
7	1	0.5	143	77.3
8	1	0.5	144	77.8
10	1	0.5	145	78.4
12	1	0.5	146	78.9
Not Applicable	39	21.1	185	100

Annex 4.1-b: Months for millet stored

Annex 4.1-b: Months for millet stored

	Frequency		Cumulative	
	Total	Percent	Total	Percent
Total	15	100	0	0
0	1	6.7	1	6.7
1	2	13.3	3	20
3	1	6.7	4	26.7
4	1	6.7	5	33.3
7	1	6.7	6	40
12	4	26.7	10	66.7
18	1	6.7	11	73.3
Not Applicable	4	26.7	15	100

Annex 4.1-c: Months for wheat stored

Annex 4.1-c: Months for wheat stored

	Frequency		Cumulative	
	Total	Percent	Total	Percent
Total	18	100	0	0
1	1	5.6	1	5.6
2	3	16.7	4	22.2
3	2	11.1	6	33.3
4	1	5.6	7	38.9
5	2	11.1	9	50
6	3	16.7	12	66.7
12	1	5.6	13	72.2
Not Applicable	5	27.8	18	100

Annex 4.2-a: Road conditions

		ROAD CONDITION					
		Very good	Good	Moderate	Poor	Very poor	Not Stated
Road paved / tarred	773	214	91	18	2	-	448
Road graveled	773	34	127	26	1	-	585
Road dirt/ sand	772	38	18	57	21	1	637
		286	236	101	24	1	
		% TERMS					
		Very good	Good	Moderate	Poor	Very poor	Not Stated
Road paved / tarred		27.7%	11.8%	2.3%	0.3%	-	58.0%
Road graveled		4.4%	16.4%	3.4%	0.1%	-	75.7%
Road dirt/ sand		4.9%	2.3%	7.4%	2.7%	0.1%	82.5%
		37.0%	30.5%	13.1%	3.1%	0.1%	

Annex 4.2-b: Entrance condition to warehouses

		WAREHOUSES ENTRANCE CONDITION					
		Very good	Good	Moderate	Poor	Very poor	Not Stated
Road paved / tarred	773	101	21	11	-	-	640
Road graveled	773	58	169	32	6	-	508
Road dirt/ sand	764	66	29	99	29	6	535
		225	219	142	35	6	
		% TERMS					
		Very good	Good	Moderate	Poor	Very poor	Not Stated
Road paved / tarred		13.1%	2.7%	1.4%	-	-	82.8%
Road graveled		7.5%	21.9%	4.1%	0.8%	-	65.7%
Road dirt/ sand		8.6%	3.8%	13.0%	3.8%	0.8%	70.0%
TOTALS		29.2%	28.4%	18.5%	4.6%	0.8%	81.5%

Annex 4.3-a: Store accessible by road

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	712	92.1	99.3	99.3
	No	5	0.6	0.7	100.0
	Total	717	92.8	100.0	
Missing	System	56	7.2		
Total		773	100.0		

Annex 4.3-b: Store accessible by railways

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	83	10.7	11.7	11.7
	No	624	80.7	88.3	100.0
	Total	707	91.5	100.0	
Missing	System	66	8.5		
Total		773	100.0		

Annex 4.3-c Store accessible river

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	3	0.4	0.4	0.4
	No	698	90.3	99.6	100.0
	Total	701	90.7	100.0	
Missing	System	72	9.3		
Total		773	100.0		

Annex 4. 4: Main problems ranked by order of importance as from 1 to 6

	Rank (from 1 to 6)						
Problem	Total	**1**	**2**	**3**	**4**	**5**	**6**
Total	10817	431	321	166	120	93	21
Lack of storage rental services	62	33	13	8	4	1	-
Poor quality of stores	123	78	26	11	4	2	1
Lack of access to bank credit	23	13	2	6	-	2	-
Lack of adequate truck rental services	26	2	6	9	3	4	1
Poor road conditions	182	94	68	5	7	5	3
High transport tariff	58	7	7	14	14	15	1
Poor quality of grain	46	2	5	7	13	14	5
Food aid distribution	34	1	5	7	10	8	3
Lack of buyers	94	22	13	28	19	11	1
High tax	71	8	28	14	10	10	-
Local tax	146	53	47	21	12	11	-
High market tax	95	31	28	15	15	3	2
Rats	71	24	33	5	4	4	1
Insects	114	59	35	12	4	3	1
Theft	16	4	5	4	1	-	2

Other problems which have less rank (> 6) were ignored.

Annex 4. 5: GPS Coordinates, dimensions and estimated capacity of the accessed warehouses in the 15 states.

State	Name_of_Company	GPS_N	GPS_E	Distance_ to_Market	Length	Width	Height	Owner_Estm _Capacity
Northern	اتحاد المحس التعاوني	19.178430	30.477210	3	63	35	4	340
Northern	البنك الزراعي	19.178030	30.480480	2	60	20	6	1500
Northern	البنك الزراعي	19.178050	30.479960	2	30	20	6	750
Northern	الإتحاد التعاوني للولاية	19.168210	30.467680	3	30	12	5	900
Northern	الشركة العربية للبذور	19.148660	30.456020	4	46	20	5	980
Northern	شركة بنا للتنمية	19.441730	30.402680	32	27	15	6	1200
Northern	البنك الزراعي	18.045920	30.958580	1	30	20	6	800
Northern	البنك الزراعي	18.045920	30.958580	1	30	20	6	800
Northern	البنك الزراعي	18.548510	31.850100	1	30	20	6	1200
Northern	البنك الزراعي	18.548510	31.850100	1	30	20	6	1200
Northern	شركة النيل للنقل النهري	18.544840	31.851240	1	24	12	5	576
Northern	شركة النيل للنقل النهري	18.548000	31.853250	1	29	11	5	750
Northern	الإتحاد التعاوني للولاية	18.548000	31.853250	1	37	8	5	786
Northern	محلية مروي	18.541970	31.843500	1	20	10	5	500
Northern	محلية مروي	18.542200	31.843050	1	20	10	5	500
Northern	شريان الشمال	18.540960	31.846300	0	18	12	5	500
River Nile	البنك الزراعي	17.712690	33.983630	3	50	20	5	1500
River Nile	تاج الدين الشيخ	17.557410	33.936940	4	20	8	5	320
River Nile	الشركة العربية لإكثار البذور	17.557660	33.936330	4	201	13	5	500
River Nile	الشركة العربية لإكثار البذور	17.529840	33.936230	7	33	8	5	528
River Nile	شركة مصانع طحن الغلال	17.719200	33.983290	8	48	16	6	900
River Nile	شركة مصانع طحن الغلال	17.719200	33.983290	7				
River Nile	شركة مصانع طحن الغلال	17.719200	33.983290	7	33	30	6	1725
River Nile	شركة مصانع طحن الغلال	17.718940	33.982210	7	30	18	6	900
River Nile	شركة السكر	17.703300	33.980710	8	45	12	6	2000
River Nile	الإتحاد التعاوني لمحلية الدامر	17.587860	33.972370	1	16	12	5	380
River Nile	البنك الزراعي	19.534950	33.330280	1	40	35	6	6000
River Nile	البنك الزراعي	18.774980	33.573060		60	40	6	6000
River Nile	التجارة الداخلية	18.032640	33.993000	1	40	16	6	1600
River Nile	البنك الزراعي	16.696500	33.426860	1	60	20	6	10000
Red Sea	شركة السودان للأقطان	19.622290	37.230980	4	100	50	6	12500
Red Sea	شركة السودان للأقطان	19.622690	37.231240	4	100	50	6	12500
Red Sea	شركة السودان للأقطان	19.622710	37.231150	4				12500
Red Sea	شركة السودان للأقطان	19.621160	37.231430	4	100	50	6	12500
Red Sea	شركة السودان للأقطان	19.618660	37.232090	4	100	50	6	12500
Red Sea	شركة السودان للأقطان	19.617800	37.233090	4	100	45	6	12500
Red Sea	البنك الزراعي السوداني	19.624140	37.235460	5	100	45	6	12500
Red Sea	البنك الزراعي السوداني	19.624800	37.235150	5	100	45	6	12500
Red Sea	البنك الزراعي السوداني	19.624610	37.230500	5	100	45	6	12500
Red Sea	شركة البحر الأحمر للملاحة	19.615900	37.233880	2	100	50	6	14000
Red Sea	شركة البحر الأحمر للملاحة	19.614670	37.233230	2	100	50	6	13000
Red Sea	شركة البحر الأحمر للملاحة	19.616040	37.233340	2	50	20	6	5000
Red Sea	شركة البحر الأحمر للملاحة	19.615400	37.232160	2	20	20	6	4000
Red Sea	شركة البحر الأحمر للملاحة	19.615130	37.232710	2	100	30	6	12000
Red Sea	شركة السودان للأقطان	19.622970	37.235440	4	100	40	6	10000

State	Name_of_Company	GPS_N	GPS_E	Distance_ to_Market	Length	Width	Height	Owner_Estm _Capacity
Red Sea	شركة السودان للأقطان	19.621660	37.235170	5	100	50	6	12000
Red Sea	شركة السودان للأقطان	19.621770	37.235070	5	100	50	6	
Red Sea	شركة السودان للأقطان	19.621670	37.234420	5	100	40	6	11500
Red Sea	شركة السودان للأقطان	19.621560	37.233770	5	100	50	6	
Red Sea	شركة السودان للأقطان	19.622350	37.235020	5	100	60	6	
Red Sea	شركة السودان للأقطان	19.622370	37.235120	5	100	50	6	
Red Sea	شركة السودان للأقطان	19.623240	37.234800		100	50	6	
Red Sea	شركة السودان للأقطان	19.623290	37.234950	5	50	50	6	
Red Sea	شركة السودان للأقطان	19.624330	37.234590	5	100	50	6	
Red Sea	شركة السودان للأقطان	19.624510	37.234710	5	100	50	6	
Red Sea	شركة السودان للأقطان	19.625350	37.234410	5	100	50	6	
Red Sea	شركة السودان للأقطان	19.629460	37.228340	4	100	50	6	12000
Red Sea	شركة السودان للأقطان	19.629670	37.228260	5	100	40	6	11200
Red Sea	شركة السودان للأقطان	19.629480	37.228190		100	50	6	
Red Sea	شركة السودان للأقطان	19.629160	37.227370	5	100	60	6	
Red Sea	شركة السودان للأقطان	19.926690	37.226830		100	50	6	12000
Red Sea	شركة السودان للأقطان	19.630290	37.227360	5	100	40	6	10000
Red Sea	شركة السودان للأقطان	19.630900	37.226380	5	100	40	6	
Red Sea	شركة السودان للأقطان	19.630670	37.226200	5	100	50	6	12500
Red Sea	شركة السودان للأقطان	19.630350	37.225910	5	100	50	6	12000
Red Sea	شركة السودان للأقطان	19.630960	37.225070	5	100	50	6	
Red Sea	شركة السودان للأقطان	19.631300	37.225280	5	100	50	6	
Red Sea	شركة السودان للأقطان	19.631550	37.225460	5	100	40	6	
Red Sea	شركة البحر الأحمر للملاحة	19.632620	37.223570	4	100	50	6	15000
Red Sea	شركة السودان للأقطان	19.637880	37.227340	5	100	40	6	11200
Red Sea	شركة السودان للأقطان	19.637880	37.227500	5	100	40	6	30000
Red Sea	شركة السودان للأقطان	19.638360	37.229840	5	100	40	6	10000
Red Sea	شركة السودان للأقطان	19.638070	37.229900	5	100	40	6	10000
Red Sea	شركة السودان للأقطان	19.637530	37.229990	5	100	40	6	10000
Red Sea	أعمال عبدالسلام عبدالقادر الخبير	19.643120	37.227120	5	120	50	6	15000
Red Sea	أعمال عبدالسلام عبدالقادر الخبير	19.642890	37.227230	5	100	50	6	12500
Red Sea	أعمال عبدالسلام عبدالقادر الخبير	19.148230	37.231330	5	75	50	10	16000
Red Sea	شركة الصمغ العربي	19.647750	37.232050	5	100	50	6	14000
Red Sea	أعمال عبدالسلام عبدالقادر الخبير	19.847780	37.232180	5	100	50	6	14000
Red Sea	أعمال عبدالسلام عبدالقادر الخبير	19.647900	37.234830	5	100	75	6	23000
Red Sea	شركة وينا الصناعية	19.644390	37.230480	6				63000
Red Sea	أعمال عبدالسلام عبدالقادر الخبير	19.639370	37.228330	5	125	50	6	15000
Red Sea	أعمال عبدالسلام عبدالقادر الخبير	19.639410	37.228430	5	150	50	10	18000
Red Sea	أعمال عبدالسلام عبدالقادر الخبير	19.625550	37.230300	5	100	50	6	14000
Red Sea	أعمال عبدالسلام عبدالقادر الخبير	19.612640	37.234680	5	150	50	6	15000
Red Sea	مشروع الجزيرة	19.637670	37.227520	3	100	35	6	18000
Red Sea	مشروع الجزيرة	19.637620	37.227380	3	100	35	6	18000
Red Sea	مشروع الجزيرة	19.637220	37.227420	3	100	35	6	18000
Red Sea	مشروع الجزيرة	19.737160	37.227520	3	100	35	7	12500
Red Sea	البنك الزراعي السوداني	19.605820	37.229270	0	65	35	7	6000
Red Sea	شركة الأمارات والبحر الأحمر	19.631710	37.220690	4	100	40	10	18000
Red Sea	شركة الأمارات والبحر الأحمر	19.633540	37.220780	4	100	40	10	18000
Red Sea	شركة الأمارات والبحر الأحمر	19.634450	37.219660	4	100	40	7	12000
Red Sea	شركة الأمارات والبحر الأحمر	19.633440	37.219600	4	100	40	6	12000
Red Sea	شركة الأمارات والبحر الأحمر	19.635300	37.218340	4	100	40	6	12000
Red Sea	شركة الأمارات والبحر الأحمر	19.633690	37.218500	2	100	40	8	14000
Red Sea	شركة الأمارات والبحر الأحمر	19.635840	37.217430	5	100	40	8	13000

State	Name_of_Company	GPS_N	GPS_E	Distance_ to_Market	Length	Width	Height	Owner_Estm _Capacity
Red Sea	شركة الأمارات والبحر الأحمر	19.635800	37.217610	4	100	40	8	14000
Red Sea	شركة الأمارات والبحر الأحمر	19.635100	37.217060	4	100	40	7	12000
Red Sea	شركة الأمارات والبحر الأحمر	19.634600	37.216770	4	100	40	7	14000
Red Sea	شركة الأمارات والبحر الأحمر	19.634430	37.217130	4	100	40	7	12000
Red Sea	شركة الأمارات والبحر الأحمر	19.634510	37.217290	4	100	40	7	12000
Red Sea	شركة الأمارات والبحر الأحمر	19.633710	37.218150	4	100	40	7	12000
Red Sea	شركة الأمارات والبحر الأحمر	19.633780	37.218300	4	100	40	7	12000
Red Sea	شركة الأمارات والبحر الأحمر	19.657080	37.224640	12	100	40	8	13000
Red Sea	شركة الأمارات والبحر الأحمر	19.657270	37.273320	12	100	40	8	13000
Red Sea	شركة الأمارات والبحر الأحمر	19.657410	37.223420	12	100	40	7	12000
Red Sea	شركة الأمارات والبحر الأحمر	19.656540	37.222890	4	100	40	7	12000
Red Sea	شركة الأمارات والبحر الأحمر	19.656330	37.223310	4	100	40	7	12000
Red Sea	شركة الأمارات والبحر الأحمر	19.656480	37.223440	4	100	40	8	14000
Red Sea	شركة الأمارات والبحر الأحمر	19.655610	37.229290	4	100	40	8	13000
Red Sea	شركة الأمارات والبحر الأحمر	19.625780	37.224500	4	100	40	8	13000
Red Sea	شركة الأمارات والبحر الأحمر	19.655120	37.225570	4	100	40	8	13000
Red Sea	شركة الأمارات والبحر الأحمر	19.624880	37.225190	4	100	40	8	13000
Red Sea	شركة الأمارات والبحر الأحمر	19.654190	37.225620	3	100	40	8	13000
Red Sea	شركة الأمارات والبحر الأحمر	19.654420	37.726670	4	100	40	8	13000
Red Sea	شركة الأمارات والبحر الأحمر	19.655120	37.227200	3	100	40	8	13000
Red Sea	شركة الأمارات والبحر الأحمر	19.655560	37.227010	4	100	40	8	13000
Red Sea	شركة الأمارات والبحر الأحمر	19.655870	37.226900	5	100	40	8	13000
Red Sea	شركة الأمارات والبحر الأحمر	19.656260	37.225970	5	100	40	8	13000
Red Sea	شركة الأمارات والبحر الأحمر	19.657200	37.224990	5	100	40	8	13000
Red Sea	شركة سين	19.612760	37.238660	5				40000
Red Sea	مجمع سيقا للصناعات الغذائية	19.607820	37.234840	5				140000
Red Sea	بنك الحرطوم	19.614640	37.232230	1	50	20	6	6000
Red Sea	بنك الحرطوم	19.639830	37.231830	3	100	50	6	35000
Red Sea	بنك امدرمان الوطني	19.618140	37.233830	4	100	45	7	14000
Red Sea	بنك امدرمان الوطني	19.617070	37.233860	4	100	45	7	14000
Red Sea	بنك امدرمان الوطني	19.625790	37.231790	4	100	45	7	14000
Red Sea	شركة السودان للحبوب الزيتية	19.650460	37.231640	5	100	50	6	12500
Red Sea	شركة السودان للحبوب الزيتية	19.650600	37.231360	5	50	45	6	6000
Red Sea	شركة محجوب وأولاده	19.649270	37.230800	5	100	50	8	17000
Red Sea	شركة محجوب وأولاده	19.650210	37.230230	5	120	60	8	24000
Red Sea	شركة محجوب وأولاده	19.636790	37.232570	5	100	45	6	11000
Red Sea	شركة مطاحن الخليج	19.623800	37.239840	5				80000
Red Sea	شركة سيقا	19.641010	37.727810	5	100	45	8	12000
Red Sea	شركة مطاحن الخليج	19.641560	37.228000	5	100	50	6	16000
Red Sea	شركة سيقا	19.640080	37.223740	5	100	50	7	14000
Red Sea	البنك الزراعي السوداني	19.541760	37.205620	5	50	20	8	1400
Red Sea	الإدار العامة للتجارة والتموين	19.630810	37.231660	1	100	40	8	14000
Red Sea	الهلال الأحمر السوداني	19.659410	37.222860	3	50	40	5	6000
Red Sea	الإدار العامة للتجارة والتموين	19.623790	37.188200	2	20	20	5	800
Red Sea	شركة الجزيرة للتجارة والحدمات	19.613540	37.232730	5	100	20	10	9000
Red Sea	شركة الجزيرة للتجارة والحدمات	19.613880	37.232830	5	100	20	10	650000
Red Sea	شركة الجزيرة للتجارة والحدمات	19.613400	37.232960	5	50	50	6	6000
Red Sea	شركة الجزيرة للتجارة والحدمات	19.611970	37.222850	5	100	25	6	5500
Red Sea	إدارة مشروع دلتا طوكر	18.430240	37.734900	160	40	25	5	2000
Red Sea	إدارة مشروع دلتا طوكر	18.430480	37.734900	160	25	20	6	2000
Red Sea	شركة سيد عبدالقادر	19.636420	37.231140	4	100	50	8	17500
Red Sea	شركة سيد عبدالقادر	19.636350	37.231820	4	100	50	8	12500

State	Name_of_Company	GPS_N	GPS_E	Distance_ to_Market	Length	Width	Height	Owner_Estm _Capacity
Red Sea	شركة سيد عبدالقادر	19.625860	37.232100	4	100	50	8	17500
Red Sea	السكلا	19.621220	37.731920	5	50	40	6	2000
Kassala	وزارة المالية	15.449750	37.424530	1	40	15	7	1500
Kassala	وزارة المالية	15.449780	37.424290	2	40	15	7	1500
Kassala	عبدالرحمن باشري	15.451970	36.425880	2	50	25	10	3000
Kassala	عبدالرحمن باشري	15.452550	36.425900	2	50	25	10	5000
Kassala	إبراهيم سليمان	15.449190	37.421200	2	50	15	6	2000
Kassala	إبراهيم سليمان	15.453930	36.444490	4	50	20	6	9000
Kassala	هيئة مياه الشرب	15.449440	36.423420	2	30	15	5	900
Kassala	هيئة مياه الشرب	15.449440	36.423070	2	30	15	5	900
Kassala	البنك الزراعي	15.462700	37.340340	3	40	20	6	2000
Kassala	مصنع البصل	14.456080	36.354740	3		8	4	500
Kassala	أحمد سيد احمد	15.456410	36.359600	2	50	30	5	3000
Kassala	2200	15.450620	36.370690	1	20	8	6	480
Kassala	2200	15.450760	36.370550	1	20	8	6	480
Kassala	هيئة سكك حديد السودان	15.446350	36.374200	2	38	18	5	1200
Kassala	2200	15.446390	36.374160	2	38	18	5	1200
Kassala	ديوان الزكاة	14.222080	36.034580	80	22	7	10	900
Kassala	2200	14.222090	36.034710	80	32	7	10	900
Kassala	مؤسسة مشروع القاش	14.231770	36.038540	80	20	7	8	500
Kassala	2200	15.449480	36.425530	2	30	15	8	1500
Kassala	2200	15.335780	35.609200	2	90	40	6	10000
Kassala	2200	15.335390	35.607060	2	50	25	8	4000
Kassala	2200	15.341810	35.610730	2	50	15	8	2600
Kassala	عبدالخالق حسن	15.327800	35.603000	2	20	10	5	600
Kassala	2200	15.345280	35.659830	8	35	10	8	2000
Kassala	2200	15.345260	35.660480	8	20	8	8	500
Kassala	2200	15.203270	35.732840	19	50	15	8	2000
Kassala	2200	15.185400	35.712350	16	30	10	5	600
Kassala	2200	15.179380	35.721940	16	40	15	4	900
Kassala	2200	15.141960	35.750000	9	50	15	8	2000
Kassala	2200	15.146910	35.593030	15	50	15	8	2000
Kassala	2200	15.253320	35.513530	15	50	15	4	3000
Kassala	2200	15.354470	35.545480	8	50	15	10	3000
Kassala	2200	15.496000	35.601280	7	35	10	10	1500
Kassala	2200	15.341750	35.610730	2	100	40	9	15000
Kassala	مؤسسة مشروع القاش	15.431830	35.616460	2	100	40	9	15000
Kassala	2200	15.342070	35.617440	2	100	40	9	15000
Kassala	2200	15.340440	35.618220	2	50	10	7	1500
Kassala	2200	15.338380	35.618410	2	50	8	8	1000
Kassala	2200	15.338040	35.619600	2	50	15	8	1500
Kassala	2200	15.342530	35.617980	20	75	35	10	10000
Kassala	2200	15.598760	35.586410	18	50	15	1	3000
Kassala	2200	15.763580	35.531460	20	30	15	8	1500
Kassala	2200	15.763920	35.531430	20	50	15	8	2500
Kassala	2200	15.847970	35.482980	40	50	15	8	2500
Kassala	2200	15.660370	35.501970	48	50	15	8	2500
Kassala	2200	15.707970	35.440520	50	50	15	8	2500
Kassala	2200	15.707910	35.442100	50	50	15	8	2500
Kassala	2200	15.554910	35.443770	40	50	15	8	2500
Kassala	2200	15.523770	35.379370	48	50	10	8	1500
Kassala	2200	15.492500	35.358300	40	25	15	8	1200

State	Name_of_Company	GPS_N	GPS_E	Distance_ to_Market	Length	Width	Height	Owner_Estm _Capacity
Kassala	2200	15.492600	35.358330	40	20	10	8	600
Kassala	2231	15.302350	35.619810	3	60	60	8	12000
Kassala	2200	15.302810	35.619710	3	30	20	10	2600
Kassala	2200	15.302150	35.620780	3	40	15	8	2000
Kassala	2200	15.215260	35.656820	12	50	15	10	3000
Kassala	عبدالمعطي إبراهيم	15.314560	35.625430	3	40	25	8	3000
Kassala	2200	15.314820	35.625770	3	75	20	8	5000
Kassala	بنك التنمية التعاوني	14.965910	35.892600	1	55	20	8	3500
Kassala	الشركة العربية	15.019670	35.904360	7	25	10	10	1000
Kassala	2200	15.019360	35.903550	7	50	15	10	3000
Kassala	2200	15.019470	35.902880	7	25	10	10	1000
Kassala	2200	15.338550	35.618540	2	50	15	8	2500
Algadarif	صومعة البنك الزراعي للغلال	14.044020	35.391190	4				100000
Algadarif	صومعة القضارف للغلال	14.029840	35.369570	4	100	40	6	12000
Algadarif	صومعة القضارف للغلال	14.029840	35.369570	6	100	40	6	10000
Algadarif	صومعة البنك الزراعي للغلال	14.029820	35.369610	3	60	50	4	4500
Algadarif	مخازن المحلية	14.029830	35.369590	4	50	30	4	2250
Algadarif	مخازن ورثة محمد توم	14.030020	35.370670	3	50	25	6	6250
Algadarif	مخازن فيصل	14.030710	35.370720	3	50	50	6	18700
Algadarif	شركة كردفان	14.030930	35.371010	3	50	15	6	1875
Algadarif	حامد يوسف عبداللطيف	14.031170	35.371300	3	50	15	6	1875
Algadarif	محزن درزون	14.031200	35.371440	3	50	15	6	1875
Algadarif	محزن درزون	14.031430	35.371590	3	50	15	6	
Algadarif	السر حاج الحسن	14.031440	35.371670	3	50	15	6	
Algadarif	بنك البركة القضارف	14.031520	35.371830	3	50	15	4	1125
Algadarif	الأمين آدم	14.031840	35.372110	3	50	15	5	1500
Algadarif	مخزن كمال حسن	14.031860	35.372320	3	50	15	5	
Algadarif	مخزن وجدي	14.032030	35.372320	3	50	15	5	
Algadarif	وجدي عمر البدوي	14.029870	35.367820	3	50	15	5	2000
Algadarif	محزن عمر	14.029720	35.367180	3	50	15	5	1500
Algadarif	وجدي عمر البدوي	14.029750	35.367380	3	50	15	5	
Algadarif	مخزن يوسف أبوعشر	14.032430	35.372040	3	50	15	5	1500
Algadarif	شركة سيقا	14.032090	35.371660	3	50	30	5	3000
Algadarif	2 15	14.032070	35.371440	2	50	15	5	1500
Algadarif	شركة محجوب أولاد	14.031960	35.371360	3	50	15	5	1500
Algadarif	شركة المزارع الإقتصادية	14.031890	35.371130	3	50	15	5	1500
Algadarif	مخازن المحلية	14.031730	35.371080	3	50	15	5	1500
Algadarif	البنك السعودي السوداني	14.031640	35.370800	3	50	15	5	1500
Algadarif	عبدالمغني زروق	14.031570	35.370700	3	50	15	5	1500
Algadarif	مصطفى محمد عيسى	14.031250	35.370530	3	50	15	5	1500
Algadarif	عبدالله الخليفة	14.031110	35.370260	3	50	15	5	1500
Algadarif	مخازن المحلية	14.029250	35.368700	3	60	50	4	4500
Algadarif	محمد صديق حاج إدريس	14.030990	35.370170	3	50	15	6	1875
Algadarif	محمد الطيب البشير	14.030760	35.369870	3	50	25	5	3500
Algadarif	المنظمة الشعبية للمياه	14.030610	35.369670	3	50	30	5	3000
Algadarif	شركة زاس لإنتاج التقاوي	14.030490	35.369500	3	50	25	5	2500
Algadarif	2300	14.030290	35.369160	3	50	15	5	1500
Algadarif	شركة سيت للغلال	14.032120	35.371580	3	85	15	6	
Algadarif	أحمد عثمان يعقوب	14.031650	35.370710	3	50	15	5	
Algadarif	أولاد حسن بحيت	14.031020	35.369710	3	50	15	6	9000
Algadarif	صلاح والرشيد عبدالرحمن	14.030390	35.369150	10	50	15	5	3000
Algadarif	مخزن عبدالفتاح	14.030260	35.368800	3	50	15	6	1500

State	Name_of_Company	GPS_N	GPS_E	Distance_ to_Market	Length	Width	Height	Owner_Estm _Capacity
Algadarif	مخازن مصطفى	14.030070	35.368610	3	50	15	5	7000
Algadarif	عبداللطيف البدوي	14.030200	35.368030	3	50	15	5	
Algadarif	السر حاج الحسن	14.030050	35.367750	3	50	15	6	3750
Algadarif	قسم السيد إبراهيم	14.329850	35.367530	3	50	15	5	1500
Algadarif	حسن حوى النبي	14.029320	35.366780	3	50	15	6	5625
Algadarif	أمين عبدالرحمن	14.029390	35.366680	3	50	15	6	1875
Algadarif	جعفر العبيد	14.029280	35.036660	3	50	15	6	
Algadarif	عبداللطيف البدوي	14.029550	35.366850	3	50	30	5	
Algadarif	إسحق عيسى إدريس	14.029710	35.367220	3	50	15	5	1500
Algadarif	الأمين آدم	14.029790	35.367310	3	50	15	5	1500
Algadarif	كرم الله عباس	14.029860	35.367500	3	50	15	6	1875
Algadarif	محمد علي عبدالرحمن	14.030050	35.367600	3	50	15	5	1500
Algadarif	الأمين السيد	14.030190	35.367800	3	50	30	5	3000
Algadarif	عثمان الصادق إدريس	14.032380	35.373920	3	50	60	5	6000
Algadarif	علي عبدالكريم	14.032580	35.370940	3	85	15	6	3188
Algadarif	ورثة بلة عرديب	14.032510	35.370010	3	50	30	6	3000
Algadarif	محمد الطيب البشير	14.032420	35.369950	3	50	15	6	1875
Algadarif	محمد الطيب البشير	14.032320	35.369820	3	50	15	6	1875
Algadarif	شركة البحار الدافئة	14.032010	35.369310	3	50	15	6	1875
Algadarif	بنك تنمية الصادرات	14.031890	35.369230	3	50	15	6	4500
Algadarif	البنك الإسلامي فرع القضارف	14.031510	35.368700	3	50	15	6	3750
Algadarif	آدم عبدالله الخليفة	14.031330	35.368400	3	50	15	6	1875
Algadarif	عبدالرحمن باشري	14.031150	35.368260	3	45	15	6	506
Algadarif	عبداللطيف البدوي	14.030330	35.638080	3	50	15	5	1875
Algadarif	مخزن أحمد الكناني	14.030450	35.368210	3	50	15	5	
Algadarif	ورثة عثمان محمد أبوعشر	14.031450	35.370620	3	50	15	5	1500
Algadarif	2300	14.031640	35.370870	3	50	15	5	1500
Algadarif	مخازن أبوغريزة	13.418140	34.630240	1	30	10	4	450
Algadarif	رابح ابكر	13.415770	34.630190	1	33	10	4	
Algadarif	سفيان عبدالله قرشي	14.031430	35.361680	3	50	20	5	
Algadarif	ديوان الزكاة	14.031410	35.362400	3	50	20	6	2000
Algadarif	عبدالمنعم عثمان باشري	14.031540	35.363060	3	15	15	5	1230
Algadarif	محمد أحمد سنهوري	13.031760	35.362030	3	45	12	4	810
Algadarif	ورثة بلة عرديب	14.031610	35.361840	3	40	20	5	1600
Algadarif	جماعة أنصار السنة	14.031920	35.391220	3	32	16	5	1023
Algadarif	سمير وديع قبريال	14.032540	35.360730	2	50	20	6	2500
Algadarif	الإتحاد التعاوني	14.033640	35.359910	3	45	25	6	5605
Algadarif	كرم الله عباس	14.034520	35.360800	3	20	12	5	480
Algadarif	بنك المزارع التجاري	14.034800	35.360360	3	50	45	5	4500
Algadarif	الأمين علي الحاج	14.033670	35.361410	3	50	20	6	2500
Algadarif	مخازن سنهوري	14.032340	35.362060	2	40	20	5	1600
Algadarif	عبدالله عبدالكريم الياس	14.032160	35.363130	3	40	15	5	1200
Algadarif	جعفر العبيد	14.033080	35.364150	3	25	15	5	
Algadarif	هيئة مياه المدن	14.033080	35.361080	3	50	45	6	
Algadarif	كمال إبراهيم الأمير	14.037010	35.301490	3	60	20	6	300
Algadarif	بنك التضامن الإسلامي	14.037760	35.361580	3	60	50	6	
Algadarif	عبدالهادي حسن	14.035550	35.362870	3	20	15	5	600
Algadarif	بنك المزارع التجاري	14.035800	35.360030	3	60	25	6	3750
Algadarif	عبدالرحمن باشري	14.033630	35.364550	3	50	25	6	
Algadarif	شركة محجوب أولاد	14.032620	35.365050	3	45	40	5	
Algadarif	السر حاج الحسن	14.032450	35.364860	3	35	15	4	788
Algadarif	عبدالرحمن باشري	14.032010	35.363540	3	20	15	5	

State	Name_of_Company	GPS_N	GPS_E	Distance_ to_Market	Length	Width	Height	Owner_Estm _Capacity
Algadarif	شركة محجوب أولاد	14.029680	35.359080	3	100	40	6	
Algadarif	مخزن بنك امدرمان الوطني	14.031040	35.358440	3	50	30	6	3750
Algadarif	مخزن بنك امدرمان الوطني	14.031250	35.358210	3	60	40	6	6000
Algadarif	محمد الإمام آدم	14.032470	35.359130	3	20	15	5	
Algadarif	بنك التضامن الإسلامي	14.031160	35.355530	3	100	40	6	10000
Algadarif	كمال إبراهيم الأمير	14.031750	35.355520	3	60	50	6	
Algadarif	شركة الدومة	14.030580	35.355540	3	60	25	5	3750
Algadarif	بنك الحرطوم القضارف	14.029620	35.357390	3	90	60	6	11250
Algadarif	أحمد قرشي جبارة	14.028430	35.355750	3	60	40	6	6000
Algadarif	إسحق عيسى إدريس	14.027720	35.035630	3	60	40	6	6000
Algadarif	الطيب رحمة الله	14.027320	35.356160	3	60	40	6	
Algadarif	القضارف سنتر	14.059880	35.352160	4	50	20	7	
Algadarif	القضارف سنتر	14.057580	35.355850	4	60	45	7	
Algadarif	القضارف سنتر	14.057870	35.355480	4	45	40	6	5400
Algadarif	كرم الله عباس	14.045370	35.367470	4	40	20	6	2000
Algadarif	مخزن صومعة الفرنسي	14.026580	35.355140	3	60	30	6	4500
Algadarif	مخزن صومعة الفرنسي	14.026880	35.354760	3				40000
Algadarif	مفوضية اللاجئين	14.406480	35.857760	3	30	15	5	900
Algadarif	مفوضية اللاجئين	14.407180	35.858960	3	30	10	5	
Algadarif	مفوضية اللاجئين	14.407160	35.859380	3	30	12	3	540
Algadarif	حسن حوى النبي	14.097890	35.466930	10	30	12	5	720
Algadarif	د. علي عبدالرحمن محمد	14.099330	35.468920	10	30	15	5	900
Algadarif	البنك الزراعي	14.104750	34.088070	1	50	20	6	
Algadarif	2387	14.104870	34.087730	0	50	20	6	2500
Algadarif	شركة السودان للأقطان	14.096390	34.091590	0	100	50	6	12500
Algadarif	شركة السودان للأقطان	14.095880	34.093440	0	100	50	6	
Algadarif	شركة السودان للأقطان	14.095060	34.095880	0	100	50	6	12500
Algadarif	شركة السودان للأقطان	14.094490	34.097800	1	100	50	6	12500
Algadarif	2387	13.958530	34.150870	25	50	20	6	2500
Algadarif	البنك الزراعي	13.958410	34.151110	20	50	20	6	2500
Khartoum	مطاحن س للغلال			3	100	30	7	5000
Khartoum	شركة سيقا			4	50	26	7	800
Khartoum	منظمة الدعوة الإسلامية	15.486850	32.550990	5	60	20	4	
Khartoum	منظمة الدعوة الإسلامية	15.486820	32.550240	5	30	12	4	
Khartoum	منظمة الدعوة الإسلامية	15.486610	32.550200	5	30	12	4	
Khartoum	منظمة الدعوة الإسلامية	15.486620	32.550570	5	20	20	4	
Khartoum	منظمة الدعوة الإسلامية	15.489810	32.550130	5	30	12	4	
Khartoum	شركة السكر السودانية	15.487210	32.550000	5	30	42	4	
Khartoum	منظمة الدعوة الإسلامية	15.487210	32.550150	5	30	12	4	
Khartoum	منظمة الدعوة الإسلامية	15.487200	32.550330	5	30	12	4	
Khartoum	شركة سكر كنانة	15.488320	32.535900	1	105	60	6	100000
Khartoum	شركة السكر السودانية	15.489100	32.533740	1	105	60	6	25000
Khartoum	3100	15.495190	32.531610	1	42	19	5	
Khartoum	قود مان للتحزين الخاص	15.494680	32.530780	5	48	19	5	
Khartoum	شركة مروج للمواد الغذائية	15.503770	32.531680	2	60	30	7	
Khartoum	شركة سكر كنانة	15.515090	32.541170	1	89	42	6	10000
Khartoum	شركة سكر كنانة	15.515560	32.540950	1	89	42	6	10000
Khartoum	شركة سكر كنانة	15.515140	32.540570	1	89	42	6	10000
Khartoum	شركة سكر كنانة	15.515460	32.539990	1	89	42	6	10000
Khartoum	شركة سكر كنانة	15.515570	32.539100	1	50	40	6	12500
Khartoum	شركة سكر كنانة	15.515440	32.539060	1	50	40	6	12500
Khartoum	ديوان الزكاة	15.513700	32.525120	1	40	34	6	

State	Name_of_Company	GPS_N	GPS_E	Distance_ to_Market	Length	Width	Height	Owner_Estm _Capacity
Khartoum	شركة السكر السودانية	15.580240	32.515610	2	67	38	5	6000
Khartoum	شركة السكر السودانية	15.510680	32.515800	2	80	40	4	6000
Khartoum	شركة السكر السودانية	15.579850	32.515820	2	80	40	4	6000
Khartoum	شركة السكر السودانية	15.579900	32.515080	5				6000
Khartoum	التأمين الإجتماعي	15.587490	32.515960	2	50	20	5	
Khartoum	شركة كوفتي	15.574800	32.509290	2	60	40	6	
Khartoum	شركة الجزيرة للتجارة	15.560710	32.519880	4	120	60	10	
Khartoum	شركة السكر السودانية	15.560650	32.519420	10	120	28	8	7500
Khartoum	شركة السكر السودانية	15.560620	32.518940	2	120	28	8	7500
Khartoum	شركة السكر السودانية	15.560590	32.518730	2	120	30	8	7500
Khartoum	شركة السكر السودانية	15.558890	32.515620	2	126	30	6	8000
Khartoum	شركة السكر السودانية	15.558540	32.515720	2	130	26	6	7500
Khartoum	شركة كوفتي	15.556980	32.518000		40	20	6	
Khartoum	شركة كوفتي	15.557300	32.520110	3	40	25	7	
Khartoum	شركة كوفتي	15.554820	32.516780	3	35	20	7	
Khartoum	مطاحن س للغلال	15.640350	32.552950	3	50	30	5	
Khartoum	مطاحن س للغلال	15.640670	32.552400	3	100	30	7	
Khartoum	مطاحن س للغلال	15.644360	32.552520	3	100	30	7	
Khartoum	شركة مروج للمواد الغذائية	15.503870	32.530690	2	60	30	7	
Khartoum	منظمة الدعوة الإسلامية	15.523500	32.528290	25	20	10	6	
Khartoum	منظمة الدعوة الإسلامية	15.523390	32.528310	3	45	15	6	
Khartoum	الرمال الذهبية	15.514810	32.544290	1	32	20	7	2000
Khartoum	الرمال الذهبية	15.514720	32.544160	1	45	20	7	
Khartoum	شركة فيتا	15.668840	32.468770	0	40	14	6	
Khartoum	شركة فيتا	15.668740	32.468760	0	40	14	6	
Khartoum	شركة فيتا	15.668370	32.468630	0	40	14	6	
Khartoum	شركة فيتا	15.668150	32.468770	0	40	14	6	
Khartoum	شركة فيتا	15.668260	32.468380	0	40	17	7	
Khartoum	أولاد شندي	15.674280	32.462390	0	55	38	6	
Khartoum	مجموعة شركات معاوية البرير	15.555610	32.509100	2	40	23	7	
Khartoum	مجموعة شركات معاوية البرير	15.556250	32.510410	2	90	25	8	
Khartoum	مجموعة شركات معاوية البرير	15.555510	32.519880	8	50	20	6	
Khartoum	مجموعة شركات معاوية البرير	15.559520	32.517220	0	80	72	6	
Khartoum	مجموعة شركات معاوية البرير	15.554540	32.514810	0	36	20	6	
Khartoum	مجموعة شركات معاوية البرير	15.559860	32.514960	2	42	12	6	
Khartoum	أعمال الهلال التجارية	15.554800	32.521850	2	50	30	6	
Khartoum	أعمال الشفيع التجارية	15.554020	32.521070	8	35	26	8	
Aljazeera	الإدارة العامة للتجارة	14.368950	33.533020	1	60	30	6	
Aljazeera	الإدارة العامة للتجارة	14.370660	33.536820	1	48	18	6	
Aljazeera	الإدارة العامة للتجارة	14.370630	33.537080	1	48	18	6	
Aljazeera	الإدارة العامة للتجارة	14.370510	33.536310	1	48	18	6	
Aljazeera	شركة السكر السودانية	14.370140	33.534730	1	100	40	8	
Aljazeera	شركة السكر السودانية	14.370150	33.534280	1	60	30	6	
Aljazeera	شركة السكر السودانية	14.369920	33.533430	1	100	40	8	11110
Aljazeera	شركة السكر السودانية	14.369000	33.534720	1	60	30	6	
Aljazeera	مصنع بركة للبسكويت	14.370600	33.536050	1	48	18	6	
Aljazeera	التخطيط العمراني	14.370520	33.536060	1	48	18	6	
Aljazeera	ديجيتك	14.370590	33.536320	1	48	18	6	
Aljazeera	أنس خوان للأثاث	14.370610	33.536570	1	48	18	6	
Aljazeera	مصنع بركة للبسكويت	14.370550	33.536560	1	48	18	6	
Aljazeera	مصنع بركة للبسكويت	14.370650	33.536900	1	48	18	6	
Aljazeera	مصنع بركة للبسكويت	14.370560	33.537110	1	48	18	6	

State	Name_of_Company	GPS_N	GPS_E	Distance_ to_Market	Length	Width	Height	Owner_Estm _Capacity
Aljazeera	مصنع بركة للبسكويت	14.370570	33.537360	1	48	15	6	
Aljazeera	مصنع بركة للبسكويت	14.370520	33.537650	1	48	15	6	
Aljazeera	مصنع بركة للبسكويت	14.370500	33.537850	1	48	15	6	
Aljazeera	مصنع بركة للبسكويت	14.370510	33.538110	1	48	15	6	
Aljazeera	مفوضية الإنتخابات	14.370490	33.538350	1	48	15	6	
Aljazeera	ديوان الزكاة	14.370700	33.538340	1	48	12	6	
Aljazeera	ديوان الزكاة	14.370660	33.538100	2	48	12	6	
Aljazeera	شركة البوادي للأثاثات	14.370670	33.537870	1	48	12	6	
Aljazeera	هيئة مياه المدن	14.370690	33.537610	1	48	12	6	
Aljazeera	شركة دار الأرقم للأثاثات	14.370670	33.537400	1	48	12	6	
Aljazeera	ديوان الزكاة	14.371060	33.531560	1	110	40	8	
Aljazeera	الشركة الليبية	14.370090	33.531600	1	100	40	8	
Aljazeera	مخازن أبوسنون	14.370140	33.532150	1	100	20	8	
Aljazeera	مخازن أبوسنون	14.371150	33.532110	1	100	20	8	
Aljazeera	البنك الزراعي	14.356940	33.534920	2	105	35	6	10000
Aljazeera	البنك الزراعي	14.359080	33.533350	2	60	40	6	5800
Aljazeera	البنك الزراعي	14.362980	33.529680	2	60	40	6	5600
Aljazeera	البنك الزراعي	14.362150	33.529680	2	100	40	6	10000
Aljazeera	تاجر	14.357630	33.534340	2	25	20	6	
Aljazeera	البنك الزراعي	14.368470	33.533900	2	25	15	6	
Aljazeera	تاجر	14.368420	33.533510	2	50	25	8	
Aljazeera	مشروع الجزيرة	14.315740	33.534980	2	40	20	6	
Aljazeera	مشروع الجزيرة	14.315740	33.534620	2	30	15	6	
Aljazeera	مشروع الجزيرة	14.330110	33.529720	2	100	40	8	7650
Aljazeera	شركة أرض المحنة الزراعية	14.342270	33.528820	2	110	50	8	
Aljazeera	شركة أرض المحنة الزراعية	14.332320	33.529180	2	110	50	8	
Aljazeera	شركة أرض المحنة الزراعية	14.331080	33.529160	2	110	50	8	
Aljazeera	شركة أرض المحنة الزراعية	14.337950	33.532400	2	20	10	5	
Aljazeera	البنك الزراعي	14.246440	32.782940	38	100	40	8	10000
Aljazeera	مطاحن مريدي للغلال	14.248930	33.008950	1	50	20	6	
Aljazeera	مطاحن مريدي للغلال	14.249250	33.008720	1	40	15	5	
Aljazeera	مطاحن سقيد للغلال	14.249870	33.010810	1	100	40	6	
Aljazeera	مطاحن سقيد للغلال	14.249870	33.011150	1	60	50	6	
Aljazeera	مطاحن سقيد للغلال	14.250500	33.011750	1	100	20	6	
Aljazeera	شركة السكر السودانية	14.244680	33.012110	1	60	20	5	
Aljazeera	شركة السكر السودانية	14.244780	33.011820	1	60	20	5	
Aljazeera	مشروع الرهد / كنانة	14.243970	33.012100	1	60	20	5	
Aljazeera	مصنع دار النعيم	14.243890	33.012530	1	60	20	5	
Aljazeera	تاجر	14.242780	33.011140	1	100	40	6	10000
Aljazeera	تاجر	14.243090	33.011120	1	100	20	6	
Aljazeera	مطاحن الفكي هاشم للغلال	14.243490	33.022360	2	100	60	6	
Aljazeera	الإدارة العامة للتجارة	14.254930	32.981400	0	30	20	6	
Aljazeera	مشروع الرهد / كنانة	14.436330	33.787220	1	40	15	6	
Aljazeera	مشروع الرهد / كنانة	14.436140	33.787640	1	25	10	5	
Aljazeera	مشروع الرهد / كنانة	14.320130	33.840480	10	25	10	5	
Aljazeera	مشروع الرهد / كنانة	14.320630	33.840150	10	40	15	6	
Aljazeera	مشروع الرهد / كنانة	14.216430	33.894960	20	40	15	6	
Aljazeera	مشروع الرهد / كنانة	14.216820	33.894890	20	25	10	5	
Aljazeera	مشروع الرهد / كنانة	14.260930	33.962180	30	40	15	6	
Aljazeera	مشروع الرهد / كنانة	14.260040	33.962310	30	25	10	5	
Aljazeera	مشروع الرهد / كنانة	14.486500	33.657470	15	40	15	6	
Aljazeera	مشروع الرهد / كنانة	14.486830	33.657260	15	25	10	5	

State	Name_of_Company	GPS_N	GPS_E	Distance_ to_Market	Length	Width	Height	Owner_Estm _Capacity
Aljazeera	شركة مطاحن غلال رفاعة	14.761770	33.383480	8	80	20	6	
Aljazeera	شركة مطاحن غلال رفاعة	14.761780	33.383790	8	40	20	8	
Aljazeera	شركة مطاحن غلال رفاعة	14.762020	33.383590	8	90	20	8	
Aljazeera	شركة مطاحن غلال رفاعة	14.762680	33.383950	8	80	20	8	
Aljazeera	شركة أرض المحنة الزراعية	14.747010	33.288670	2	40	15	6	
Aljazeera	شركة أرض المحنة الزراعية	14.757510	33.286350	2	100	50	8	
Aljazeera	البنك الزراعي	14.757860	33.284440	2	100	40	8	
Aljazeera	شركة أرض المحنة الزراعية	14.749860	33.287040	2	50	20	6	
Aljazeera	البنك الزراعي	14.747610	33.282570	2	30	20	5	
Aljazeera	بنك المزارع التجاري فرع الحصاحيصا	14.761470	33.301900	1	50	20	6	
Aljazeera	شركة مطاحن غلال النهرين	14.760750	33.296690	1	50	40	8	
Aljazeera	شركة مطاحن غلال النهرين	14.761190	33.297020	1				900
Aljazeera	معصرة زيوت إبن الحاج	14.760520	33.297750	1	40	15	6	
Aljazeera	معصرة زيوت إبن الحاج	14.760640	33.297510	1	25	10	6	
Aljazeera	معصرة زيوت إبن الحاج	14.760370	33.297320	1	30	25	6	
Aljazeera	تاجر	14.759810	33.292220	1	80	15	6	
Aljazeera	تاجر	14.770610	33.298780	1	50	10	6	
Aljazeera	شركة الحزم التقنية	14.744320	33.227340	8	70	70	8	
Aljazeera	شركة الحزم التقنية	14.744420	33.227940	8	25	20	8	
Aljazeera	شركة السكر السودانية	14.760560	33.295410	2	30	15	6	
Aljazeera	شركة السكر السودانية	14.761960	33.295700	2	50	20	6	
Aljazeera	تاجر	14.759170	33.291910	2	25	15	6	
Aljazeera	تاجر	14.758890	33.291480	2	25	15	6	
Aljazeera	شركة البوادي للأثاثات	14.758570	33.292670	2	30	15	6	
Aljazeera	مصنع غزل الحاج عبدالله - وزارة الزراعة	13.973640	33.591330	50	60	40	8	
Aljazeera	مصنع غزل الحاج عبدالله - وزارة الزراعة	13.972710	33.593190	50	60	40	8	
Aljazeera	مصنع غزل الحاج عبدالله - وزارة الزراعة	13.971750	33.592690	50	60	40	8	
Aljazeera	مصنع غزل الحاج عبدالله - وزارة الزراعة	13.972590	33.590810	50	60	40	8	
Aljazeera	شركة أرض المحنة الزراعية	15.339900	33.750750	40	105	35	8	
Aljazeera	شركة أرض المحنة الزراعية	15.341910	32.754800	40	30	10	4	
Aljazeera	شركة أرض المحنة الزراعية	15.342310	32.754850	40	20	15	5	
Aljazeera	شركة أرض المحنة الزراعية	15.343150	32.754820	40	50	20	6	
Aljazeera	شركة الشيخ مصطفى الأمين التجارية	15.345450	32.737490	40	100	40	6	
Aljazeera	شركة الشيخ مصطفى الأمين التجارية	15.345160	32.738570	40	110	40	8	
Aljazeera	شركة الشيخ مصطفى الأمين التجارية	15.343130	32.739540	40	50	20	6	
Aljazeera	شركة الشيخ مصطفى الأمين التجارية	15.343890	32.740030	40	50	20	6	
Aljazeera	شركة الشيخ مصطفى الأمين التجارية	15.341690	32.737010	40				2000
Aljazeera	الشركة الكبرى لمطاحن الغلال	15.320490	32.829800	70	70	45	6	
Aljazeera	الشركة الكبرى لمطاحن الغلال	15.320630	32.828450	70				50000
Aljazeera	شركة الحبوب الزيتية الحدودة	15.338130	32.745890	40	100	30	6	
Aljazeera	شركة الحبوب الزيتية الحدودة	15.337840	32.745530	40	100	30	6	
Aljazeera	شركة مطاحن غلال الباقير	15.350120	32.760210	40				8000
Aljazeera	شركة مطاحن غلال الباقير	15.350950	32.761140	40	70	15	6	
Aljazeera	شركة مطاحن غلال الباقير	15.351070	32.761340	40	70	15	6	
Aljazeera	شركة مطاحن غلال الباقير	15.350220	32.759210	40	100	50	6	
Aljazeera	شركة مطاحن سيقا 2	15.352880	32.743380	40				25000
Aljazeera	شركة مطاحن سوفت للدقيق	15.360560	32.759330	40	24	24	8	
Aljazeera	شركة مطاحن سوفت للدقيق	15.360360	32.758980	40				10500
Aljazeera	مخزن علي أبرسي	15.353910	32.760770	40	50	20	6	
Aljazeera	تاجر	15.356470	32.757300	40	25	10	5	

State	Name_of_Company	GPS_N	GPS_E	Distance_ to_Market	Length	Width	Height	Owner_Estm _Capacity
Aljazeera	تاجر	15.356470	32.757300	40	25	10	5	
Aljazeera	تاجر	15.356470	32.757040	40	25	10	5	
Aljazeera	بنك المزارع التجاري فرع المسعودية	15.357590	32.757750	40	40	15	8	
Aljazeera	تاجر	15.360770	32.752820	40	50	20	6	
White Nile	أسم تاجر	13.015390	31.874200	225	30	12	4	
White Nile	أسم تاجر	13.014120	31.874730	1	60	20	6	
White Nile	أسم تاجر	13.014730	31.874860	1	30	20	5	
White Nile	أسم تاجر	13.013600	31.875730	1	30	20	5	
White Nile	الشركة القطرية	13.013920	31.877310	1	100	50	6	
White Nile	أسم تاجر	13.012480	31.876850	1	40	20	5	
White Nile	4200	13.013160	31.874330	1	20	15	5	
White Nile	أسم تاجر	13.015020	31.871840	0	20	15	5	
White Nile	أسم تاجر	13.014820	31.869760	1	40	15	5	
White Nile	أسم تاجر	13.014820	31.869760	1	30	20	5	
White Nile	أسم تاجر	13.017050	31.865370	1	30	20	5	
White Nile	البنك الزراعي	13.017770	31.865810	0	20	15	5	
White Nile	السكة حديد	13.017480	31.867330	1	30	20	4	
White Nile	أسم تاجر	13.016440	31.868080	1	40	20	5	
White Nile	أسم تاجر	13.016970	31.868340	1	20	20	5	
White Nile	البنك الزراعي	13.994490	32.306360	1	25	20	5	
White Nile	البنك الزراعي	13.994190	32.306480	1	40	20	6	
White Nile	البنك الزراعي	13.992720	32.307110	0	90	15	5	
White Nile	البنك الزراعي	13.982770	32.316650	1	40	20	5	
White Nile	أسم تاجر	13.992470	32.304180	1	30	20	5	
White Nile	وزارة الزراعة	13.150830	31.689120	2	100	42	6	
White Nile	البنك الزراعي	13.150240	32.687870	2	50	15	4	
White Nile	أسم تاجر	13.148980	32.689370	2	30	15	3	
White Nile	أسم تاجر	13.149560	32.690450	2	40	10	5	
White Nile	أسم تاجر	13.149900	32.691120	3	40	15	5	
White Nile	أسم تاجر	13.148630	32.690510	3	60	20	5	
White Nile	أسم تاجر	13.147160	32.689920	4	40	10	5	
White Nile	أسم تاجر	13.147050	32.690940	2	50	10	4	
White Nile	أسم تاجر	13.147460	32.690810	3	40	10	5	
White Nile	أسم تاجر	13.139000	32.696350	2	60	10	5	
White Nile	برنامج الغذاء العالمي	13.144310	32.691920	4	100	40	6	
White Nile	أسم تاجر	13.144350	32.695740	2	40	10	3	
White Nile	أسم تاجر	13.143870	32.694390	4	35	10	5	
White Nile	أسم تاجر	13.143260	32.698260	4	40	20	5	
White Nile	المخزون الإستراتيجي	13.142050	32.697040	4	60	20	6	
White Nile	الزكاة	13.141420	32.693810	2	50	20	5	
White Nile	أسم تاجر	13.141520	32.693250	4	120	20	4	
White Nile	أسم تاجر	13.140960	32.693830	4	100	15	4	
White Nile	أسم تاجر	13.141040	32.694590	4	30	15	4	
White Nile	أسم تاجر	13.148600	32.688110	2	100	20	5	
White Nile	أسم تاجر	13.148510	32.688220	4	30	10	3	
White Nile	أسم تاجر	13.140010	32.695800	2	100	12	5	
White Nile	أسم تاجر	13.139370	32.694820	4	100	10	5	
White Nile	أسم تاجر	13.138590	32.695160	2	60	15	5	
White Nile	أسم تاجر	13.138640	32.693810	3	60	60	4	
White Nile	أسم تاجر	13.138310	32.693770	3	60	40	5	
White Nile	أسم تاجر	13.139460	32.694300	2	40	10	5	
White Nile	أسم تاجر	13.140420	32.697660	4	50	15	5	

State	Name_of_Company	GPS_N	GPS_E	Distance_ to_Market	Length	Width	Height	Owner_Estm _Capacity
White Nile	المخزون الإستراتيجي	13.140540	32.698130	4	30	15	5	
White Nile	المخزون الإستراتيجي	13.140270	32.698180	4	80	20	5	
White Nile	أسم تاجر	13.140910	32.697990	4	40	15	5	
White Nile	أسم تاجر	13.139470	32.697270	4	50	15	5	
White Nile	أسم تاجر	13.140510	32.698720	2	40	15	4	
White Nile	أسم تاجر	13.140190	32.698570	2	40	15	5	
White Nile	داماس	13.139360	32.698290	4	40	20	5	
White Nile	أسم تاجر	13.138540	32.697800	3	40	20	4	
White Nile	أسم تاجر	13.138120	32.698140	2	40	15	5	
White Nile	أسم تاجر	13.137500	32.698100	2	40	15	5	
White Nile	أسم تاجر	13.137500	32.698060	2	40	10	4	
White Nile	أسم تاجر	13.138560	32.699540	3	30	20	4	
White Nile	أسم تاجر	13.136480	32.699680	3	50	20	4	
White Nile	أسم تاجر	13.138160	32.699570	3	60	30	6	
White Nile	أسم تاجر	13.136660	32.687890	3	100	15	5	
White Nile	أسم تاجر	13.140050	32.691570	3	50	30	6	
White Nile	أسم تاجر	13.137100	32.692760	4	80	30	3	
White Nile	أسم تاجر	13.137050	32.695720	4	100	20	6	
White Nile	أسم تاجر	13.138550	32.695530	4	130	50	5	
White Nile	البنك الزراعي	13.135770	32.692230	4	80	20	6	
White Nile	البنك الزراعي	13.135850	32.692020	4	40	30	6	
White Nile	أسم تاجر	13.134060	32.695800	2	40	10	5	
White Nile	أسم تاجر	13.134040	32.696280	2	40	10	4	
White Nile	أسم تاجر	13.133610	32.696100	3	40	15	4	
White Nile	أسم تاجر	13.134030	32.696920	4	50	20	5	
White Nile	أم بادر	13.133390	32.696650	5	30	10	5	
White Nile	أسم تاجر	13.133240	32.697220	4	50	20	5	
White Nile	أسم تاجر	13.133050	32.697770	4	40	30	6	
White Nile	أسم تاجر	13.132830	32.697810	4	35	15	5	
White Nile	أسم تاجر	13.134370	32.697300	3	30	20	5	
White Nile	أسم تاجر	13.134370	32.697510	3	40	20	5	
White Nile	أسم تاجر	13.136050	32.696700	3	50	20	4	
White Nile	أسم تاجر	13.134320	32.700970	4	30	15	4	
White Nile	أسم تاجر	13.134130	32.700400	4	50	20	4	
White Nile	أسم تاجر	13.134430	32.699390	3	40	20	5	
White Nile	برنامج الغذاء العالمي	13.132900	32.698220	4	100	40	10	
White Nile	أسم تاجر	13.132850	32.699450	2	50	20	5	
White Nile	أسم تاجر	13.133480	32.699590	3	30	15	5	
White Nile	أسم تاجر	13.133510	32.699710	3	30	15	5	
White Nile	أسم تاجر	13.132690	32.700070	5	50	20	5	
White Nile	أسم تاجر	13.131960	32.699690	5	50	20	5	
White Nile	أسم تاجر	13.131790	32.699750	5	40	15	5	
White Nile	أسم تاجر	13.130340	32.701500	5	40	15	5	
White Nile	البنك الزراعي	13.185430	32.732730	2	100	40	8	
White Nile	برنامج الغذاء العالمي	13.184800	32.731690	2	50	40	8	
White Nile	أسم تاجر	13.186870	32.732390	2	30	15	8	
White Nile	أسم تاجر	13.186890	32.732320	2	30	30	8	
White Nile	أسم تاجر	13.186470	32.731970	2	30	15	8	
White Nile	أسم تاجر	13.189440	32.727750	2	70	60	6	
White Nile	أسم تاجر	13.190820	32.728400	3	100	20	5	
White Nile	4200	13.190480	32.728920	1	50	20	5	
White Nile	أسم تاجر	13.191140	32.729320	1	50	20	5	

State	Name_of_Company	GPS_N	GPS_E	Distance_ to_Market	Length	Width	Height	Owner_Estm _Capacity
White Nile	أسم تاجر	13.191220	32.728310	2	40	20	5	
White Nile	أسم تاجر	13.190400	32.729900	1	60	20	5	
White Nile	أسم تاجر	13.188840	32.729550	1	80	20	5	
White Nile	أسم تاجر	13.188840	32.729320	3	30	15	4	
White Nile	أسم تاجر	13.193990	32.728280	1	50	20	5	
White Nile	شركة كنانة	13.193720	32.727940	1	30	25	5	
White Nile	أسم تاجر	13.194460	32.722660	3	40	20	5	
White Nile	أسم تاجر	13.194520	32.726990	3	30	10	6	
White Nile	أسم تاجر	13.194240	32.726230	1	40	20	5	
White Nile	أسم تاجر	13.196170	32.727990	1	50	20	6	
White Nile	أسم تاجر	13.198230	32.726050	4	50	40	6	
White Nile	أسم تاجر	13.200190	32.726040	3	30	10	4	
White Nile	أسم تاجر	13.198970	32.726830	2	50	10	6	
White Nile	صومعة ربك	13.215230	32.830230	13				
White Nile	صومعة ربك	13.216260	32.831230	13	70	40	6	
Sinnar	4302	13.154040	33.920270	1	50	20	7	3000
Sinnar	4303	13.154260	33.919810	1	65	25	7	3000
Sinnar	4304	13.158970	33.910610	1	100	45	8	6300
Sinnar	4302	13.158580	33.911420	1	52	20	6	1800
Sinnar	4305	13.158480	33.911500	1	52	20	6	1800
Sinnar	4305	13.079190	33.941170	7	25	12	5	
Sinnar	4306	13.139770	33.929430	2	30	10	6	
Sinnar	4307	13.144870	33.925750	1	35	35	5	500
Sinnar	4300	13.151860	33.927360	2	40	23	5	20000
Sinnar	4300	13.151780	33.927590	2	40	15	5	1500
Sinnar	4300	13.151730	33.927760	2	40	10	5	1500
Sinnar	4308	13.544700	33.602390	2	50	20	7	
Sinnar	4304	13.552620	33.538700	5	100	40	7	1000
Sinnar	4310	13.539210	33.576630	2	50	20	6	5000
Sinnar	4318	13.544960	33.571280	1	40	15	6	
Sinnar	4308	13.545700	33.602390	2	45	17	6	1250
Sinnar	4309	13.555050	33.560550	2	110	40	10	9000
Sinnar	4304	13.552620	33.568700	5	100	40	7	1000
Sinnar	4310	13.539210	33.576630	2	35	18	6	
Sinnar	4304	13.543920	33.609020	2	100	40	7	1000
Sinnar	4320	13.546680	33.595010	1	25	15	5	
Sinnar	4308	13.545100	33.599420	2	32	12	8	4500
Sinnar	4311	12.509850	34.099710	1	30	15	4	630
Sinnar	4311	12.472150	34.027230	9	30	15	4	700
Sinnar	4312	12.503930	34.099980	2	35	15	5	500
Sinnar	4313	12.694860	34.115210	18	60	35	6	3150
Sinnar	4313	12.691060	34.115520	18	70	30	5	1800
Sinnar	4313	12.690590	34.115520	18	60	15	6	1800
Sinnar	4313	12.690030	34.116310	18	30	20	5	360
Sinnar	4311	12.943410	34.014900	1	20	10	5	900
Sinnar	4314	12.932480	34.023820	1	32	12	7	4000
Sinnar	4315	13.546640	33.596330	1	32	12	6	900
Sinnar	4315	13.546450	33.592800	1	75	10	5	
Sinnar	4316	13.548900	33.569440	1	60	15	6	3000
Sinnar	4317	13.548030	33.569210	1	50	10	5	1000
Sinnar	4317	13.547980	33.569880	1	40	15	6	1000
Sinnar	4318	13.544960	33.571120	1	70	15	6	

State	Name_of_Company	GPS_N	GPS_E	Distance_ to_Market	Length	Width	Height	Owner_Estm _Capacity
Sinnar	4331	13.555660	33.566310	2	20	15	5	1400
Sinnar	4300	13.551550	33.057160	2	20	10	5	900
Sinnar	4319	13.545270	33.594140	1	40	20	8	
Sinnar	4319	13.545260	33.594500	1	30	15	8	
Sinnar	4320	13.546680	33.595010	1	60	20	6	3000
Sinnar	4321	13.545270	33.598200	1	40	20	6	10000
Sinnar	4334	13.591050	33.918240	4	80	20	7	
Sinnar	4322	12.833880	34.080430	13	45	16	5	2700
Sinnar	4302	13.155040	33.917970	2	45	15	7	1620
Sinnar	4323	13.155150	33.918450	2	48	12	5	2200
Sinnar	4324	13.155410	33.917770	2	60	20	6	4000
Sinnar	4325	13.154580	33.918290	2	20	10	6	300
Sinnar	4300	13.151630	33.927160	1	52	16	6	1980
Sinnar	4328	13.149150	33.926620	2	32	15	5	1000
Sinnar	4327	13.150170	33.924600	2	15	10	5	450
Sinnar	4328	13.151380	33.925720	2	30	20	4	900
Sinnar	4329	13.543710	33.601870	2	52	20	6	3500
Sinnar	4329	13.453490	33.603050	2	50	20	6	3500
Sinnar	4330	13.553020	33.565340	1	60	15	7	3000
Sinnar	4331	13.553660	33.566310	1	30	8	5	1400
Sinnar	4332	13.546650	33.593180	1	36	15	9	1530
Sinnar	4332	13.547190	33.593110	1	75	15	9	5000
Sinnar	4314	13.544100	33.603370	1	25	12	6	700
Sinnar	4300	13.328860	33.896470	1	30	12	6	500
Sinnar	4339	13.557610	33.561890	2	20	20	4	600
Sinnar	4333	13.323210	33.889590	1	20	10	5	
Sinnar	4309	13.438470	33.769650	18	75	40	10	15000
Sinnar	4304	13.440820	33.767700	18				13000
Sinnar	4334	13.591050	33.918240	50	16	12	6	
Sinnar	4335	13.591860	33.917660	44	12	10	5	
Sinnar	4336	13.546040	33.661400	6	80	20	5	
Sinnar	4302	13.548270	33.557000	6	30	10	5	500
Sinnar	4337	13.551260	33.540380	8	50	20	4	1500
Sinnar	4333	13.563180	33.549980	1	50	15	4	
Sinnar	4309	13.546950	33.593790	2	100	40	10	13500
Sinnar	4312	13.546280	33.611630	2	30	10	6	
Sinnar	4338	12.552910	33.742870	160	45	9	7	
Sinnar	4338	12.553710	33.743010	160	27	10	6	636
Sinnar	4305	12.470750	33.687310	160	50	12	6	1919
Sinnar	4338	12.385150	33.645260	160	27	10	6	636
Sinnar	4338	12.433590	33.702690	160	27	10	6	636
Sinnar	4338	12.432950	33.702590	160	45	9	7	
Sinnar	4338	12.532620	33.812320	160	27	10	6	636
Sinnar	4338	12.533100	33.812240	160	45	9	7	
Sinnar	4339	13.557610	33.561890	2	60	15	8	
Sinnar	4339	13.567610	33.561890	2	60	15	8	
Sinnar	4339	13.557610	33.561890	2	35	20	5	
Sinnar	4339	13.557610	33.561890	2	20	15	8	
Sinnar	4339	13.557610	33.561890	2	30	15	8	
Sinnar	4339	13.545300	33.593560	1	80	25	6	
Sinnar	4339	13.545210	33.602950	1	110	30	8	
Blue Nile	منظمة الدعوة الإسلامية				30	15	4	10000

State	Name_of_Company	GPS_N	GPS_E	Distance_ to_Market	Length	Width	Height	Owner_Estm _Capacity
Blue Nile	بابكر عثمان الحاج	11.783840	34.366820	12	50	30	7	4500
Blue Nile	فهمي نجم الدين	11.783010	34.366870	12	100	20	10	
Blue Nile	فهمي نجم الدين	11.782940	34.367260	12	50	20	8	3000
Blue Nile	محمد صديق حمد	11.784190	34.363140	12	40	25	7	4000
Blue Nile	الفاتع عبداللعبوش	11.785780	34.364680	12	26	7	5	450
Blue Nile	4400	11.812250	34.343490	12	100	20	10	
Blue Nile	السكة حديد	11.798130	34.344260	12	35	15	5	800
Blue Nile	الشركة العربية	11.807650	34.070450	35	30	8	7	720
Blue Nile	الشركة العربية	11.812030	34.342720	12	27	14	7	
Blue Nile	الشركة العربية	11.812440	34.342310	12	27	14	7	
Blue Nile	الشركة العربية	11.786300	34.360000	12	30	25	6	60000
Blue Nile	بابكر الشريف	11.791850	34.344100	12				
Blue Nile	ديوان الزكاة	11.793890	34.344990	12	80	20	6	4000
Blue Nile	4415	11.787800	34.344720	12	100	30	7	6500
Blue Nile	البنك الزراعي	11.782100	34.361360	12	100	50	7	8500
Blue Nile	شركة التكامل	11.787930	34.365340	12	30	13	6	800
Blue Nile	شركة الدالي والمزموم	11.783330	34.367280	12	50	20	5	1600
Blue Nile	الفرقة الرابعة مشاة	11.790630	34.353300	12	100	45	5	9000
N. Kordofan	برنامج الغذاء العالمي	13.073710	30.114670	4	73	24	6	3500
N. Kordofan	برنامج الغذاء العالمي	13.073910	30.114920	4	73	24	6	4000
N. Kordofan	برنامج الغذاء العالمي	13.074090	30.115070	4	73	24	6	4000
N. Kordofan	برنامج الغذاء العالمي	13.094890	30.141380	8	23	10	3	320
N. Kordofan	برنامج الغذاء العالمي	13.095090	30.141530	8	23	10	3	320
N. Kordofan	برنامج الغذاء العالمي	13.095090	30.141530	8	23	10	3	320
N. Kordofan	وزارة المالية	13.114240	30.132560	3	70	25	6	9000
N. Kordofan	بنك فيصل	13.112210	30.132890	8	30	18	5	500
N. Kordofan	بنك فيصل	13.115430	30.132870	8	30	18	5	500
N. Kordofan	بنك الخرطوم	12.422370	30.384360	0	70	20	6	400
N. Kordofan	مشروع السميح	12.423720	30.414240	17	100	40	12	10000
N. Kordofan	البنك الزراعي	12.534130	31.134120	0	100	40	6	10000
N. Kordofan	البنك الزراعي	0.000000	0.000000	0	25	16	6	700
N. Kordofan	البنك الزراعي	0.000000	0.000000	17	30	18	5	1500
S. Kordofan	البنك الزراعي	12.002740	29.395180	4	50	40	6	6
S. Kordofan	الزراعة المطرية	11.562520	30.014330	2	30	12	5	1000
S. Kordofan	الزراعة المطرية	11.562480	30.014390	2	30	12	5	1000
S. Kordofan	الزراعة المطرية	11.562620	30.014110	2	30	12	5	1000
S. Kordofan	الزراعة المطرية	11.562610	30.014340	2	30	12	5	1000
S. Kordofan	وزارة المالية	12.304650	29.481280	0				6000
S. Kordofan	هيئة جبال النوبة	12.304510	29.480740	0	100	40	7	10000
S. Kordofan	البنك الزراعي	0.000000	0.000000	4	40	30	6	3500
N. Darfur	البنك الزراعي	13.621750	25.385600	2	100	50	6	10000
N. Darfur	المخزون الإستراتيجي	13.629750	25.338490	2	100	50	5	8000
N. Darfur	وزارة المالية	13.619870	25.353260	2	100	25	5	10000
N. Darfur	وزارة التربية والتعليم	13.622800	25.380500	2	100	20	6	8000
W.Darfur	البنك الزراعي				100	10	6	500
W.Darfur	البنك الزراعي				100	10	6	
W.Darfur	البنك الزراعي				100	10	6	600
W.Darfur	المخزون الإستراتيجي	13.433290	22.445730	2	50	20	5	450
W.Darfur	البنك الزراعي	13.434300	22.424630	1	15	8	6	500
W.Darfur	6200	13.434350	22.424660	2				
S. Darfur	البنك الزراعي	12.070400	24.900220	5	100	20	5	5000
S. Darfur	وزارة الزراعة	12.024860	24.894610	5	20	10	5	

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S. Darfur	البنك الزراعي	12.070400	24.900220	3	50	20	6	5000
S. Darfur	6300	12.068170	24.919850	2	100	30	6	8000