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## **The Impact of Early Warning System on Food Security at Red Sea State – Eastern Sudan**

**By**

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## **Dedication**

This thesis is dedicated to soul of my mother

*Fatima Mohammed Sulieman*

Who emphasized the importance of education and worked very hard and exert efforts to educate me and my sisters throughout her life.

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I thank Allah Subhanho Wa Talla who created me and gave me this opportunity to come to South Africa and study a very important Master program in: Disaster Management.

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## Abstract

Since the major famine of 1984/85 the Red Sea State lacked a proper early warning and well defined functioning monitoring system for food security. In response to the current food crisis, the Red Sea State government and International non – Governmental Organizations (NGOs), sought to create a system of early warning based on assessment of certain indicators of vulnerability.

The food security situation in the Red Sea State remains precarious. The region experienced eight major famines during the 20th century. This chiefly stemmed from its geo-political context. The main priority for effective response to food crises remained the strengthening of national institutions for food security monitoring.

This study assessed the impact of the early warning system on food security at the Red Sea state with emphasis on the welfare of the vulnerable groups in Red Sea State. With more focus on:

- ◆ Understanding the modalities of the early warning system in the Red Sea State;
- ◆ Highlighting the coping strategies by local community to food shortage;
- ◆ Verifying indicators which were strongly related to the impact of food security in the RSS;
- ◆ Draw recommendations that can be utilized for sustainability of early warning system for food security in Red Sea State;

Primary data collection involved both quantitative and qualitative data generated from different localities of RSS which represented its agro ecological zones. Samples of households were taken from villages and localities at State levels.

Three questionnaires were designed to collect information on basic household demographic information, questions about early warning system.

The questionnaire and interviews were carried out in Port Sudan town, Rural Port Sudan, Tokar north and south and Halaib Localities.

Secondary data based on review of books, articles, evaluations and assessment, reports and internet.

The main result of this study show that the early warning system:

Based on community interview the food security impact was limited they felt that measures taken by government , donating institutions and other partners did not alleviate the food crisis situation.

Also based on the key informants response, the food security impacts were complex. The lack of continuous funding and the low commitment of the political and economic environment together with poor governance were noted as key factors relating to negative impact of early warning system on food security.

The EWS team respective on food security impact was also low because as the whole system use to depend on central government reserve and mobilization of food aid during the crisis.

The most important recommendations of this study were:

Government interest – it is paramount that the government agrees and supports that an EWS for Food security is necessary in the RSS and that the information provided by the EWS will be reliable enough to help in government planning and action.

Concerted efforts by the government should be persuaded to activate the role of local communities in food production, food accessibility, storage, market behaviour and the decision making process during food security crisis.

Linkage of key informants with the role of EWS team for the purpose of enhancement of dialogue and the decision making process with community creates and enabling environment for quick response during food crises.

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## Acronyms:

RSS	Red Sea State
OGB	Oxfam Great Britain
CSI	Community situation Indicator
EWS	Early Warning System
NGOs	Non Governmental Organizations
CPA	Comprehensive Peace Agreement
GOS	Government of Sudan
SPLM	Sudan People's Liberation Movement
JAM	Joint Assessment Mission
FS	Food Security
WFS	World Food Summit
MDG	Millennium Development Goal
RSFSC	Red Sea Food Security Committee
EW	Early warning
CSI	Community situation Indicator
WFP	World Food Programme
FAO	Food and Agriculture Organization
UNDP	United Nation Development Programme
SANA	Sudan Annual Needs Assessment
ESPA	East Sudan Peace Agreement
SIFSIA	Institutional Capacity Programme Food Security Information for Action
SRA	Strategic Food Reserve Authority
SGR	Strategic Grain Reserve
RSFSC	Red Sea Food Security Committee
MoA	Ministry of Agriculture
TANGO	Technical Assistance to NGOs
MoH	Ministry of Health
SAM	Severe Acute Malnutrition
GAM	Global Acute Malnutrition
HAC	Humanitarian Aid Commission
SRC	Sudanese Red Crescent
CRPs	Community Resource Persons
MOU	Memorandum of Understanding

# Chapter 1

## Introduction

### 1. 1. Introduction:

Over the last century, the Red Sea State (RSS) has experienced, at least, fourteen cycles of drought, which affected its livelihood system. Highly complex concerts of factors, both natural and induced have combined to create a situation of structural poverty. Acute malnutrition indices for RSS were reported to be the highest among all Sudanese states. There was also strong association between malnutrition and proxy indicators of relative poverty (Aziz, 2008).

In order to address the needs of livelihood, Oxfam GB (OGB) initiated its monitoring food security net in 1985 in response to a growing food demand. The Community Situation Indicators (CSI) provided an analytical structure to help diagnose the situation at chosen community sentinel sites. Indicators based on biweekly collection of market prices of stable food crops, movement of population, and nutrition trends (accurate picture of nutrition at a particular moment in time) were analyzed on regular basis (regular information on same individuals over time) (Aziz, 20028).

Data generated were circulated using a food security bulletin, which was being produced on quarterly basis. The bulletin information was designed to alert decision makers to respond quickly to community alleviation intervention measures. CSI has passed through several transitional stages of development before being transformed into an Early Warning System (EWS). Several institutions, government units and NGOS Participated in the exercise of transformation.

The EWS was noticed to be at cross roads by the study which was formulated at the end of 2008 regarding its mandate, dimension and vision (Aziz, 2008).

- ◆ EWS needed a clear understanding of the efficiency and effectiveness.
- ◆ EWS needed a Review on its strengths and weaknesses, credibility, cost-effectiveness and sustainability in regards to institutional, methodological, technical and resource issues; and

- ◆ EWS required technical and institutional recommendations on actions to be taken to strengthen the EWS for improved decision-making at state and national levels (Aziz, 2008).

This study has not been carried out on early warning system because of its importance and multiplicity of useful information that the early warning system provides on food security monitoring components, but also for its unique and not being touch before.

## 1.2. Background

### 1.2.1. The Republic of Sudan:

Situated in northeast Africa (Fig. 1.1), the Sudan is the largest country on the continent. It is bordered with Egypt to the north, Ethiopia and Eritrea to the southeast, Kenya, Uganda and Congo to the south, the Central Africa Republic and Chad to the west and Libya to the northwest (<http://www.africaguide.com/country/sudan/> 2009, March07).

The greatest part of Sudan is vast plain traversed by the northward flowing Nile River and its tributaries. Widely separated mountain chains and many hilly areas reach a maximum altitude of 7,000ft. The northern area is mainly desert, with rock at or near the surface covered by thin soils of low fertility. The western undulating sandy wastes merge into the Red Sea Hills to the east

(<http://www.africaguide.com/country/sudan/> 2009, March07).

The dominating geographical feature of Sudan is the Nile River, formed near Khartoum by the confluence of the Blue Nile and White Nile Rivers. There are natural harbours at Port Sudan and Sawakin on the Red Sea. The highest elevations are in the Marra Mountains, the main mountain range.

(<http://www.africaguide.com/country/sudan/> 2009, March07).

In its sheer size and diversity of geography climate and people, Sudan resembles the entire African continent. More than 80% of its population lives in rural areas, in an area of 2.5 million km<sup>2</sup> as a consequence, so many types of disasters encountered Sudan in the recent 3 three decades (HAC, 2007).

Sudan is considered to be in a special development situation. The current economic status characterized by low standards of living, widespread poverty, and prolonged civil conflict of almost 40 years have contributed to the current fragile state of affairs in the country (Aldoma, 2005).

**1.2.2. Sudan is at a critical juncture.** The successful conclusion of peace negotiations reflected in the Comprehensive Peace Agreement (CPA) on January 2005 between the Government of Sudan (GOS) and the Sudan People's Liberation Movement (SPLM) after decades of conflict poses enormous challenges for the parties and their international partners. Sudan's civil war, the longest running in

Africa, has had a devastating toll in terms of loss of human life, displacement, and destruction of infrastructure and social fabric. Now the people's expectations for better lives are high and there is an historic opportunity to overcome the devastation of war and the neglect of human development in policies and programmes, and to address on this basis the potential for renewed tensions elsewhere. This opportunity comes with substantial domestically-generated oil revenues as well as the expectation of increased donor flows and international support (JAM, 2005).



Figure. 1.1. Sudan map

### **1.3. The Study Area**

The Red Sea State, was the focus of the current study area representing one of the 26 states constituting Sudan.

#### **1.3.1. Red Sea State:**

The Red Sea State falls between latitudes 16° and 22° North and longitudes 35° and 37.5° east in north-eastern Sudan. It is thus part of Sahelian-drought zone which is characterized by low and highly variable rainfall both amounts and geographical distribution. The state has historically been prone to drought and famine conditions, mainly because of the climatic conditions and the topography that does not help in harvesting available water sources, particularly with the primitive technology used (Farah, 2008).

The region experienced eight major famines during the 20th century. While the traditional agro-pastoral production system managed to regenerate and sustain livelihood after most of them with limited external support, after the Sahelian drought of the 1980s, the system failed to retain to a state of normalcy, despite the extensive external help. The severity and longer duration of the drought, desiccation of the herd, gradual loss of traditional leaders' authority, high rates of urban growth and the collapse of the traditional adaptation mechanisms have all contributed to that failure (Aziz, 2008).

#### **1.3.2. Population:**

The total population is about 725,326 persons with an annual growth rate 2.9% and population density of 3.4 persons per sq. km. Population density, however, varies considerably between the different localities of the state, with the coastal areas and major towns accommodating over 70% of the population. While population growth is one of the highest in the country, largely due to migration, the RSS is known for having the lowest natural increase rate (0.52%) in the country (Abdel Ati, 2008).

#### **1.3.3. Administration: -**

State government headed by the state governor "Wali" and Cabinet Secretariat of 10 Ministers. The State is administratively divided into 10 Localities that are headed by a Commissioner. The Cabinet and the Commissioners form the State Legislative Council. The state also recognizes existence of NGO'S & Civic associations (Shingrai, 2008).

#### **1.3.4. Drought and famine in the Red Sea State:**

Famine and famine – like conditions have a long history among the Beja (indigenous tribes of Red Sea State). At the beginning of this century; the Beja economy was marked by the aftermath of widespread disasters. Available data (Egemi 1994) tell that famine outbreaks were produced for the years 1910, 1911, 1920 -21, 1925 -27, 1936, 1939 - 42, 1947 – 49, 1955, 1958 – 60, 1972 – 74, 1979, 1983 – 85 and 1990 (UNDP, 2005).

All these years were described as years of low rainfall, poor grazing, decreased milk production, low crop yields, high durra (sorghum) prices and depressing animal trade, of these the 1983 – 1985 famine will be remembered as the worst of all during this century, not only in Red Sea State Hills but also for the Sudan (UNDP, 2005).

It directly affected 8.5 million people in the country and forced 1.8 million to flee their homes to other areas in search of food. In the Red Sea Hills 350,000 persons were directly affected, with large numbers being forced in massive waves towards the urban centres, relief camps and road sides. The impact of disaster on the Beja and on their pastoral economy was serious; about 90% of the people lost their animals (UNDP, 2005).

#### **1.3.5. Chronic livelihoods vulnerability**

Over the last three decades, livelihood systems in Red Sea State (RSS) have been subject to different environmental and socio-economic challenges. They include drought, floods and long dry spells, negatively impacting on the food security situation of the local population. The predominant ethnic group is the Beja whose traditional livelihood of transhumance pastoralist (moving from place to place in search of water and pastures for livestock) and agro-pastoralist was adapted to the adverse unpredictable climate and limited natural resources in RSS. The Beja and other population groups are now suffering from a chronic livelihoods crisis and acute food insecurity as a result of various long-term macro level factors that have negatively impacted on their ability to grow crops, maintain livestock herds and hence sustain the traditional main sources of food and income. The availability of sufficient pasture and water to sustain large livestock herds has been reduced due to restricted access to traditional pasture areas (partly due to poor water policy and practices that have seen diversion of water from the former dry-

season grazing areas of the Arbaat delta to serve Port Sudan town) and the influx of other non-Beja groups, which in turn have increased the pressure on remaining natural resources and contributed to ecological degradation. Small scale crop production has also been negatively impacted over the last ten years by the rapid spread of Mesquite trees that has significantly reduced the amount of agricultural land, disrupted irrigation channels and provided shelter for pests, particularly in the Delta areas and South Tokar. This has led to increased sharecropping by farmers. A lack of sufficient agricultural extension, inadequate pest control, and inappropriate water harvesting systems has further contributed to the inability to grow crops (Pantuliano, 2002).

### **1.3.6. Food Security (FS) in the State:**

Red sea state rural areas population had experienced several types of food Insecurity extending from mild malnutrition to severe famine during the last century. The accumulated impact of drought cycles and mismanagement of the meager resources culminated in a chronic food security crisis that causes suffering to the nomads and agro pastoralist's population of the state. The hazardous food security situation in rural areas was manifested in the marked shift in the ratio of nomadic population between the two census periods 1983 & 1993 –from 54.72% to 9.42%. The present urban population estimate of 62% indicates the magnitude of the internally displaced people in RSS; compared to 35% in 1983 (Shingrai, 2008).

### **1.3.7. Early warning system in Red Sea State**

In Red Sea State there were some efforts from international organizations in area of early warning, monitoring of the situation such as Sudanese Red Crescent and Oxfam GB, who has for many years, Community Situation Indicators (CSI). The project was formed to respond to a lack of early warning information for food security in the Red Sea state housed in Oxfam GB has been monitoring Food Security and Nutrition indicators yet it does not have the mandate to make decisions or to influence policy. Early warning and early action should go hand in hand and thus the felt need by Oxfam GB to have CSI transform into an EWS for food security for the RSS to provide early warning on food security issues within the state and also to ensure early action is taken (CSI, 2005).

CSI was in the process of transition from being housed and implemented from the Oxfam GB Red Sea State programme to becoming a Food Security Early Warning System for the Red Sea State housed in a public institution where timely and appropriate

decisions are made following the recommendations of the Early Warning system to serve as a basis for response actions (Transition strategy, 2007)

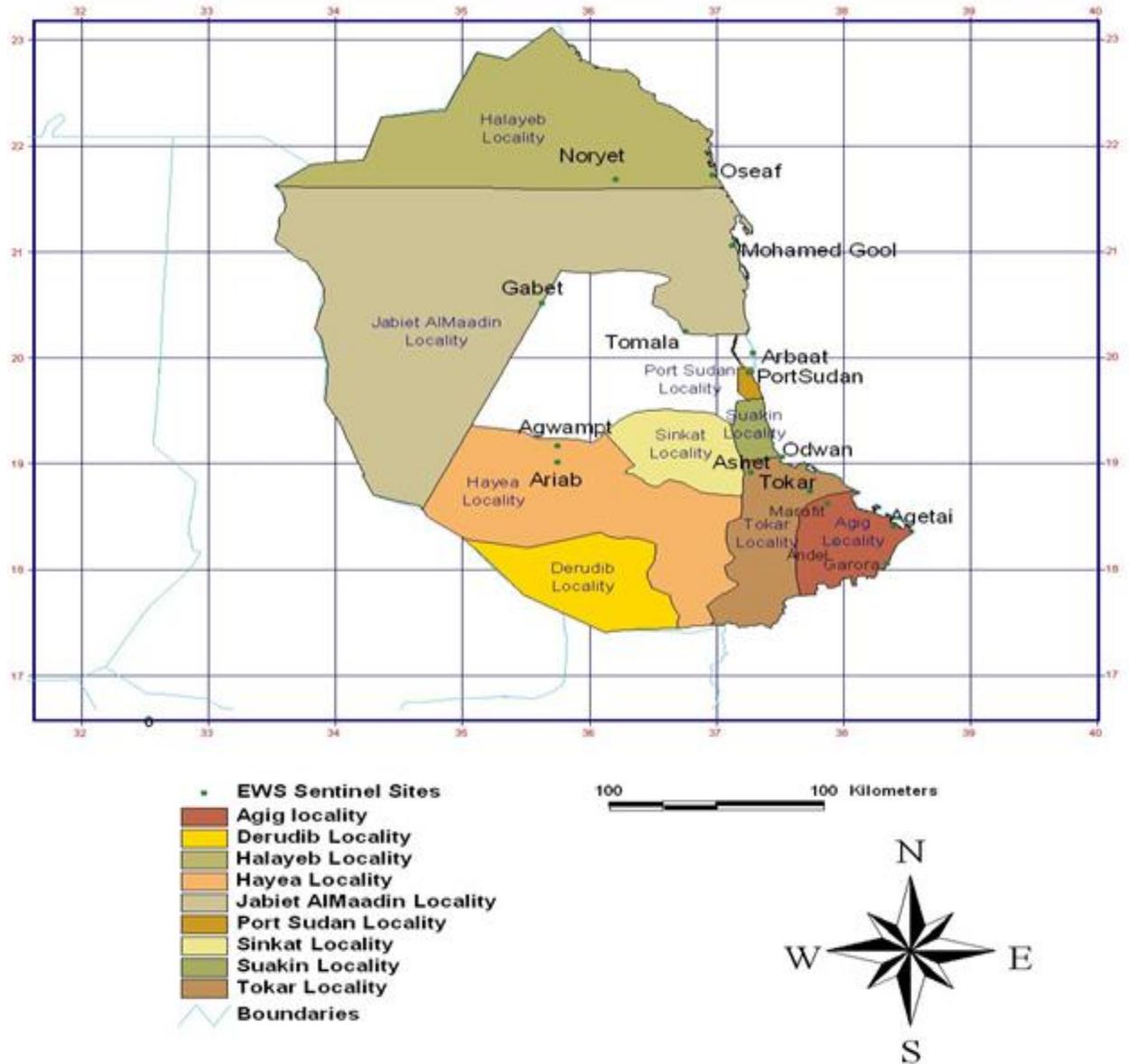


Figure. 1.2. Red Sea State map

## **1.4. The Early warning system**

### **1.4.1. General overview:**

Early warning is a major element of disaster risk reduction. It helps prevent loss of life and reduces the potential economic impact of disasters. To be effective, early warning systems need to actively involve the communities at risk, facilitate public education and awareness; communicate and disseminate warnings and messages, and ensure there is a constant state of preparedness.

([http://www.ewc3.org/upload/downloads/Early\\_warning\\_complete2.pdf](http://www.ewc3.org/upload/downloads/Early_warning_complete2.pdf) 2009, March 07).

Early warning reveals that these systems have generally been effective in alerting countries and donors to impending food crises in the context of seasonal droughts. However, exceptions suggest that inadequate early warning analysis, together with poor communication and coordination; have often contributed to acute food security emergencies that could have been prevented (Tefft, McGuire & Maunder, 2006).

### **1.4.2. Purposes of early warning system**

The purpose of early warning systems is to detect, forecast and when necessary issue alerts related to impending hazard events. In order to fulfill a risk reduction function, however, early warning needs to be supported by information about the actual and potential risks that a hazard poses, as well as the measures people can take to prepare for and mitigate its adverse impact. Early warning information needs to be communicated in such a way that facilitates decision making and timely action of response organization and vulnerable groups (Maskrey 1997)

Early warning system information comes from a number of sources: e.g. meteorological offices, Ministry of Health (disease outbreak) and agriculture (e.g. crop forecast); local and indigenous sources; media sources and increasingly from Internet early warning system ([www.ifrc.org/doc/pubs/disasters/resource](http://www.ifrc.org/doc/pubs/disasters/resource) 2009, March07).

### **1.4.3. Applications of early warning system globally:**

In this part we will test examples of an application of EWS internationally such as the “Cyclone Warning, Andhra Pradesh, India” where the Government was able to evacuate 600,000 people from the cyclone within 40 hours. This was possible because of meteorological forecasts and warnings communicated through advanced and traditional channels to the local community. Fatalities numbers less than one – tenth of the more

than 10,000 people who died in a similar cyclone 13 years before at that time in the same location, where neither warnings, communications, nor local response capacities were established (UN, 1995).

## **1.5. Global Food security**

### **1.5.1. Overview**

Worldwide, some 1 billion people in 70 lower income countries are food insecure, and the situation could grow worse in the poorest countries. Ironically, most of these people live in rural areas where food is produced. But food availability does not guarantee food security, which depends also on the ability to buy food and to utilize it effectively. Individual health and education levels, as well as local conditions such as safety of the water supply, affect the ability to utilize food effectively ([www.ers.usda.gov/Briefing/GlobalFoodSecurity/](http://www.ers.usda.gov/Briefing/GlobalFoodSecurity/) 2009, March 15)

### **1.5.2. What is food security?**

Food security exists when all people, at all times, have physical and economic access to enough safe and nutritious food to meet their dietary needs and food preferences for an active and healthy lifestyle. Household food security is the application of this concept to the family level, with individuals within households as the focus of concern (World Food Summit, 1996).

According to the USAID (1995) definition: To be food secure means that:

**Food availability:** is achieved when sufficient quantities of food are consistently available to all individuals within a country. Such food can be supplied through household production, other domestic output, commercial imports, or food assistance.

**Food access:** is ensured when households and all individuals within them have adequate resources to obtain appropriate foods for a nutritious diet. Access depends on income available to the household, on the distribution of income within the household, and on the price of food.

**Food utilization:** is the proper biological use of food, requiring a diet providing sufficient energy and essential nutrients, potable water, and adequate sanitation. Effective food utilization depends in large measure on knowledge within the household of food storage and processing techniques, basic principles of nutrition and proper child care, and illness management. ([www.fantaproject.org/downloads/pdfs/fsindctr.PDF](http://www.fantaproject.org/downloads/pdfs/fsindctr.PDF) 2009, March 15).

## **2. The statement of Problem:**

Since the major famine of 1984/85 the Red Sea State lacked a proper early warning and well defined functioning monitoring system for food security.

In the past two decades both environmental as well as political forces have combined to create a situation of chronic poverty for many of the rural inhabitants of Red Sea State. The significant climatic variability in terms of amount and distribution of rainfall has pushed the State towards continued migration from rural areas. The political stress factors and the cross border fighting by the agro-pastoralist on meager resources, jointly lead to vulnerability to food security in the State.

In response to the current food crisis, the Red Sea State government and International non – Governmental Organizations (NGOs), sought to create a system of early warning based on assessment of certain indicators of vulnerability.

Since 1985, Community Situation Indicators (CSI) housed in Oxfam GB has been used to regularly monitor food security and nutrition indicators through the establishment of community tools which could be used to access continuous change on livelihood of household food security. Early warning and early action should go hand in hand and thus the felt need by Oxfam GB to have CSI transformed into an EWS for food security for the RSS to provide early warning on food security issues within the state and also to ensure early action is taken (Transition strategy, 2007).

CSI methodology is that, at each Locality, 10 households were selected randomly from villages prone to food insecurity. Such families were visited regularly (each month) to access their coping mechanism through interviews and questionnaires. Also local market analysis for availability of food items and their prices were recorded biweekly.

At time of crisis the decision making process becomes extremely important. The quick response needed from the government and NGOs and their coordination to address the disaster situation can greatly improve or aggravate the food situation. According to Buchanan-Smith (1991) how key decision makers use early warning (EW) information is one of the most important factors.

The presence of an effective system alerting and at the same time a quick response has stabilized the food access situation in the latest few years.

Since the inception of early warning system by Oxfam GB during 1985 – 2003 the project has encountered and faced some problems which led to the disruption of implementation or closure of the project for several times. This was either due to lack of funding commitment by donors as seen in 1999 and 2003 or when Oxfam worked in partnership with others. Oxfam Funds were used by the Sudanese Red Crescent and Ministry of Agriculture (Soil Conservation) to collect data on market and population movement information.

Due to strong coordination by Oxfam GB, and coupled with generally weak information systems at the state level, the CSI grown in popularity and it has been a dominant source of reliable data and statistics in the state. It is partly for this reason that members of the CSI Steering Committee (CSI SC) decided during their October 2005 meeting to transform the CSI into a state-owned early warning system for food security. The same meeting identified the State HAC as the suitable home for the Unit (Mkumbwa, 2008).

The main priority for effective response to food crises remained to be strengthened within national institutions for food security monitoring.

This problem needed to be investigated through scientific research so as to study the situation and impact of this Early Warning System on the Red Sea State.

In addition to the above mentioned, we could described the research problem through addressing the questions below:-

- ◆ What are the community indicators which are related to food security?
- ◆ Was it recognizable and applied by stakeholders e.g. Government, INGOs, LNGOs, private institutions?
- ◆ What was the impact of the existing early warning system?.
- ◆ How could we best coordinate EWS at state level and link it with information centres in order to sustain the impact of EWS?

### **3. The importance of the study:**

The importance of this study envisaged from its uniqueness and furthermore, it has not being touch or evaluated before in the field of scientific research.

Moreover, the importance of this study stems from the importance of food security itself, beside the role of the early warning system in the context of people livelihood.

The food security situation in the Red Sea State remains precarious. The region experienced eight major famines during the 20th century. This chiefly stems from its geo-political context. The state lies on the Sahelian-drought zone which is characterized by low and highly variable rainfall both amounts and geographical distribution. Coupled with limited technology for water harvesting, the state has historically been prone to drought conditions affecting the agro-pastoral livelihoods and threatening human lives. Monitoring of the food security situation using an effective EWS is, therefore, very crucial for the prevention of famine in the state (Mkumbwa,2008).

### **4. Research Objective**

#### **Main objective:**

The main objective of this study is to assess the impact of the early warning system on the welfare of the vulnerable groups in Red Sea State.

#### **Sub objectives:**

The sub objectives of this study is to:

- ◆ Understand the modalities of the early warning system in the Red Sea State;
- ◆ Highlight the coping strategies by local community to food shortage;
- ◆ Verify which indicators are strongly related to the impact of food security in the RSS;
- ◆ Draw recommendations that can be utilize for sustainability of early warning system for food security in Red Sea State;

## **5. Hypothesis:**

The study will test the following hypothesis:-

- Early warning system indicators in Red Sea State can be used to mitigate the impact of food insecurity
- The presence of a functioning early warning monitoring system for the RSS is related to poverty alleviation and food security .
- The early warning system can provide more information which could be used in strategic planning against poverty in Red Sea State.

## **6. Research methodology:**

Avison and Pries-Heje (2005: 218) write, “The research method is the way it is described to carry out the research.” These authors note that research methods are either quantitative or qualitative with their respective various techniques for data collection.

Based on a number of many quantitative as well as qualitative research methods (Avison and Pries-Heje, 2005) suggested the use of a combination of data collection procedures. In this study a multitude of data collection tools were used to provide an in-depth analysis of the impact of early warning system on food security in RSS.

Primary data collection involved both quantitative and qualitative data generated from different localities of RSS which represent agro ecological zones. Samples of households shall be large enough to allow comparison at village, locality and State levels. Tashakkori & Teddlie (1988) pointed out shortcomings of mono-methods in measuring underlying construct and suggested that a multi-method approach be adopted as it provides ground for data triangulation.

The questionnaire was designed to include basic household demographic information, questions about early warning system, specific details on early warning systems and specific details on early warning indicators. Questions will also include local perception and coping mechanisms with disasters.

The questionnaire was administered to assess households practice and resilience for food crisis, perception of early warning (30 samples) and two different interviews was

administered for assessing early warning system indicators, action and response by decision makers and Food Security Committee (FSC) at State level (30 samples) and the second interview will be conducted with CSI & FS steering committee and CSI team members.

The questionnaire and interviews were carried out in Port Sudan town, Rural Port Sudan, Tokar north and south and Halaib Localities.

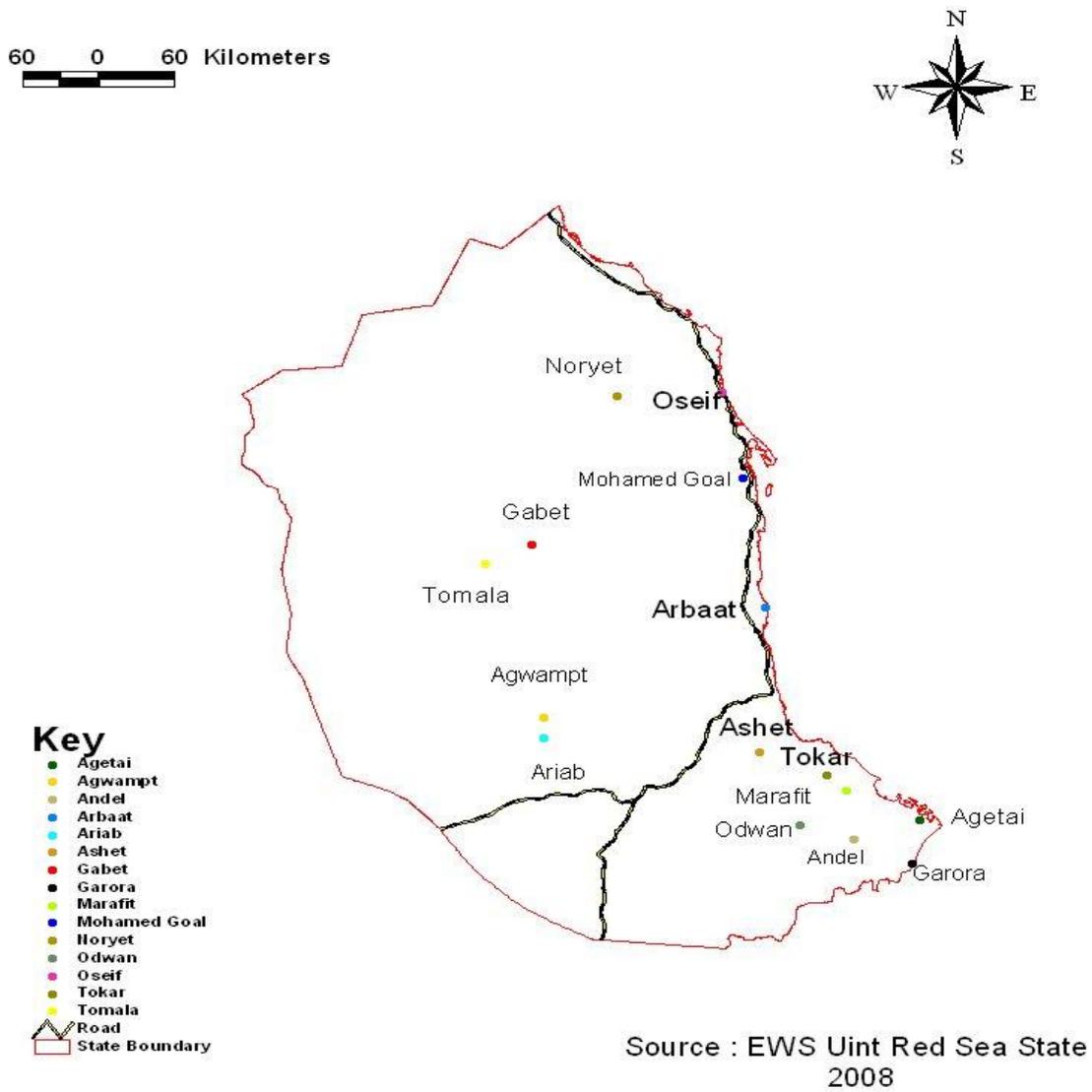


Fig 1.3 Areas for data collection

Small training workshop was conducted for those involved in data collection to augment objectives, sampling strategy and the role of questionnaire members and their responsibilities. Farah emphasized on strong capacity building program for data collection and evaluation. He has also put stress on the selection of wordings related to the questionnaire so that it could be reasonably tackled by respondents. Aziz (2008) pointed that prior to carry out the survey an orientation was conducted to ensure that everyone involved in data collection understood the objectives of the survey.

The qualitative assessment was aimed to enhance knowledge about livelihood system including socio-cultural, economic and political constraints leading to vulnerability of RSS community to food security.

(<http://projects.exeter.ac.uk/prdsu/> 2009, March).

Focus group discussion: will use this method and bring together small group number to discuss early warnings this method used by Rutman (1996) . She used group workshops to generate data, key informant interviews, household interviews and interactive tools to compliment information.

In-depth interviews with decision makers at Locality and State levels was carried out to verify if early warning indicators are used for the decision making process while they are handling food crisis.

The selection criteria for the households to be interviewed was based on the random spin method, which involve starting from the centre of the village to peripheries.

Data entry and analysis began shortly after finalizing questionnaire and interviews. Data was entered and analyzed using a computer software programme (Statistical Package for Social Science - SPSS). This software package was used for statistical analysis, manipulation of data, and construction of tables and graphs that summarize data (APTECH, 2007).

Data transformation into charts was done so as to enhance understanding of trends in food security.

## **7. The limitation of the study**

The greatest limitations of this study were the cross sectional nature of the majority of the data collected. Household coping mechanism, early warning indicators, early warning perception, livelihood strategies and food security indicators are likely to vary considerably with time. According to Hargreaves (2002), this may limit the study in its ability to accurately characterize the complexity of variables. Qualitative interviews conducted as part of this study provided an insight into the changing nature of these issues. Time and resources required for completing the work became a constraint. Research assistants were recruited to assist in data collection and data analysis. A translator was hired to alleviate the problems for cultural barriers of communication. The nomadic and agro-pastoralists were naturally mobile. This led to a lack of non-response or non-availability of participants for an interview.

## **8. Ethical issues to be considered:**

While preparing and conducting the interviews with participants data collectors considered some ethical issues that affect the interviewees. First of all data collectors were asked to respect interviewee decision to participate in research without imposing any kind of penalties on him/her. Data collectors ensured privacy while interviewing, a female researcher talked to target groups in their own language due to cultural barriers (Abdel Ati, 2008).

There were a lot of benefits that emerged from this research. In some cases, thanksgiving the participants for being interviewed and valued information they responded. Other benefits emerged as a result of positive changes made at the program that was based on the final assessment of the study for improving a program's impact. This may lead to more positive outcomes for current or future studies. On the other hand, also considering the risks that emerged from the study which needed to be weighted carefully. The researcher needed to reconsider any harm that resulted from the interview, and took steps to reduce it and address safety and confidentiality factors. Holm-Hansen (2007) noted that before beginning an evaluation of project, it was important to consider and address ethical issues, professional standards and strategies

to protect the rights and dignity of stakeholders. Such strategies need to be incorporated into the way the design and carry out of project.

Data collectors also has treated people fairly and without regard to gender, race, political affiliation and/or other characteristics.

This assessment was conducted and completed in efficient manner and in time. It was legal and ethical and accurate.

## **Chapter 2**

### **Literature Study**

#### **2.1. Early warning and food security in the Red Sea State**

This chapter briefly reviews the existing literature on food security status and indicators and its effects on the people of Red Sea State (RSS) and at the same time looks at the correlation with the early warning system and its impact on food security at Red Sea State.

#### **2. 2. Food security:**

The World Food Summit Plan of Action (2006) defines food security in the following terms: “Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (FAO, 1996). Food security comprises four dimensions: (i) adequacy of food availability; (ii) stability of supply; (iii) physical and economic accessibility of food; and (iv) quality and safety of food.

##### **2.2.1. Food Security Is a Global Concern**

In recent decades, demographic and economic growth have challenged the limits of economic, social, and ecological sustainability, giving rise to questions about food security at the global level. Despite technological advances that have modernized the conditions of production and distribution of food, hunger and malnutrition still threaten the health and well-being of millions of people around the world (Mustafa, Rod, Luc et Jennifer, s.a).

Access to food is still perceived by many as a privilege, rather than a basic human right, and it is estimated that about 35 000 people around the world die each day from hunger. An even larger number of people (mainly women, children, and the elderly) suffer from malnutrition. Far from disappearing, hunger and malnutrition are on the increase, even in advanced industrialized countries like Canada, where each year an estimated 2.5 million

people depend on food banks. About 30 million people in the United States are reported to be unable to buy enough food to maintain good health. The continuing reality of hunger and the sustainability of current practices, both locally and globally, make food security an essential concern (Mustafa, Rod, Luc et Jennifer, s.a).

International Food Policy Research Institute (IFPRI, 2002) reported that what would the world look like if the commitment, not only to the WFS goal but to food security for all, were real? The 2020 Vision of the International Food Policy Research Institute describes it this way: a world where every person has access to sufficient food to sustain a healthy and productive life, where malnutrition is absent, and where food originates from efficient, effective, and low-cost food systems that are compatible with sustainable use of natural resources. The benefits to the poor and hungry are obvious—the possibility of a healthy and productive life, perhaps for the first time. Yet the gains to the well-off also bear mentioning: a world with less risk of conflict over scarce resources, less need for costly emergency relief, a healthier worldwide economy, less poverty-driven migration, less environmental degradation.

Achieving the 2020 Vision is by no means easy or simple, but it can be done. In the late 1950s and early 1960s much of Asia was written off as a hopeless basket case. Yet since 1970 the number of food-insecure people in developing countries fell by 17 percent to the current 800 million, even with rapid population growth. Between 1990 and 1997 China reduced its number of food-insecure people by nearly 80 million. Costa Rica, Egypt, Ghana, and Thailand, for example, have made progress as well (IFPRI, 2002).

### **2.2.2. Food security in sub-Saharan Africa**

An analysis of the number of the undernourished in sub-Saharan Africa (SSA) shows a widespread undernourishment in the region and an increase in absolute numbers by about 20 percent between 1990-1992 and 2000-2002 (FAO, SOFI 2004), when the total estimated number of undernourished in the region increased from 170.4 million to 203.5 million persons. Over the same period, the number of people undernourished in the entire world decreased from 823.8 million to 814.4 persons, the bulk of the decrease taking place in Asia from 569.2 to 519.0 million (Kidane, Maetz & Dardel. 2006).

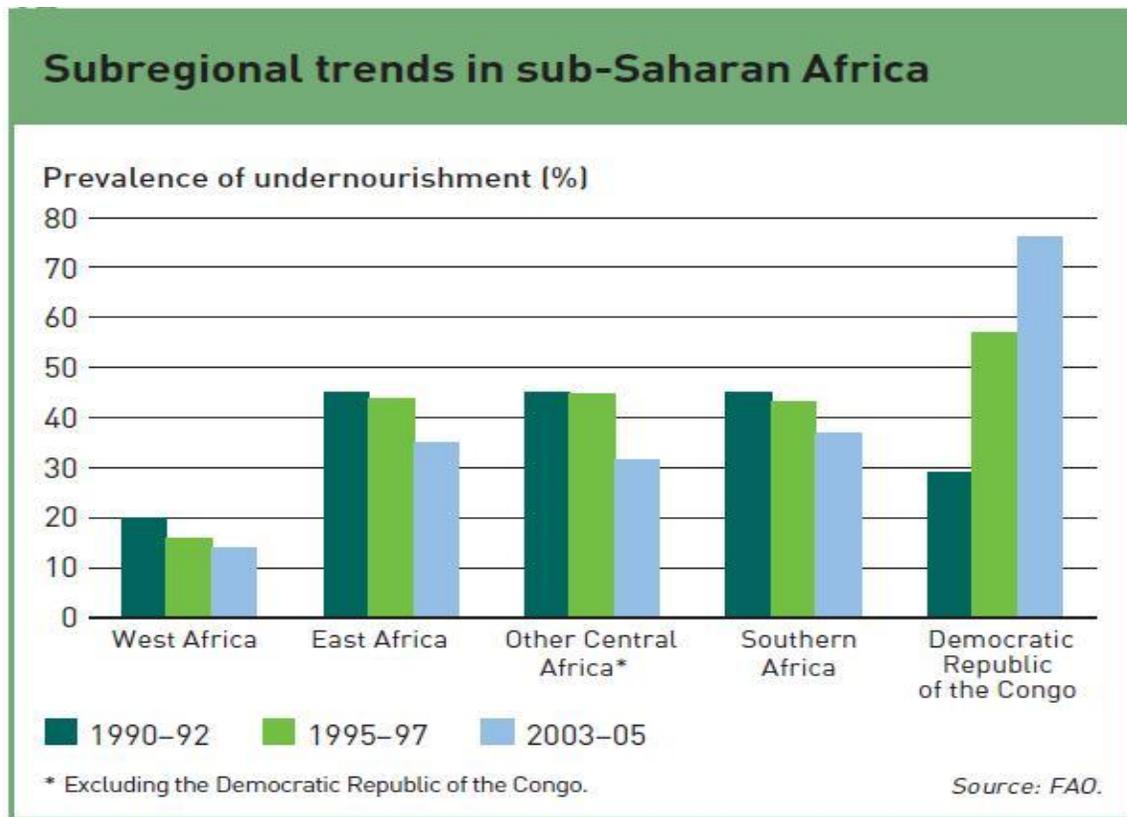


Figure 2.1. Sub region trends in sub Saharan Africa – source FAO, 2008

FAO (2006) reported that Sub-Saharan Africa's population grew by 200 million between the early 1990s and 2003–05, to 700 million. This substantial increase, coupled with insufficient overall and agriculture-sector development, placed a burden on hunger reduction efforts. However, while the overall number of undernourished people in the region increased by 43 million (from 169 million to 212 million), sub-Saharan Africa did achieve some progress in reducing the proportion of people suffering from chronic hunger (down from 34 to 30 percent).

### 2.2.3. Food security in Sudan

Agriculture is the backbone of economic and social development in Sudan, with 80% of the population depending on agriculture and all other sectors being largely dependent on it. Food security information is the key to food security and its timely availability, reliability and usability not only averts disaster, but also leads to developments that improve people's livelihoods (Mati, 2005). Food security information in Sudan is generated by many governmental institutions, UN agencies (WFP, FAO, IFAD, UNDP, etc.) and NGOs.

With its diverse agricultural system, Sudan has often been referred to as the “breadbasket” of the Arab World (Jaffe, 1992). Sudan has the potential to feed, not only its growing population of 28 million (FAO, 1999), but other countries. It has three distinct agricultural sub-sectors: irrigated, mechanized rain-fed, and traditional rain-fed.

While the three agricultural sub-sectors are generally well supported by the diverse agro ecological zones in Sudan, drought is a re-occurring phenomenon and is generally an intrinsic feature of the rural environments in Sudan, especially in the north.

FAO (2005) reported that one prominent feature of the protracted crisis that has characterized Sudan over the last two decades is widespread food insecurity which has triggered a number of dramatic famines. The problem mainly addressed with a large injection of food aid.

The war had a direct impact on food insecurity due to the:

- ◆ Damage caused to the social and economic fabric and related entitlements;
- ◆ Destruction of the scarce infrastructure;
- ◆ Mass displacement of the population;
- ◆ Weakening of institutions providing required services;
- ◆ Role played by the warring factions in stopping and controlling international assistance and food relief; and
- ◆ Consequent changes in food systems.

In addition, other factors affecting food security are:

- ◆ Recurrent natural disasters (drought and floods);
- ◆ A lack of infrastructure;
- ◆ Limited access to basic services;
- ◆ Insecurity in neighbouring countries; and
- ◆ Shortcomings in the policy and programming framework and of the institutional set ups.

In theory, the consolidation of the peace process might be the starting point for the achievement of sustainable food security in Sudan. In practice, the gradual process towards recovery and development is unlikely to be linear since elements of emergency,

recovery and development situations are likely to be present at the same time in Sudan for many years to come.

#### **2.2.4. Food security in Red Sea state**

Red Sea State is chronically food insecure. Persistent drought has affected the state for decades, undermining the traditional livelihoods of both pastoral and agro-pastoral communities. Over 90% of the cereals consumed in the State primarily come from other parts of the country especially Gardarif, agricultural production in surplus areas has a strong impact on food security situation. Small-scale crop production has been negatively impacted over the last ten years by the rapid spread of mesquite trees (*Prosopis chilineses*), which has reduced the amount of suitable agricultural land. The trees have also disrupted irrigation channels and harbour crop pests and predators, particularly in the Delta and South Tokar.

Sudan Annual Need Assessment (ANA 2006) reports that during the past years, high cereal prices due to poor production at the national level added to chronic food insecurity. Food aid provided by WFP, NGOs and the Goes help to mitigate the impact of price shocks, but could have only a limited impact on the root causes of food insecurity

Liberalization and privatization policies adopted since the early 1990s have led to price inflation, withdrawal of state subsidies and have thus led to increased impoverishment. Environmental crisis and the conflict led to huge population movement towards towns that currently accommodate around 60% of the Red Sea State population. Most of the rural Beja migrants are currently living in the margins of towns (squatters) and on the margins of the formal economy. Increased sedentarization of the remaining pastoralists is also leading to degradation of pastures which; raises the prices of fodder and of keeping livestock, as a result the last two decades witnessed the growth of two economic activities: charcoal production and manual labor, though still temporary migration and humanitarian aid remain significant in supporting life in most rural areas. (Abdel Ati, 2008:3).

## **2.2.4.1. Food security status**

### **2.2.4.1.1. General situation:**

Red Sea State suffers from chronic food insecurity as a result of recurrent drought and increase in the number of inhabitants. This coincides with a decline in the resource base, underdeveloped agricultural systems and limited opportunities for off-farm employment. The most food insecure regions/ states and traditional food aid recipients are considered to be: Kassala, North Darfur, North Kordofan and Red Sea in the Northern Sudan (SIFSIA 2006:8). Inadequate basic services deteriorating socio-economic conditions and population displacement are other major concerns.

The UN stated that the Implementation of East Sudan Peace Agreement (ESPA) has created an opportunity for the UN, partners and government institutions to support early recovery and begin considering long term development programmes for food security and livelihoods.

FAO (2007) reported that over the last three decades, livelihood systems in Kassala State and Red Sea State (RSS) have been subject to different environmental and socioeconomic challenges. They include drought, floods and long dry spells, negatively impacting on the food security situation of the local populations. The conflict in Kassala between the GoS and the National Democratic Alliance (NDA) which led to the displacements of border populations towards more secure areas inland, and the old conflict between Eritrea and Ethiopia that forced about 85 000 people to take refuge in the eastern regions, has put particularly great stress on existing resources, particularly land, and has created competition with local populations over wage employment opportunities.

FAO (2007) reported that the great majority of the population continues to be affected by vulnerability to food insecurity and, as indicated in many previous assessments, underlying factors are clearly structural and cannot be attributed to any distinct seasonal crisis. Prevailing problems include chronic poverty due to eroded traditional pastoral and agro-pastoral livelihoods which contribute to continuing, even increasing rates of malnutrition. In both states, the GAM and SAM remain above the emergency level of 15 percent in all four localities. People continue shifting from their traditional livelihoods to relying on different, often more than one income sources. While 49 percent of

households surveyed in RSS by the ANLA reported earning income from wage labour, fifty two (52) percent reported earning some income from the sale of firewood and charcoal and only 9 percent indicated income from the sale of cereal. The consequence of half the population engaging in the sale of firewood and charcoal clearly contributes to the marked depletion of natural resources which in turn has long-term, detrimental effects on people's livelihoods. Wage labour, on the other hand, is becoming increasingly difficult to find due to the increasing mechanization of the agricultural sector and the industries in Port Sudan which accommodates about 51 percent of the state population and over 90 percent of the urban population. While urban migration has been increasing at high levels, depleting employment opportunities, the rural population has been dropping by about 15 percent over the last thirty years.

Agriculture (mainly sorghum production) is concentrated largely in the valleys and deltas and construction of a dam upstream has limited the magnitude of floods downstream. Tokar agricultural scheme suffers from mesquite (*Prosopis chilineses*) encroachment, which infests 45 percent of potential crop production surface. Human habitation along the wadies and khors valleys is common due to sub – surface water availability. Small scale traditional cultivation, composed of ground water irrigated holdings, traditional dry land cultivation and animal herding are the major farming systems. Charcoal production has become an important source of income adding pressure to national resources, according to Nur & Khateeb (2006:13) that charcoal remains as real alternative for those who lost their animal wealth and agricultural lands during droughts cycles.

#### **2.2.4.1.2. Severity of climate:**

The presence of Red Sea and Red Sea Hills are responsible for RSS's unique climate characteristic compare to the rest of Sudan. The frequency and severity of climate events have its negative effect on food production, crop failure, diseases and mortality of livestock, forest-disturbance, losses of genetic resources available for food and agricultural production. This in turn will affect food security in the State.

##### **2.2.4.1.2.1. Temperature:**

The effect of altitude on temperature is marked. In the hills top mean annual temperature is 22° C with mean monthly summer temperatures of 27° C. In the coastal plain, mean annual temperature is about 30° C with a more limited temperature range due to the effect of the Red Sea. However, extreme temperatures as high as 47°C are experienced

in the summer months between July and August in the coastal zone together with high humidity. The summer months also bring frequent and often severe sandstorms approximately south of latitude 19°N. (CSI bulletin 2005:3).

#### **2.2.4.1.2.2. Rainfall**

RSS is classified as arid or hyper arid and experiences extremely low, unevenly distributed and variable rainfall. Heaviest rainfall falls in the south.

According to meteorology the State experiences two seasons of rainfall. The summer rains generally fall between July to September in the largely mountainous zone, whilst winter rains fall between October to January in the coastal zone, including the eastern sides of the main mountains in Red Sea and the mountains on the Eritrea border. Rainfall causes immediate flooding of the complex khors system in the respective zones aside from the two coastal delta areas (Arbaat and Tokar) that flood in the summer months, some inland mountain areas receive two seasons of rainfall and flooding. Pantaleo (2002:4) noted that the summer rainfalls occur from July to September in the interior of the State, while the coastal part is generally drought throughout the summer season, and receive rainfall from November to February. These two different rainfall patterns explain different agriculture and pasture seasonality between the coastal and internal areas, and cause seasonal migrations between the two zones.

Summer rains are considered more important than winter rains, as the majority of crop producing and pasture areas, including the coastal delta areas, are dependent on them. Winter rains are needed for crop production; pasture regeneration and the replenishment of water supplies in the coastal zone, including the delta areas.

#### **2.2.4.1.3. Poverty and livelihood:**

Chronic poverty has increased the vulnerability to food insecurity of a substantial portion of the population. In the Northern part of the Country particularly high poverty rates are recorded in Red Sea, Eastern Darfur and Northern Kordofan with rural poverty rate over 60%. (SIFSIA: 2006:7).

Farah (2008:1) reports that poverty in the Red Sea State is a multifaceted phenomenon manifesting itself in low income and consumption, unemployment, high illiteracy, poor health, low education attainment, disempowerment and social isolation. Within that women are further affected by conservative cultures and un-supportive state policies.

Poverty in the state is a process caused by a combination of socio-economic factors which in rural areas greatly depends on the condition of natural resources and the rates of its utilization and in urban areas on the anti-poverty measures applied.

The World Bank defines extreme poverty as living on less than US\$1 per day, and moderate poverty as less than US\$ 2 per a day. Abdel Ati (2008:25) reported that using UN and World Bank standards, based on cash income, the majority of the surveyed households are poor. About 22% of households are living on 2 or less US dollars a day, one half of them on less than one dollar. The traditional agro-pastoral livelihood strategy, combining livestock rearing and crop production, has been undermined by the impacts of conflict and drought, and is no longer adequate to assure household food security. See table 1.

**Table 2.1: % Distribution of Households by Mechanisms Adopted to Cover Food Needs**

Locality	Secondary job	Reduce food consumption	Selling Animals	Slaughtering Animals	Selling Property	Others	No Response
RPS	38.6%	5.7%	18.2%	2.3%	1.1%	3.4%	30.7%
Ageig	28.6%	6.3%	4.8%	.0%	1.6%	1.6%	57.1%
Swakin	50.0%	10.0%	10.0%	.0%	.0%	10.0%	20.0%
N. Tokar	25.4%	3.0%	4.5%	1.5%	.0%	1.5%	64.2%
<b>Total</b>	<b>32.5%</b>	<b>5.3%</b>	<b>10.1%</b>	<b>1.3%</b>	<b>.9%</b>	<b>2.6%</b>	<b>47.4%</b>

Source: Abdel Ati 2008

The reduction in livestock holdings, as animals have been sold to pay for food in poor years, means that households are less able to cope with the impact of drought, in most times remote communities of rural Port Sudan and Tokar, sell their goats collectively .Each time a group of households expressed a need to sell some goat, a representative from the community is nominated to take the goats to the market in Port Sudan or Tokar or another nearby rural market for selling (Khogali 2004:15). Households increasingly rely on other income sources such as wage labor and the sale of firewood or charcoal. Even these alternatives may not be sustainable in the long term. Job opportunities in the ports are shrinking as mechanization proceeds. Tree-cutting for firewood and charcoal production cannot be sustained at current levels without significant environmental impacts.

#### **2.2.4.1.4. Food aid:**

Cyclical famine has led to major food distribution in the past in many areas of Sudan. Since the famine of 1983/5 many international agencies started to provide external food aid to Red Sea State.

##### **2.2.4.1.4.1. WFP food aid:**

Atkinson (2004:32) reports that in 2004, WFP estimated emergency food needs for RSS to be 5,664 MT to 155,900 beneficiaries in rural areas over the hunger gap. This represents a 39% decrease in number of beneficiaries and 78% decrease in amount of food allocated in 2003. WFP also provided food for targeted feeding programmes (supplementary and therapeutic feeding), food for work programming, school meals and a one off ration to asylum seekers and monthly ration to those registered as refugees. WFP is the main donor for food aid in RSS and use to distribute food aid in partnership with other NGOs in RSS particularly Oxfam GB, and Sudanese Red Crescent SRC. (CSI bulletin 2005) reports that WFP is distributing food (cereals, pulses, oil, Corn Soya Blend, Sugar and salt) through its partners namely Oxfam GB and Sudanese Red Crescent (SRC).

##### **2.2.4.1.4.2. Government food aid:**

The government aid supplied through the National Strategic Food Reserve Authority (SRA) the governmental body for food aid. The authority is distributing food aid namely (sorghum, wheat and millet) to the affected states over the country during the hard times. Khogali (2004:21) reports that the operations of the SRA are of limited impact relative to foreign aid and in comparison to its operations in other States given the magnitude of the gap in the Red Sea State, the total allocation in four years represent 8% of the total national allocations and 15% of annual average food gap in Red Sea State. *Atkinson (2004:35)* argues that 40,000 bags of sorghum (3,600 MT) from the national strategic grain reserve delivered as free food aid to the rural councils of each of the four localities between September and October 2004. This represents more than double the amount distributed by WFP to date. The food aid distributed by the SRA to affected areas varies in quantities over years; MOA & Forestry (2008:46) reports that the highest percentage of strategic reserve (33,000 MT) in 2007 allocated to Red Sea State among other affected States due to high deficit in 2007. Seem to have been effective in mitigating food insecurity.

An effective strategic grain reserve (SGR) system in this context should be ready to release grains in the market in periods of partial or total crop failure, thus protecting poor consumers from depleting their livestock and other assets to purchase grain at inflated prices due to scarcity. Babiker & Pantuliano (2006:43) recommends that in Red Sea State where crop failures and consequent food scarcity are a recurring phenomenon, the government should seriously consider a policy of grain market stabilization through the maintenance of a Strategic Grain Reserve (SGR) mechanism. The aim of the SGR would be to avoid the onset of famine by protecting the food security of vulnerable groups. An effective SGR system in this context should be ready to release grains in the market in periods of partial or total crop failure, thus protecting poor consumers from depleting their livestock and other assets to purchase grain at inflated prices due to scarcity. Similarly, the SGR authority should ideally enter the market as buyer in periods of bumper and surplus food grain production to prevent prices from being depressed to levels that might be discouraging to producers. To be efficient and effective, there should be a central SGR at the Red Sea State level as well as local SGRs at district level.

The Strategic Reserve Corporation operates under the Ministry of Finance and crucial links and coordination, relevant to its mandate (maintain buffer stocks in food insecure areas and support/stabilize food prices).

SIFSIA (2006:11) reported that the Strategic Reserve Corporation (operating under the Ministry of Finance) should play a price stabilization function. In fact it is mandated with the management of buffer stocks (mainly sorghum) to ensure the consumers' access to basic food staple (sorghum in particular) at affordable prices (basically by selling its stocks when prices are high) and at the same time support crop producers through the purchase of their produce when prices are low. Under the Ministry of Finance and Economic there is also the Poverty Reduction Unit mandated with the coordination of line ministries and mandated institutions efforts in the preparation, implementation and monitoring of the Poverty Reduction Strategy (PRS).

**Table 2.2: WFP food Aid to Sudan**

Food aid deliveries to Sudan in cereal MT 000									
1995	1996	1997	1998	1999	2002	2001	2002	2003	2004
82.4	103.3	114.4	210.00	293.5	182.4	202.8	149.4	256.1	388.8

Source: WFP, 2004 food Aid flow' Interfais 2005

## 2.2.4.2. Food sources:

### 2.2.4.2.1. Agriculture

According to the State Ministry of Agriculture (MOA), the average annual production grains in the State are around 8000 metric tons equivalent to 10% of the total annual grain requirement of the State which is estimated around 72,000 metric tons. The State is a grain importer and depends on neighbouring States for almost 90% of its annual grain requirement. Frize (2001:12) argues that agriculture is at best of times risky in RSS and it is estimated that agriculture exploitation is only 10% of its potential, this is due to the use of traditional rainwater harvesting techniques, no use of animal traction and basic tools.

**Table 2.3: Grain Production and Demand in RSS**

Crop	Total Demand (sacks)	Local Production (sack)	Gap%
Sorghum (Dura)	756,840	22,705	97%
Millet (Dukhn)	102,636	17,450	83%
Wheat	63,688	Zero	100%
Total	923,164	40,155	95.6%

Source: SMOA reports, Suleiman and Musa (2005)

(CSI bulletin 2007) states that the crop production only accounts for 5-10% of total needs in RSS and is consumed locally. "Traditional" crop production take place in flooded khors in the internal zone, as well to a limited extent in the khors in the southern coastal zones. "Irrigated" agriculture takes place in the main crop producing areas of the Tokar and Arbaat deltas in the coastal zone that rely on summer flooding and winter rains. Although crop production has traditionally been an important livelihood activity for those with access to such flooded areas, particularly the deltas' unfavorable climatic conditions spread of mesquite and lack of effective agricultural research and extension activities to improve agricultural practices, has led to decreased reliance on agriculture as a major source of food and income in the last two years.

### 2.2.4.2.2. Livestock

Traditionally, livestock were the main source of income and a major source of food for transhumance pastoralist and agro-pastoralists in the Red Sea State. The major famine of 1983-4 led to large-scale loss (death and emergency sale) of livestock and herd size has never since fully recovered. Many households now keep smaller numbers of livestock at home; those with larger numbers of animals tend to pay individuals to graze

them away from home in the main pasture areas. According to UNDP (2005:15) many households have reduced their herd size and now keep livestock at home but those who possess larger herds tend to move to the main pasture area, lack of alternative fodder or access to it, increase reliance to mesquite and other shrubs that cause ill health and lead to further spread of mesquite.

#### **2.2.4.2.3. Fishery**

Atkinson (2004:36) reports that Red Sea offers good potential for fishing, as well as harvesting of other sea products such as oysters. This potential has never been fully realized however, with the traditional Beja focus on livestock rearing.

Fishing is only practiced in a few coastal settlements in Red Sea State and is not a significant source of food outside of these fishing communities. Fishing is seasonal with less fishing done between November and March. Some coastal communities rely on collection of sea products as an additional source of income. According to UNDP (2005:15) fishing activities has been reduced as a result of poor conditions of equipments used and unfavorable terms of contracts with trades who rent fishermen equipments. Abdel Ati (2008 :) reports that few groups in the coastal area are relying on fishing as the main source of income and/or food. Poor skills, backward technology, lack of essential inputs (e.g. refrigerators/ice) and high costs of transport, make them vulnerable to economic loss and to exploitation by fish traders.

The RSS with a 740 Km coast presents a huge food potential, with an estimated total annual fish stock of 35,000 tons and 75,000 tons according to the Greek Fishing Company (2006). At present only 3,500 tons are produced per annum i.e. 5-10% is currently utilized. Under utilization is attributed to the small number of fishermen (about 1,500), traditional equipment used, the unfavorable terms of contracts between traders and fishermen and the limited outlets resulting from poor transport and lack of proper storage facilities. (RSS Fishery Department)

#### **2.2.4.3. Food security indicators:**

In most analyses of food security conditions in developing countries, multiple indicators are used to reflect the various dimensions of the problem. Some of the most commonly used types of indicators in the assessment of food security conditions include those related to:

### 2.2.4.3.1. Food production:

Although crop production has traditionally been an important livelihood activity for those with access to agricultural land, the level of crop production in RSS is small, providing as little as five percent of the State's total demand for sorghum. Agricultural activities are restricted to fertile khors and delta areas flooded by rainfall. Agricultural production is concentrated in the south, particularly Tokar locality, due to the higher rainfall received. The two delta schemes, Arbaat and particularly Tokar, are the most productive agricultural areas in RSS. There is limited mechanized agriculture in Red Sea State (Food security bulletin: 2008)

It is important to note that with the exception of Khor Arbaat and Tokar Delta, annual cultivated area is extremely variable as a result of the large temporal and spatial distribution of rains and floods. Table 2 illustrates total cultivated area, and yield season 2006/2007 compared to 2005/2006 in Tokar for main crops.

**Table 2.4: Summary of total cultivated area and yield season 2006/2007 compared to 2005/2006 in Tokar for main crops**

Yield sack/feddan		Cultivated area				Crop
2005/2006	2006/2007	%	2005/2006	%	2006/ 2007	
8.2	2	47.1	20012	48.6	21744	Sorghum
4	3.8	36.5	15500	40	17845	Millet
4.02	37	10.4	4400	9	4020	Cotton
		6	2538	2.5	1100	Vegetable
			<b>42450</b>		<b>44709</b>	<b>Total</b>

Siror 2007. Crop cutting survey on sorghum and millet in Tokar

### 2.2.4.3.2. Nutritional status

As a result of the recurrent crisis, global malnutrition rate in the state in 2005 was 19.4% (WFP/TANCO, 2005). The ANA report (2006:41) came with the same figure and stated that malnutrition was widely prevalent among children under 5 years and women. Severe acute malnutrition (SAM) was 3.7%, Severe 15.0% and moderate malnutrition 45.4%. (RSSFSC, 2004:3) reports that WHO recommended Global acute malnutrition (GAM) above 10% it required immediate response in Sudan GAM above 15% and in RSS GAM range between 25% -38%. MOH reports in all surveys conducted, it has

been noticeable that prevalence of malnutrition has always been lower in urban areas and highest in rural areas particularly in Tokar locality.

Since the nutritional survey of 2005 no nutritional surveys carried out in the Red Sea State by State Ministry of Health, except the recent survey which is conducted in 2008 still being analyze and the final result not yet.

#### **2.2.4.3.3. Market prices:**

A number of organizations are monitoring market prices in the Red Sea State. These institutions include the Red Sea State government, the World Food Programme (WFP) and Oxfam GB.

These market prices give an indication about the availability and accessibility of different products on the market. They also give warning signs to both government and other stakeholders on whether the food security situation in the state is improving or deteriorating.

#### **2.2.4.3.4. Access to markets**

Access to markets in rural areas is very poor due to sparsely populated and remote communities, particularly in the northern Halaib and Rural Port Sudan localities, where a distance of only 120 km can take six hours to travel.

Khogali (2004:12) reported that not like other areas of Sudan, the Red Sea State is characterized by the lack of village market and main rural markets. Atkinson (2004:29) stated that Rural Port Sudan locality; Suakin and Tomala are the only markets outside of Port Sudan town and only a few central villages have shops selling basic provisions such as sugar, coffee, onions and small quantities of sorghum. Tokar locality is more densely population with better rural transport networks and hence better access to rural markets. ”.

Pantaleo (2004:8) noted that the main rural market towns, located on the main railways and roads network connecting Port Sudan to Khartoum. These areas are characterized by thriving market exchanges and transport activities. Beja use to ask for “sakanap” (from the Beja meaning “to give information” or “to bring news”)when visitors stop to their villages, to get information about goods prices, rains and pasture conditions, tribal

disputes etc. In fact, these markets towns are a crossroad of information and informal networks that can be very useful for the CSI monitoring.

Livestock market places in RSS are only found in big urban centres like Tokar and Port Sudan and in some villages like Ashat and Dolabyai. Port Sudan livestock market is the only market serving the whole State.

Grain market: Local production of grain is limited and so the vast majority of grain on the market in RSS is imported from other neighbouring States mainly Gedarif. There are two types of sorghum supplied to markets, red sorghum (Mugud) for human consumption, and white sorghum (Fetareta) used mainly for animal feed, and a limited amount of millet are imported into RSS(Khogali, 2004).

The Community Situation Indicators (CSI) project monitors the prices of sorghum, wheat, millet, one-year-old male goats, bean fodder, drinking water and charcoal. The market prices are collected in Port Sudan and Tokar markets.

## **2.3. Early warning system:**

### **2.3.1. Background:**

The Third International Conference on Early Warning (EWC III) held in Bonn reports that early warning is a major element of disaster risk reduction. It helps prevent loss of life and reduces the potential economic impact of disasters. To be effective, early warning systems need to actively involve the communities at risk, facilitate public education and awareness; communicate and disseminate warnings and messages, and ensure there is a constant state of preparedness.

Following the Indian Ocean tsunami disaster of December 2004, United Nations Secretary-General Mr. Kofi Annan made the following statement on averting future disasters through early warning systems in his 2005 report on the implementation of the Millennium Declaration, *In Larger Freedom: towards development, security and human rights for all (A/59/2005, paragraph 66)*:

As the death toll from Cyclone Nargis in Myanmar in 2008 rose above 130,000, people repeated the same questions that were asked after the Indian Ocean tsunami claimed 250,000 lives in 2004. Why were no systems in place to alert coastal residents of the incoming threats? Could nothing have prevented the loss of so many lives? (IFRC 2009)

Global attention caused by these mega-disasters has given additional impetus to the ongoing efforts to improve early warning systems for natural hazards, which had begun gaining momentum towards the end of the 20th century (see timeline in UNISDR, 2006a). The 1990s were declared the International Decade for Natural Disaster Reduction and the first global early warning conference was held in 1998 in Potsdam (Germany). Early warning practitioners had begun to examine systematically early warning systems to identify their strengths and weaknesses (IFRC 2009).

UN Global Survey of Early Warning Systems reported that early warning is a readily understood concept and early warning systems are well advanced for many hazards. There is widespread recognition of the need for early warning systems as an essential component of strategies to build resilience to natural disasters. Without further efforts at the local, national, regional and international levels, some hazards will continue to strike without warning and existing early warning systems may continue to fail to reach people at risk or may fail to elicit appropriate lifesaving and property-saving responses.

Accordingly, the Secretary-General in his report on the International Strategy for Disaster Reduction (A/61/229) has encouraged Member States and organizations to develop global early warning systems for all hazards and all communities, based on existing systems, and to address the associated technical and organizational gaps and needs, as recommended in the Global Survey of Early Warning Systems.

Mackinnon (2008) reported that Indonesia today launched a sophisticated new tsunami warning system designed to give coastal residents enough time to flee or seek shelter from an impending tidal wave.

The national system aims to protect the inhabitants of the archipelago's vast coast and prevent a deadly repeat of the 2004 Indian Ocean tsunami that killed 168,000 people in Indonesia alone.

But even as President Susilo Bambang Yudhoyono inaugurated the system in Jakarta, officials conceded it would be several years yet before it is fully complete and the whole coastline protected.

In particular, deep-sea warning buoys have yet to be installed around Bali, Flores and northern Sumatra — which includes Aceh where most lost their lives in the tsunami — with the result that there could be delays in predicting a tsunami and issuing warnings.

The crippling famines of the 1970s and 1980s in sub-Saharan Africa (SSA) prompted the development of national and regional early warning systems (EWS) across the continent. Over the past three decades, governments, regional institutions and development partners invested extensively in establishing EWS as a critical element of the emergency response system. Evidence suggests that these systems have been generally been effective in alerting countries and donors to impending food crises. However, there have been cases where inadequate analysis, together with poor communication and ineffective coordination and response mechanisms, have contributed to acute food security emergencies that might have been prevented (FAO, 2006).

General Assembly resolutions on the International Strategy for Disaster Reduction have consistently recognized the importance of early warning as an essential element of disaster risk reduction. Many key international agendas, forums and resolutions also

refer to early warning systems as an important tool for disaster risk reduction, including the Yokohama Strategy and Plan of Action for a Safer World which was adopted at the World Conference on Natural Disaster Reduction, Yokohama (1994), the Barbados Plan of Action for Small Island Developing States (1994), the Johannesburg Plan of Implementation of the World Summit on Sustainable Development (2002), the Second International Conference on Early Warning, Bonn (2003), the United Nations Report of the International Meeting to Review the Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States, Mauritius (2005), the meeting of G8 ministers in Gleneagles (2005), and the Third International Conference on Early Warning, Bonn, (2006). Early warning is an important objective in the processes of the United Nations Convention to Combat Desertification, in the food security activities of many United Nations and other international organizations, and in other humanitarian and environmental fields. Effective early warning systems will be an essential component of climate change adaptation strategies, given the projections of the Intergovernmental Panel on Climate Change of increases in extreme weather and climate conditions in a warmer climate (GSEWS, 2006).

As stated by the global survey of early warning system that to be effective, early warning systems must be people-centred and must integrate four elements - (i) knowledge of the risks faced; (ii) technical monitoring and warning service; (iii) dissemination of meaningful warnings to those at risk; and (iv) public awareness and preparedness to act(see Figure 1). Failure in any one of these elements can mean failure of the whole early warning system.

## The four elements of people centered EWS

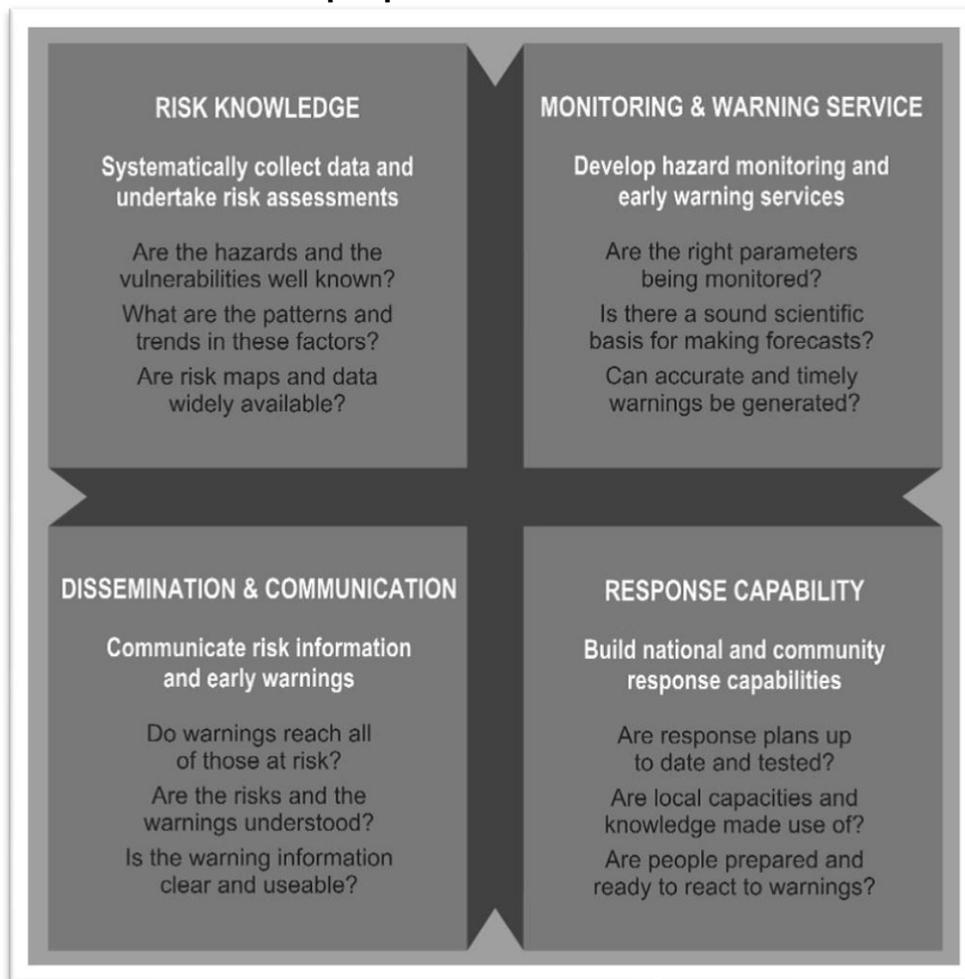


Fig 2.2. The four elements of people-centered early warning system

Source: ISDR Platform for the Promotion of Early Warning.

The global survey on early warning system makes five main recommendations, as follows:

- **Develop a globally comprehensive early warning system, rooted in existing early warning systems and capacities.**

A global early warning system will require long-term sustained action by diverse players, strong political commitment to engender public action and to make early warning a core task of national policy and disaster risk reduction strategy, strong international support and coordination, with clear roles and responsibilities and wide participation of NGO, private sector and regional organizations.

◆ **Build national people-centered early warning systems**

Country-based early warning systems are needed for the protection of citizens and also provide the building blocks of the global early warning system. The recommendation includes calls for a national multi-party roundtable on early warning, a national plan based on a survey of capabilities, a warning dissemination strategy, community-based approaches, public education and mock exercises.

◆ **Fill the main gaps in global early warning capacities**

The recommendation highlights gaps and opportunities that deserve immediate concerted action, including for tropical cyclones, floods and tsunamis for the most ill-protected populations, agreements and networking for drought, food security and wild land fire, a global survey and mobile monitoring facility for volcanoes and a major early warning project in each least-developed country.

◆ **Strengthen the scientific and data foundations for early warning.**

The scientific and technical recommendation seeks action on a long-term global data plan, upgraded telecommunications, an agreement on basin-wide data exchange for floods, a pan-African project to fill major data gaps, improved hazard and vulnerability mapping, an early warning science and technology agenda and an internet portal for natural hazards, risks and warnings.

◆ **Develop the institutional foundations for a global early warning system.**

This recommendation addresses the needs for underpinning mechanisms of international and regional governance, coordination and support, starting with a call for the UN system to affirm the goal of a global early warning system and including requests for various UN and international agencies in technical, humanitarian and development fields to undertake specific governance and support roles.

The survey presents an assessment of capacities, gaps and opportunities towards building a comprehensive global early warning system for all natural hazards.

### **2.3.2. Early warning systems in sub-Saharan Africa**

The crippling famines of the 1970s and 1980s in sub-Saharan Africa (SSA), which claimed the lives of millions of people and forced millions more into destitution, prompted the development of early warning systems (EWS) across the continent. Governments, regional institutions and development partners have invested extensively in establishing

EWS as a critical element of the emergency response system over the past three decades (Tefft, McGuire & Maunder, 2006).

According to Tefft, McGuire & Maunder (2006) contemporary early warning systems emerged in the 1970s and 1980s, as a response to drought-induced famines in the Sahel. Since droughts, food insecurity and, ultimately, famine evolve very slowly, governments and donors postulated that by tracking certain indicators, such as malnutrition, market prices or rainfall levels, it would be possible to anticipate future food insecurity and intervene before people starved to death. Today, the number of deaths due to drought-induced famine has been reduced dramatically. Early warning systems for food insecurity continue to evolve and improve, although there remains a large gap between warnings and response, especially the capacity and capability to provide longer-term response to address vulnerability and the root causes of risk.

Today, there is a wide presence of EWS across SSA and evidence suggests, albeit with well-acknowledged exceptions, that these systems have been largely effective in alerting countries and donors to impending food crises (largely in the context of seasonal droughts), helping to mitigate adverse impacts. Notably, the recurrence of large-scale famines has been prevented, in part due to the functioning of these EWS systems (Tefft, McGuire & Maunder, 2006).

There are, however, important exceptions that suggest that inadequate early warning analysis, together with poor communication and ineffective coordination and response mechanisms, have often contributed to acute food security emergencies that might have been prevented. The well-documented examples include Ethiopian 1999/2000, Malawi in 2001/2002 and Niger in 2005. Learning from the breakdowns in early warning and response systems can lead to improvements in their future operation and performance. In addition, EWS are increasingly challenged by several emerging issues, such as the continued susceptibility of African agriculture to climatic variability and other hazards and the vulnerability of millions of chronically impoverished and malnourished households to a diversity of threats, from HIV/AIDS to prolonged violent conflict (Tefft, McGuire & Maunder, 2006).

Other hazard-specific early warning systems have emerged, especially in developed countries and especially for frequent hazards. Tornado warning systems are well

developed in the United States, for example; many countries have established flood early warning systems for major river basins; cyclone warning systems exist and represent excellent examples of international cooperation. Early warning systems for volcanoes exist in most regions or countries where there are active volcanoes. Interestingly, the tsunami early warning system for the Pacific Ocean has been operational for more than 40 years yet such a system was absent in the Indian Ocean in 2004 due to the infrequency of tsunamis in this region (IFRC, 2009).

### **2.3.3. Sudan early warning system**

In Sudan different types of early warning and food information systems operate at different levels varying from local up to the national ones. In spite of the surge of interest by various institutions to handle such affairs, HAC Official argues that indicators employed are not sufficient to guarantee against food shortages at the local and household levels.

According to Humanitarian Aid Commission (HAC) official that the early warning system in Sudan includes warnings on the food security situation, floods, epidemics, fires and emergencies, with a focus on drought, floods and armed conflicts. Efforts were made to establish such systems by using the disaster indicators, with the aim of forecasting, alerting local communities and providing information to makers and the international community on the expected situation. De Waal (2005:222) reported that since the famine of 1984/85 in Africa, huge amount of money have been spent on building famine early warning system, for various African countries including Sudan. The logic of this system is that famine can be seen in advance by collecting and analyzing data on rainfall, animal and crop production, and socio- economic indicators such as grain prices, and volume of livestock sales.

The massive drought which induced famine that hits Sudan in 1984/85 has led to crop failure, loss of livestock, displacement of people and consequently grain price inflation and high demand for employment and destruct people's livelihood mainly those in rural areas . Eltigani (1995:68) in his essay war and drought in Sudan concluded that the drought of 1984/85 had an enormous impact on food production, and the country's lack of preparation coupled with drought severity forced the government to ask the international community for food relief.

#### **2.3.4. Red Sea State early warning system:**

The severe famine of the 1980s in the Red Sea State region revealed the acute need for a systematic monitoring mechanism of food security for the rural population of the RSS. The harsh semi desert and arid conditions of RSS constitute a survival challenge to the nomads and agro pastoralists of the State. Aziz (2008:4) reports that over the last century, the Red Sea State (RSS) has experienced, at least, fourteen cycles of drought, which affected its livelihood system. Highly complex concerts of factors, both natural and induced have combined to create a situation of structural poverty. Acute malnutrition indices for RSS were reported to be the highest among all Sudanese states. There was also strong association between malnutrition and proxy indicators of relative poverty.

Oxfam GB came to the Red Sea State (Sudan) in 1984. This was as a response to a drought that resulted in a serious famine. This famine resulted in loss of human life and more than 80% of livestock in the State (Pantuliano, 2000).Oxfam GB came with the objective of saving lives and probably moving out later on but unfortunately, the organization has found itself stuck in the state since then.

Pantaleo (2004:2) reported that Oxfam started to monitor the food security situation in RSS between1989-91 and to collect information for early warning purpose in conjunction with the Sudanese Red Crescent (SRC). Given the cyclical nature of drought and the acute vulnerability of the population to drought shocks, Oxfam decided to implement a continuous information system, which led to the development of the CSI programme in 1994. Pantaleo (2004:2) stated that

The CSI program aims at providing reliable information on changes affecting livelihoods and poor communities living conditions in RSS with the objective to safeguard ongoing development and facilitate planning for timely and appropriate intervention responses. The program is a unique source of reliable, relevant and consistent information regarding food security and livelihoods and it has been used by a wide range of stakeholders including agencies and government departments for planning development and humanitarian interventions as well as evaluating emergency response in the State.

According to Shoham (2001), the CSI sentinel villages have been initially selected following a number of criteria that include physical/geographic/climatic conditions, human activities, resources availability, local markets and remote areas with critical

access. There are 7 sentinel sites in Tokar, 4 sites in rural Port Sudan and 5 sites recently added in Halaib during CSI-EWS transition phase.

Table 2.5: Sentinel sites in Tokar and Rural Port Sudan

<b>Tokar</b>	<b>Rural Port Sudan</b>	<b>Halaib*</b>
Agetai	Ariab	Oseif
Garora	Agwampt	Nuraiet
Andel	Tomala	Gebeit
Marafet	Arbaat	Mohammed Goul
Oduoan		
Ashet		
Tokar Town		

\*Added in 2008 during the CSI-EWS Transition Phase: source Aziz 2008, Oxfam EWS Evaluation.

The CSI program is the only institutional resource in the RSS based on the existing staff experience and on the use of an extensive network of Community Resource Persons (CRPs) at the community level. Pantaleo (2004:2) reported that due to funding constraints, the CSI has been suspended twice since its inception in 1994, it allowed to succeed in identifying and facilitating the humanitarian interventions, such as the 2004 humanitarian (food Aid and supplementary feeding) program which involves WFP and ACF/MoH/Oxfam in provision of food commodities and implementation respectively.

As stated in (CSI strategic paper 2005) the aim of the Community situation indicator project housed in the Oxfam GB office is to provide Early Warning (EW) information for food security in the Red Sea State (RSS) in particular and Sudan in general. The CSI project monitors and communicates changes in living conditions in the Red Sea state (RSS) to government and other stakeholders within the State to follow and understand the underlying determinants of food and livelihoods insecurity in the RSS and to plan appropriate interventions in the event of food stress.

#### **2.3.4.1. Specific Objectives of CSI include:**

- ◆ To monitor the food security and nutrition situation in the RSS through provision of accurate and timely early warning information.
- ◆ To raise awareness to institutions in and around the RSS about the numbers of people in need of food.

- ◆ To provide Oxfam with relevant information from which to advocate and ,lobby for appropriate and timely response and assistance to the area
- ◆ To inform OGB programming about the evolving food security and nutrition situation in an attempt to develop appropriate strategies addressing long-term food security issues in the Red Sea State.
- ◆ To empower communities to highlight their own needs to government and other stakeholders.

#### **2.3.4.2. Specific Activities of the CSI team were:**

- ◆ Using a household questionnaire and focus group discussion checklist collected data from 7 sentinel sites in Tokar and 4 sentinel sites in Rural Port Sudan. The questionnaires were administered by the trained community resource persons (CRPs) on monthly basis. In return, the CRPs were paid some money as incentive for the data collection. The CSI Information Officers visited each sentinel site once a month to collect the questionnaires, issue new questionnaires, pay incentive to the CRPs, and conduct focus group discussion on the food security status in the sentinel sites.
- ◆ Using the market data form, the information officers collected market prices for sorghum, wheat, millet, fodder, water, goats on a biweekly basis in the Tokar and in Port Sudan main markets.
- ◆ The information officers also collected secondary data from government ministries and departments and other agencies.
- ◆ The CSI staff analyzed the data on monthly basis to produce a monthly report and a quarterly food security bulletin.
- ◆ Disseminated the monthly report and the quarterly bulletin was presented to the CSI committee for scrutiny before officially released. Oxfam GB paid for the Steering committee incentives and refreshments.
- ◆ The CSI staff also participated in the crop assessment surveys and nutrition surveys.

Since then, the project contributed significantly to developing early warning methodologies throughout the State.

In 2005 OGB decided to transform the OGB CSI project into a Red Sea State EWS Unit and the CSI steering committee meeting that was held in October 2005 identified HAC as suitable home for the EWS Unit. Subsequently, OGB and HAC held several meetings in January-march 2006. In December 2007, a Memorandum of Understanding (MoU) was drawn and signed to guide the transition process by OGB, HAC and CSI SC effective from November 2007 to October 2008 Oxfam GB (RSS EWS, 2008).

#### **2.3.4.3. Objectives of the Red Sea State Early Warning System are:**

- ◆ To monitor the food security situation and provide decision makers and stakeholders with regular updated information and develop necessary recommendations to serve as a basis for response actions
- ◆ To monitor changes in the nutrition situation in the state through a nutrition surveillance system.
- ◆ To provide advice and warning about expected disasters so that necessary preparedness measures are taken (RSS EWS, 2008).

The transition period is expiring on 31st October 2008 and subsequently shifted, with consent of the donor (DFID) to December 2008. Upon which the EWS Steering Committee with leadership of HAC will take full ownership of the EWS Unit and OGB finalize its support to the EWS Unit. There is a general feeling that not much has been done by all the three parties to the MoU to bring about a smooth transition of the CSI into the EWS Unit (Oxfam GB: 2008).

CSI Steering Committee was set up to present, discuss and validate the information and analysis among all stakeholders before releasing the bulletins. Role and responsibilities defined within the Committee. The steering committee is representing government ministries, NGOs, UN and other stakeholders. The Humanitarian Aid Commission (HAC) chairs the steering committee.

Aziz (2008:12) noted that among other functions, the CIS Steering Committee is mandated to direct the development of the CSI project in terms of indications, information sources data collection methods, analytical frameworks, and the content and presentation of bulletins and to act as a body through which recommendations from CSI work can be channeled.

CSI has passed through several transitional stages of development before being transformed into an Early Warning System (EWS) in 2007. Several institutions, government units and NGOs Participated in the exercise of transformation.

During the transitional phase the EWS encountered some constraints. According to Mkumbwa (2008:1) several shortcomings were identified during the transition phase: firstly, the transition was started without prior evaluation of the CSI Project and assessment of the capacity of the potential government institutions to host the CSI Project. Secondly, EWS has wider thematic and geographic dimensions than the Oxfam GB owned CSI Project. Thirdly, demonstrated interest and commitment of the government was also necessary to give the EWS the legal existence and mandate to collect, analyze and disseminate information in the State. Fourth and most important is that the MoU did not have the hard facts to guide the tripartite member signatory to it in the transition.

In response to that, several remedial actions have been done. Firstly, the EWS Advisor made a presentation on EWS for food security to the members of the EWS SC in October 2008. Secondly, an evaluation of the EWS Unit and transition process was done in November 2008. Finally, in December 2008, a Strategy Workshop (SW) was organized to forge the way forward for the EWS in the State. The EWS SW consultations were rigorous and stretched as higher as the Federal HAC Commissioner and the State Minister of Social Affairs, and as wider as the community resource persons and other EWS related agencies within and outside Sudan.

The specific location of the EWS in a government's ministerial structure affects its ability to influence the decision-making process. Early warning systems need a setting that is conducive to a reciprocal flow of information with the primary decision-making bodies involved in emergency actions and food security programming.

The strategy work shop (Shingrai, 2008) and the EWS evaluation (Aziz, 2008) came out with similar recommendations of the technical and institution components including:

## Technical recommendations

The evaluation indicates that the way, in which information is collected, analyzed and disseminated is critical to its use in decision-making and to supporting timely state responses to short-term food and nutrition crises.

- ◆ EWS agenda need to be driven from the communities & localities
- ◆ Data collection tools need to conform with level of CRPs competencies
- ◆ EWS need to be domain-neutral
- ◆ EWS sentinel site selection be based on highest needy rather than convenience of reach.
- ◆ Few well calculated indicators derived with the consensus and information priorities of the decision-makers.
- ◆ The presentation of the information should be in a way that it will facilitate prompt action for response to mitigate the impact of the food deficits and diverse threats to livelihoods.
- ◆ Bulletin size, timing, contents be revised.

## Institutional recommendations

The institutional setting or home of an EWS has a major influence in its ability to carry out its mission. Our recommendations are:

- ◆ EWS need to be an independent unit for food security information collection and analysis
- ◆ EWS needs to be housed closer to the decision makers (Legislative Council).
- ◆ EWS need to be institutionalized and technically strengthened at locality level

We hope this will exert a positive influence on the EWS performance by enabling:

- ◆ Quick response to alerts/warnings, and commitment to deal with food crises expeditiously, as the EWS will be closer to the primary decision-making bodies on emergency actions
- ◆ Administrative ease to access primary and secondary data from the line ministries, departments and other agencies.
- ◆ Opportunity to procure sustainable sources of funding from the State budget.
- ◆ The EWS to recruit train and retain staff with abilities to address the evolving nature of the EWS work, particularly in terms of multi-sector orientation.

- ◆ Easier to coordinate other stakeholders including at the locality level. Hence easier to pool available resources for rapid assessment and response.
- ◆ Avoid information politics: managerial independence and analytical autonomy that allows the EWS to carry out its mission with minimal bureaucratic obstruction or political interference

The global survey of early warning system reported that past experience has shown that early warning can be a highly effective tool for saving lives and property in natural hazard events. Although the frequency of disasters has noticeably increased over the last fifty years, death tolls from disasters have declined, in large part owing to early warning systems and associated preparedness and response systems. The enormous losses of life in the major droughts, storms and floods of last century are now rare. It is not uncommon for early warnings to lead to the evacuation of a million people from areas at risk. For example, evacuations based on the hurricane forecasting and warning of Hurricane Katrina in 2005 undoubtedly saved many thousands of lives, even though the event also clearly demonstrated the limitation of scientific and technical early warning systems and the importance of a comprehensive disaster risk reduction approach, including public awareness and education for enhanced preparedness and response.

The global survey of early warning system (2006) concluded that the early warning is a readily understood concept and early warning systems are well advanced for many hazards. There is widespread recognition of the need for early warning systems as an essential component of strategies to build resilience to natural disasters. Without further efforts at the local, national, regional and international levels, some hazards will continue to strike without warning and existing early warning systems may continue to fail to reach people at risk or may fail to elicit appropriate lifesaving and property-saving responses. Accordingly, the Secretary-General in his report on the International Strategy for Disaster Reduction (A/61/229) has encouraged Member States and organizations to develop global early warning systems for all hazards and all communities, based on existing systems, and to address the associated technical and organizational gaps and needs, as recommended in the Global Survey of Early Warning Systems.

## Chapter 3: Results and discussion

In this chapter the data and information collected are tabulated, analyzed and discussed before presented.

### 3.1. Local community results

#### 3.1.1. Location and language

Results pertaining to location and language are tabulated in tables 1, 2 and 3. The 30 respondents of this study represented the sample of the local community of the Red Sea State (table 1), within the Red Sea State the study covered four localities (table 2).

**Table 1: Red Sea State**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Red Sea	30	100.0	100.0	100.0

**Table 2: Locality**

	Frequency	Percent
Agig	14	46.7
G.Maaden	5	16.7
R. Gonob	6	20.0
Tokar N.	5	16.7
Total	30	100.0

Sixty three percent (63%) of respondents of rural community members were interviewed in Arabic (table 3). This was used to save time for translation and the interpretation between local dialect and interview language. While 37% of the sample responded in Beja local dialect and a facilitator was used to communicated their views.

**Table 3: Language**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Beja	11	36.7	36.7	36.7
	Arabic	19	63.3	63.3	100.0
	Total	30	100.0	100.0	

### 3.1.2. Population trend and sample:

Results pertaining to population parameters regarding age, sex and occupation are tabulated in tables (4, 5, 6, and 7). More than 50% of the population (table 4) lies within the young category while 40% of them were at the age (31-40) and 20% of the population were above the age of 50 years.

**Table 4: Age groups**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	21-30	5	16.7	16.7	16.7
	31-40	12	40.0	40.0	56.7
	50+	6	20.0	20.0	76.7
	5.00	7	23.3	23.3	100.0
	Total	30	100.0	100.0	

RSS population trend fall within young ages. The productive age relating to development constituted 40% which implies that it could be used effectively for RSS food security projects.

Almost about 20% of the community was above the age of 50 this may have its repercussion on the development at community level.

Samples have shown that 60% of respondents (table 5) were males while 40% were females. Although this figure seem to depart from 1:1 ratio which is the general trend yet it was considered as a great achievement to have Beja women in (this high percentage) to participate in this research according to their conservative nature.

**Table 5: Sex (q2)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	18	60.0	60.0	60.0
	Female	12	40.0	40.0	100.0
	Total	30	100.0	100.0	

Seventy percent (70%) of respondents (Table6) live in the localities since birth, while 7% live more than 20 years and other 7% live between 1 -5 years.

**Table 6: Duration of living in the village (q3)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Since birth	21	70.0	75.0	75.0
	1-5	2	6.7	7.1	82.1
	6-10	1	3.3	3.6	85.7
	11-15	1	3.3	3.6	89.3
	16-20	1	3.3	3.6	92.9
	20+	2	6.7	7.1	100.0
	Total	28	93.3	100.0	
	Missing	System	2	6.7	
Total		30	100.0		

The majority of the community live in their villages since birth so they are quite familiar with the general context in their communities and the negative climatic changes over years.

Almost 80% of respondent (table 7) were herders, farmers or both. This categories strongly involved with food security trends, which affected directly their livelihood either through food production for farmers or/ and animal husbandry in terms of fodder production and availability or sales of animals to access grains. About 93% of the population are working with natural resources (Fig.3.1) which will have its negative impact such as over grazing and erosion of soil or positive impact on the environment such as natural fertilizing of soil. According to the results obtain about 7% of the population have their livelihood connected with non agricultural activities and most of them were reported to work as labourers. This category will be affected with the access and availability of food in local markets.

**Table 7: Local community occupation (q4)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Farmer	8	26.7	26.7	26.7
	Herder	9	30.0	30.0	56.7
	Fisherman	2	6.7	6.7	63.3
	Livestock owner	1	3.3	3.3	66.7
	1, 2	7	23.3	23.3	90.0
	Other	2	6.7	6.7	96.7
	2, 3	1	3.3	3.3	100.0
	Total	30	100.0	100.0	

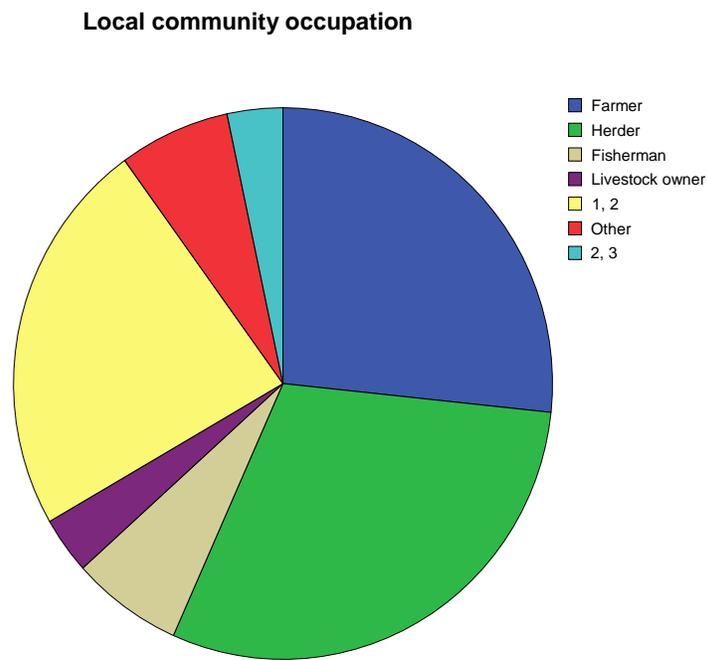


Fig. 3.1. Occupation – Source: Researcher field research data

The livelihood of most of this community are interlink with natural resources, basically as herders and farmers. Hence this may have its positive or negative impact on the environment.

### 3.1.3. Early warning knowledge and perception:

Results pertaining to food security and early warning knowledge and perception in the community were tabulated in tables 8, 9, 10, 11 and 12. Almost 70% of respondents (table 8) indicated clearly that they knew there was an EWS for food security at Red Sea State and were familiar with the early warning information activities through market behaviour and changes reflected in grain, livestock, goat, fish, and fodder prices (table 10) and (Fig 3 2). While 26% do not know about EWS. Almost 20% of them (table 9) think that RSS need an EWS for food security, due to its climatic and environment context. While 7% don't think that the RSS need an EWS. It's not clear why this group think so despite the harsh nature of the Red Sea State.

**Table 8: Information access on food security (q5.a)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	21	70.0	72.4	72.4
	No	8	26.7	27.6	100.0
	Total	29	96.7	100.0	
Missing	System	1	3.3		
Total		30	100.0		

The data reflected that about 26% of the population had no idea about the EWS in RSS. This indicated that almost one fourth of the community have no idea about the EWS which will have its negative effect on food security.

**Table 9: EWS methods in local communities (q5.b)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	6	20.0	75.0	75.0
	No	2	6.7	25.0	100.0
	Total	8	26.7	100.0	
Missing	System	22	73.3		
Total		30	100.0		

Data has shown that the 26% who have no knowledge about EWS in Red Sea State 7% of them indicated that RSS not in need of EWS for food security, this is not clear since all the community either they are farmers, herders or both or local traders who in fact in

need of an EWS for prediction of grain prices, livestock prices, rainfalls, goat/grain term of trade and availability of grain and fodder in the local markets.

**Table 10 : EWS information activities (q5.c)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Grain price	1	3.3	4.2	4.2
	Livestock prices	2	6.7	8.3	12.5
	All	1	3.3	4.2	16.7
	4-6	2	6.7	8.3	25.0
	2-6	7	23.3	29.2	54.2
	2-4	6	20.0	25.0	79.2
	7, 8	2	6.7	8.3	87.5
	2-5	1	3.3	4.2	91.7
	2, 3	1	3.3	4.2	95.8
	1-4	1	3.3	4.2	100.0
	Total	24	80.0	100.0	
	Missing	System	6	20.0	
Total		30	100.0		

Early warning knowledge and perception, the community was aware of certain indicators of food insecurity reflected in rain, livestock, goats, fish and fodder prices. This may let the local community to be prepared and to took precautionary measures against food crisis.

### Early warning system information activities

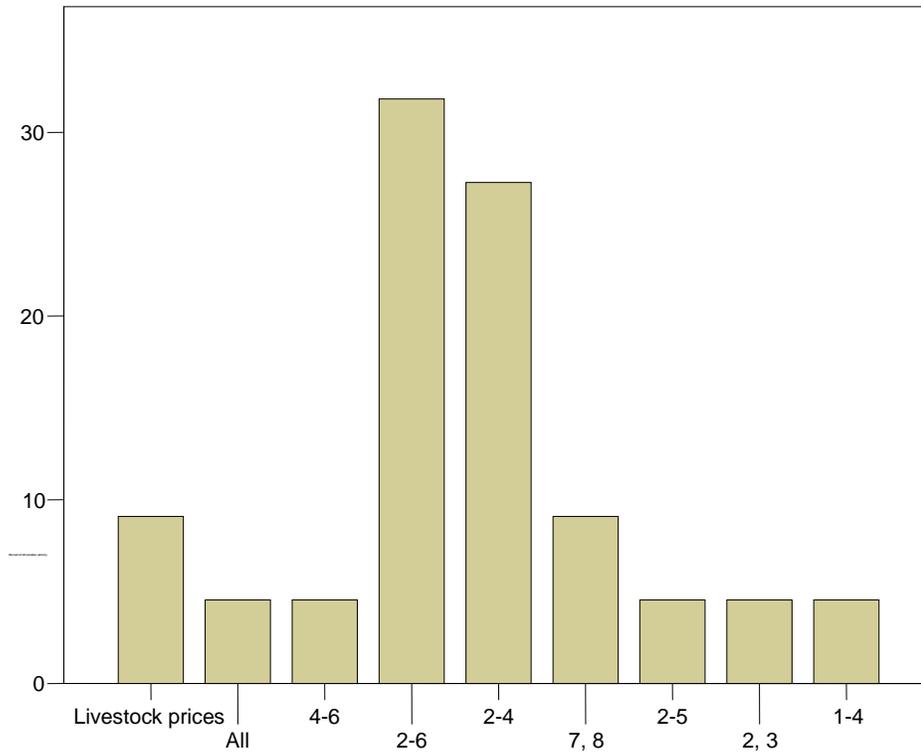


Fig. 3.2. EWS information – Source: Researcher field research data

Figure 3.2 shows that highest number of respondent more than 30% received information on EWS activities (2-6) mainly grain prices, livestock prices, grain/goat term of trade, availability of grain and fodder in the local market. While more than 25% received information on grain prices, livestock prices and grain/goats term of trade (2-4). These respondents are mainly farmers and herder

More than 83% of the respondents received information on early warnings (table 11). Such information was received by the local community through sakanab (table 12) and (Fig.3.3), which constituted (67%). The local community in the rural areas also received information by the community resource persons (16.7%). The community resource persons relayed back to the community the information that had been analyzed by the EWS team and reported in the CSI bulletin. Community resource persons had limited

access to cover wide rural areas, therefore only communicated the information where they live with their communities.

**Table 11: Access to EWS information (q6.a)**

		Frequency	Percent
<b>Valid</b>	<b>Yes</b>	25	83.3
	<b>No</b>	5	16.7
	<b>Total</b>	30	100.0

**Table 12: Forms and kinds of EWS information (q6.b)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sakanab	8	26.7	32.0	32.0
	Community resource persons	5	16.7	20.0	52.0
	1, 3	2	6.7	8.0	60.0
	1-3	4	13.3	16.0	76.0
	1-2	6	20.0	24.0	100.0
	Total	25	83.3	100.0	
Missing	System	5	16.7		
Total		30	100.0		

Sakanab is widely spread among the rural communities and considered as the main source of information and communication since the rural community and those live in remoteness areas lack any means of information and communication through normal channels such as radio broadcasting, television and news papers. All information received through sakanab is valued by the local community.

### Forms and kinds of early warnings

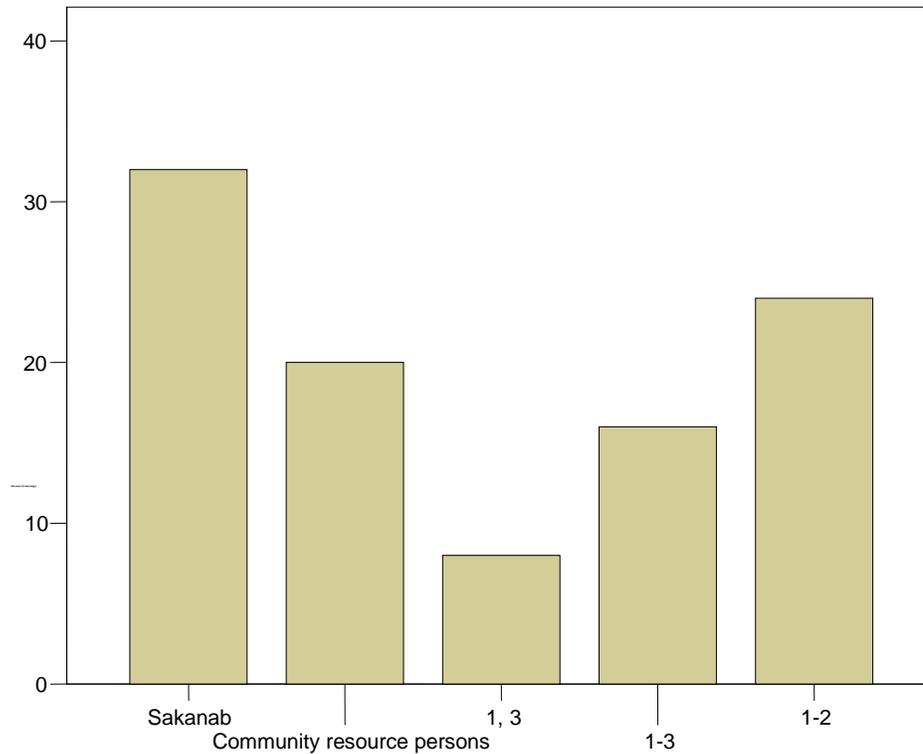


Fig. 3.3. Forms of warnings – Source: Researcher field research data

Sacanab (Fig. 3.3) represented the most influential information communication on EWS and food security along with the role of community resource persons.

#### 3.1.4. Food security information

Results pertaining to food security information in the community were tabulated in tables 13, 14 and 15. More than 73% of the respondents had access on information on food security (table 13). While 23% had no access to such information.

**Table 13: Access to EWS information (q7)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Definitely yes	2	6.7	6.9	6.9
	Yes	17	56.7	58.6	65.5
	sometimes	3	10.0	10.3	75.9
	No	5	16.7	17.2	93.1
	Definitely not	2	6.7	6.9	100.0
	Total	29	96.7	100.0	
Missing	System	1	3.3		
Total		30	100.0		

Data indicated that almost (23%), one fourth of the population in the rural areas were unable to receive information on food security. There was a problem of access to many areas of the RSS. The RSS is a large geographic area of over 200,000 Km<sup>2</sup> with a dispersed rural population. The access to these populations was constrained by the lack of communication and road networks, which makes travel to the more distant areas of the state extremely hazardous and time consuming.

The respondents were satisfied (77%) with the information generated by the EWS (table 14). While 17% were not satisfied with such information.

**Table 14: Satisfaction with EWS information (Q8)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Definitely yes	2	6.7	6.7	6.7
	Yes	21	70.0	70.0	76.7
	sometimes	2	6.7	6.7	83.3
	No	3	10.0	10.0	93.3
	Definitely not	2	6.7	6.7	100.0
	Total	30	100.0	100.0	

Although a considerable portion of community was satisfied by the information generated by the EWS, those who are not satisfied by the information may be because the information they received was not enough or may be not be relevant and on time.

Such information was communicated to individuals of the community (table 15) through local traditional method (Sakanab) which constituted more than 96% The local communities in the rural areas used other methods such as animal behaviour and birds migration in addition to Sakanab (Fig. 3.4). Changes in animal behaviour was given the least priority in connection with information transfer .

Nine (9%) of the population used old method such as birds migration in detecting EWS while 3% of the community used other methods such as rain fall cycles and the appearance of weakness on livestock.

**Q9**

Table 15

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sakanab	12	40.0	40.0	40.0
	Changes in animal behaviour	1	3.3	3.3	43.3
	1, 3, 4	4	13.3	13.3	56.7
	1, 3	4	13.3	13.3	70.0
	1,2,3	6	20.0	20.0	90.0
	1, 2	3	10.0	10.0	100.0
	Total	30	100.0	100.0	

### Community early warning system methods

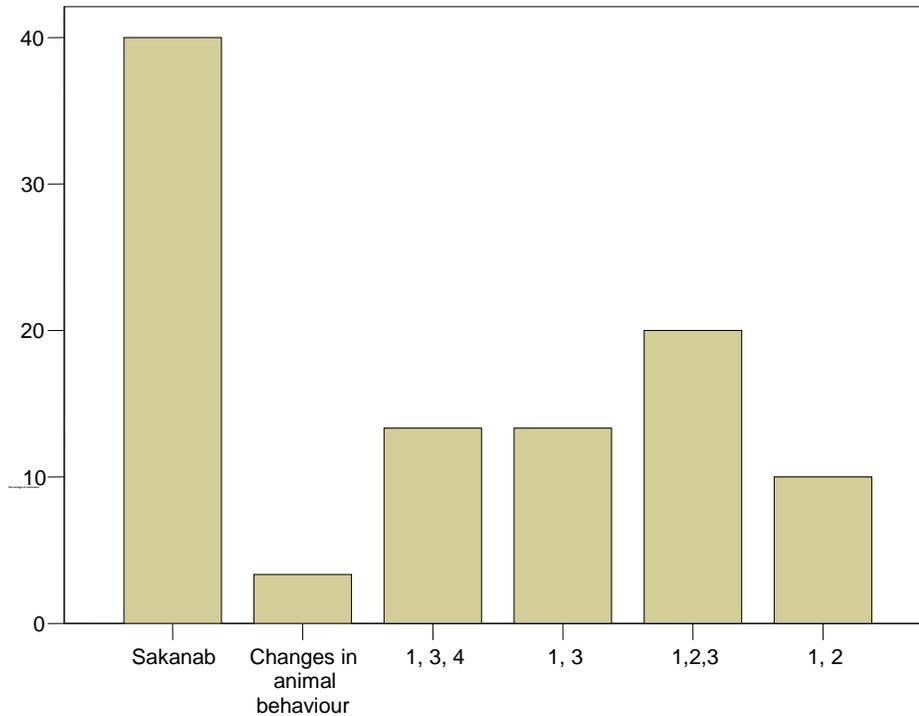


Fig. 3.4. Community EWS methods – Source: Researcher field research data 2009

Access to information through local traditional methods such as animal behaviour, birds migration were of significant means of EW information methods to the local community.

Local community believed that sakanab was the most important local traditional method for communication within Red Sea State rural communities.

#### 3.1.5. Food security indicators:

Results pertaining to food security indicators are tabulated in tables 16, 17, 18 and 19. Almost 100% of the respondent (table 16) aware of different food security indicators in their communities such as lack of rains, poor production, grain and fodder availability and goats/grain term of trade (Fig. 3.5).

**Table 16: Community food crisis prediction (Q10)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Lack of rain	5	16.7	16.7	16.7
	All of the above	19	63.3	63.3	80.0
	1, 3, 5	1	3.3	3.3	83.3
	6, 7	2	6.7	6.7	90.0
	1, 2	1	3.3	3.3	93.3
	1, 2, 3	1	3.3	3.3	96.7
	1, 4	1	3.3	3.3	100.0
	Total	30	100.0	100.0	

**Community food crisis prediction**

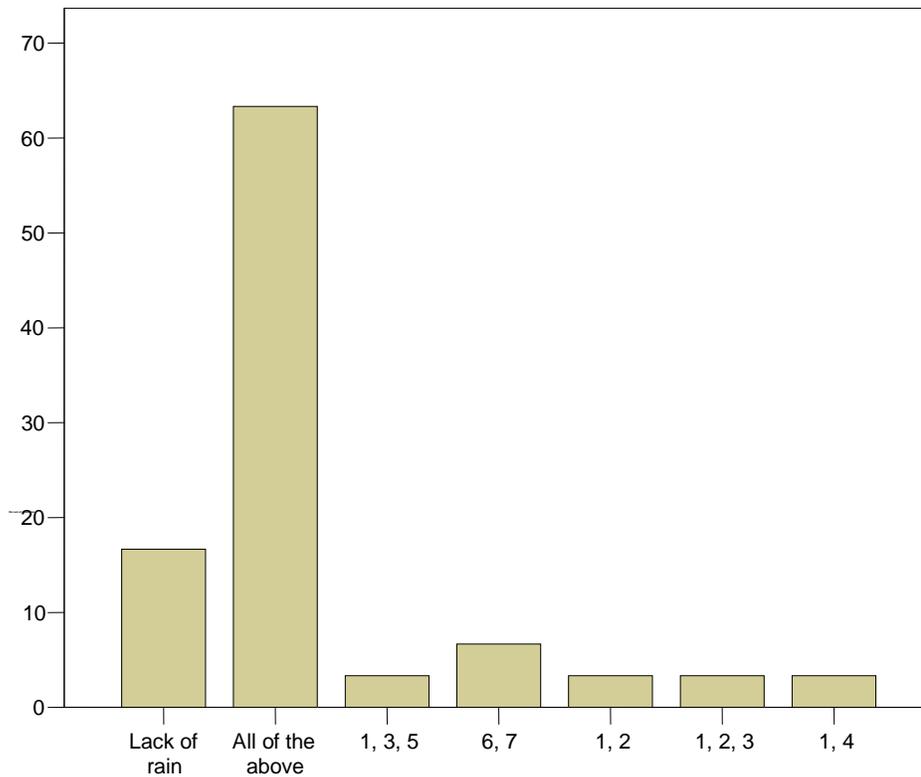


Fig. 3.5. Food crisis prediction- Source: Researcher field research data 2009

The respondents have clearly shown that the food security indicators are complex. 77% of the respondents indicated that the most single food security indicator is the lack of

rain. Rain fall availability associated with goats prices and grain prices seems to be associated with each other and can be used as indicators of food security. Grain prices and market behaviour though important received only 7% of the respondents views.

Out of 70% of respondents (table 17) indicated that they were able to be prepared in advance to face food crisis predicted by early warning system. The community seems to be prepared to face gaps in food availability.

**Table 17: Community preparedness for food crisis (q11.a)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	21	70.0	70.0	70.0
	No	9	30.0	30.0	100.0
	Total	30	100.0	100.0	

The 70% (table 18) were able to take actions and measures in advance such as selling animal to buy food, store available food, goat/grain term of trade, alternative livelihood, reduce meals, borrow food and tap food reserve available in the local community (Fig. 3.6).

**Table 18: Community measures and actions in food crisis (q11.b)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Store available food	1	3.3	4.8	4.8
	Sell animal to buy food	3	10.0	14.3	19.0
	1, 3-6	1	3.3	4.8	23.8
	1-6	1	3.3	4.8	28.6
	1, 3, 6	1	3.3	4.8	33.3
	3-9	3	10.0	14.3	47.6
	2-9	2	6.7	9.5	57.1
	1-9	1	3.3	4.8	61.9
	5-9	1	3.3	4.8	66.7
	1-4	3	10.0	14.3	81.0
	2, 3	2	6.7	9.5	90.5
	1, 3	1	3.3	4.8	95.2
	3, 4	1	3.3	4.8	100.0
	Total	21	70.0	100.0	
	Missing	System	9	30.0	
Total		30	100.0		

### Community preparedness and actions

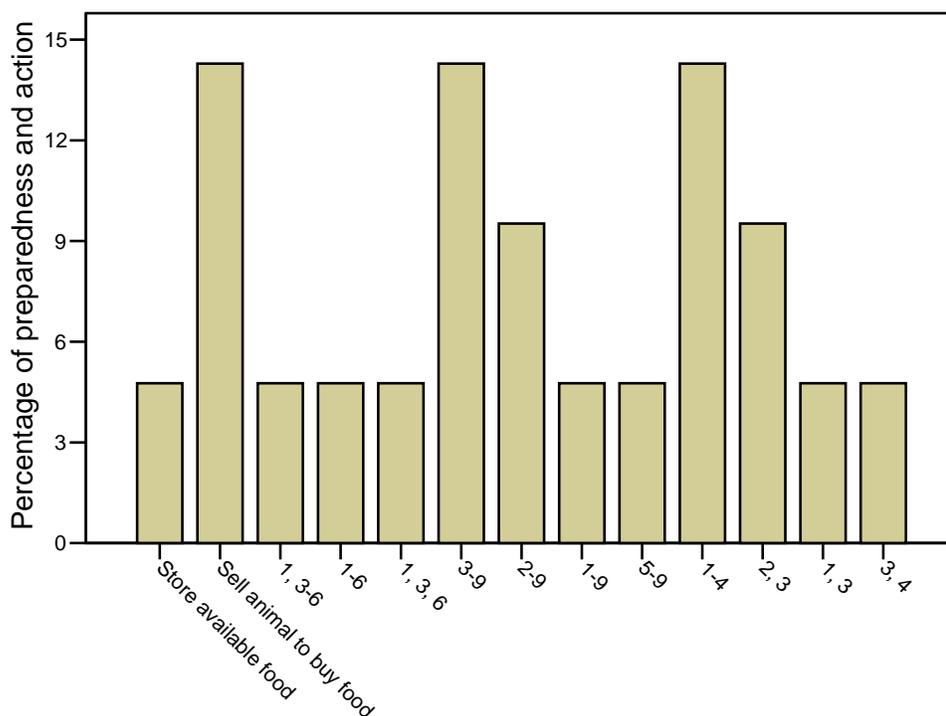


Fig.3.6. Community preparedness - Source: Researcher field research data 2009

Coping mechanisms for food security seem to be complex as the community pick various preparedness mechanism, among the most relevant preparedness selling of animals to buy food, reduction of numbers of meals and borrowing food from relative and friend seems to be obvious choices by the community during food crisis. The linkage between goat selling and sorghum seem to operate during food crisis.

Food security indicators: the community is aware of complexity of food security indicators such as lack of rain, poor production, grain and fodder availability and terms of trade.

None of the respondents were satisfied with measures and actions taken according to EWS prediction because their answers didn't indicate (yes) as a choice. Out 60% of respondents (table 19) indicated that such action and measures taken had reduced the effect of food crisis to some extent in their local communities. while 10% indicated negative effect of food crisis despite the actions taken.

**Table 19: Effects of community measures and action taken on FS crisis (q12)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	To some extent	18	60.0	81.8	81.8
	No	3	10.0	13.6	95.5
	13.00	1	3.3	4.5	100.0
	Total	22	73.3	100.0	
Missing	System	8	26.7		
Total		30	100.0		

Community actions to reduced the negative effect of food crisis has impacted positively in reducing food crisis effect in the community to somehow, this means that the local community was aware and able to took certain precautionary measures and support the poor within the community.

The community also respond by purchasing grain to combat disaster situation.

### **3.1.6. Leadership and decision making**

Results pertaining to leadership and decision making are tabulated in (table 20) More than 50% of the respondents indicated that the government was still responsible for responding to food crisis (Fig.3.7). About 23% of the respondent feel that all the partners including state government, UN/NGOs, Food security committee and the local community are partners for the leadership of EWS in the Red Sea State. Also about 27% of the respondents felt that the international community (donors) had a role to play.

**Table 20: EWS decision making and leadership (q13)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	State government	13	43.3	43.3	43.3
	UN/NGOs	1	3.3	3.3	46.7
	RSS food security committee	1	3.3	3.3	50.0
	All together	3	10.0	10.0	60.0
	others, include local community	3	10.0	10.0	70.0
	1-2	1	3.3	3.3	73.3
	5, 6	8	26.7	26.7	100.0
	Total	30	100.0	100.0	

**EWS decision making and leadership**

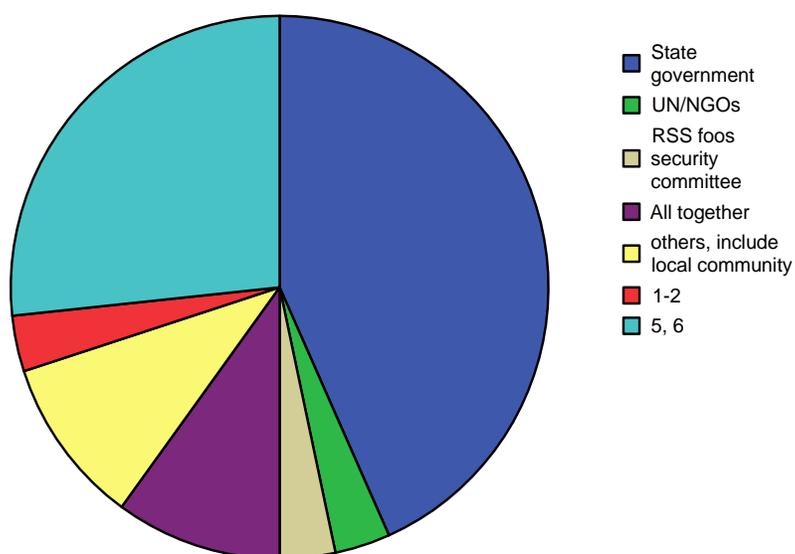


Fig. 3.7. EWS decision making - source: Researcher field research data 2009

The graph indicated clearly that the local government is seem to be the sole decision makers in regards to food security in the Red Sea State.

The stakeholders believed that all the partners together (state government, international bodies and RSS food security committee) and the local community could participate in the decision making process on the EWS in the RSS.

## 3.2. Key informants results

### 3.2.1. Location and language

Results pertaining to location and language are tabulated in tables 21, 22, 23 and 24. The 30 respondents of this study represented the sample of the key informants of the Red Sea State (table 21).

**Table 21: Red Sea State**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Red Sea	30	100.0	100.0	100.0

Within the Red Sea State the study covered four localities (table 22) where 87% of the key informants are based in Port Sudan the major city Red Sea State.

Within the RSS localities four towns were covered (table 23) .

**Table 22: localities**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Agig	2	6.7	6.7	6.7
Haya	1	3.3	3.3	10.0
P. Sudan	26	86.6	86.6	96.7
Tokar	1	3.3	3.3	100.0
Total	30	100.0	100.0	

**Table 23** **Town/village**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid P. Sudan	26	86.6	86.6	86.7
Agig	2	6.7	6.7	93.3
Haya	1	3.3	3.3	96.7
Tokar	1	3.3	3.3	100.0
Total	30	100.0	100.0	

Most of key informants are based in cities in particular Port Sudan town. Most of them are government employees. This is one of the problems where most of the decision makers at rural areas and small towns preferred to be in main towns mainly in port Sudan town the capital of the Red Sea State which has all the facilities and resources. The absence of decision makers and key persons from their base impact negatively in day to day management and development of rural areas.

Out 67% of key informants respondents interviewed in English (table 24). While 33% respond in Arabic and a facilitator was used to communicate their views.

Table 24 **language**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Arabic	10	33.3	33.3	33.3
	English	20	66.7	66.7	100.0
	Total	30	100.0	100.0	

The majority of respondent interviewed in English language. This was used to save time for translation and the interpretation between Arabic and interview language.

This also indicated that the high numbers of respondents are governmental officials who could communicate in English language.

### 3.2.2. Population trend and sample:

Results pertaining to population parameters regarding age, sex and occupation are tabulated in tables (25, 26, and 27). More than 50% of the respondents (table 25) lies within the young category while 47% of them were at the age (41-50). While 30% of the population were above the age of 50 years.

Table 25: Age groups

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	31-40	7	23.3	23.3	23.3
	41-50	14	46.7	46.7	70.0
	50+	9	30.0	30.0	100.0
	Total	30	100.0	100.0	

More than one fourth of the key informants were above the age of 50, who are at decision making mechanisms. This category seem to be slow in achieving results and performing day to day management, and mostly at the process of retirement.

Samples have shown that 77% of respondents (table 26) were male while 33% were female. Although this figure seem to depart from 1:1 ratio which is the trend yet it is considered as a positive result to have women in decision making mechanism.

**Table 26: Sex**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid male	23	76.7	76.7	76.7
female	7	23.3	23.3	100.0
Total	30	100.0	100.0	

Almost 23% of decision makers are females at government and community levels. In the conservative environment of the Red Sea State this trend is considered as a positive impact to have females in decision making process, which would encouraged and persuaded more women to be involve and participate in decision making process in the near future and achieved 1:1 ratio.

Out 60% of respondents (table 27) were government officials representing different governmental department. While 17% were community leaders and/or pastoral union representatives and 20% representing UN and NGOs Officials (Fig 3.7). The private sector link with food security has not yet developed only representing (3.3%). Which needs more focus and attention to be involve in food security mechanism.

**Table 27: Key informants occupation**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Executive Officer	2	6.7	6.7	6.7
Government Official	16	53.3	53.3	60.0
Community leader	1	3.3	3.3	63.3
UN/NGO official	6	20.0	20.0	83.3
5, 7	4	13.3	13.3	96.7
Private sector	1	3.3	3.3	100.0
Total	30	100.0	100.0	

Community leaders and pastoral union officials (5,7) were represented within the key informants this considered as good trend since they were mostly influential in their communities. They can facilitate communication and inteaction with the local community.

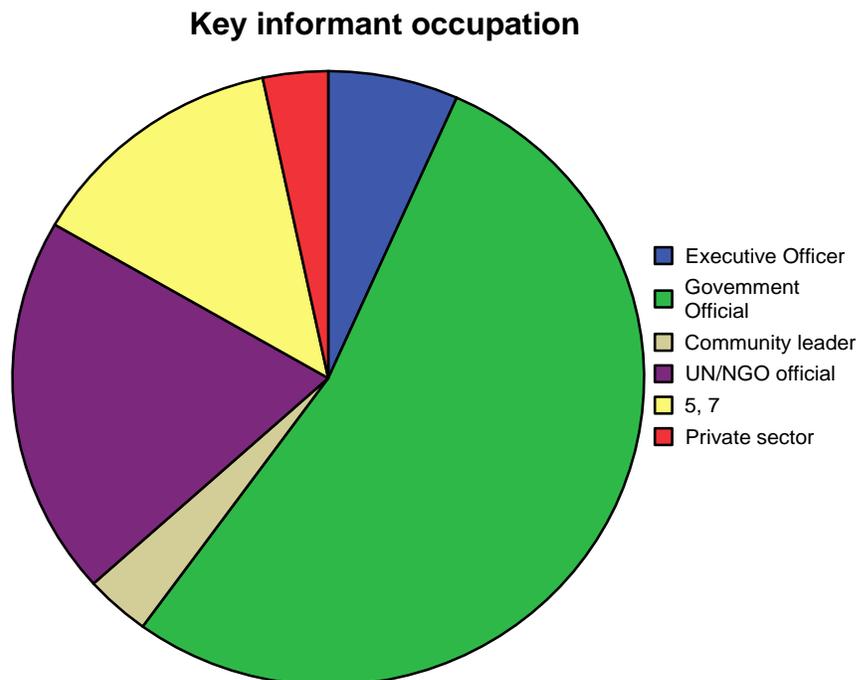


Fig. 3.8. Occupation. Source: Researcher field research data 2009

Most of the key informants are government employees. Who are based in different localities in the Red Sea State, unfortunately most of them are based in cities in particular Port Sudan town.

### 3.2.3. Early warning knowledge and perception:

Results pertaining to food security and early warning knowledge and perception of the key informants are tabulated in tables 28, 29, 30 and 31. Almost 97% of respondents (table 28) indicated clearly that they knew there was an EWS for food security in Red

Sea State and that the early warning system provided relevant and timely information to stakeholders such as decision makers, market actors (table 29). while 3% had no idea about EWS in RSS.

**Table 28.: The existence of early warning system in RSS**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	29	96.7	96.7	96.7
no	1	3.3	3.3	100.0
Total	30	100.0	100.0	

The EWS in the Red Sea State was widely recognizable and acknowledgeable by the key informants at different decision making levels. Where it could be developed and activated.

**Table 29: EWS provided timely and relevant information to all stakeholders**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes definitely	4	13.3	14.3	14.3
yes	15	50.0	53.6	67.9
not sure	6	20.0	21.4	89.3
no	2	6.7	7.1	96.4
definitely not	1	3.3	3.6	100.0
Total	28	93.3	100.0	
Missing System	2	6.7		
Total	30	100.0		

Those who do not know about EWS, think that (table 30) RSS need an EWS for food security. Out 97% of the respondents (table 31) indicated the complex nature of knowledge and perception although the prevailing condition of drought was the most significant factor associated with food security perception (Fig.3.9). While 3% of the key informants think that the deterioration of natural resources and low productivity were very important factor in relation to food security. Poor governance and poor management were cited in conjunction with other factors to widen poverty in RSS. More than 30% of key informants have clearly indicated the complexity and association of all factors leading to food insecurity.

**Table 30: Red Sea State needs an EWS (q 6)**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	2	6.7	100.0	100.0
Missing System	28	93.3		
Total	30	100.0		

**Table 31: Reasons for RSS needs an EWS (q7)**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid red sea is a drought prone area	2	6.7	6.7	6.7
severity of climate	1	3.3	3.3	10.0
recurrent food security crisis	1	3.3	3.3	13.3
deterioration of natural resources	1	3.3	3.3	16.7
all above mentioned	5	16.7	16.7	33.3
1-4	1	3.3	3.3	36.7
1-2, 4-6	1	3.3	3.3	40.0
1-2, 4-7	2	6.7	6.7	46.7
1, 7	1	3.3	3.3	50.0
1, 4	2	6.7	6.7	56.7
1, 4-7	1	3.3	3.3	60.0
1,3, 5-6	1	3.3	3.3	63.3
1-6	4	13.3	13.3	76.7
1, 4-6	2	6.7	6.7	83.3
4, 6	1	3.3	3.3	86.7
1, 3, 5	1	3.3	3.3	90.0
1-4, 6-7	1	3.3	3.3	93.3
1, 3-6	1	3.3	3.3	96.7
1, 3, 6, 7	1	3.3	3.3	100.0
Total	30	100.0	100.0	

### Needs of EWS for food security in RSS

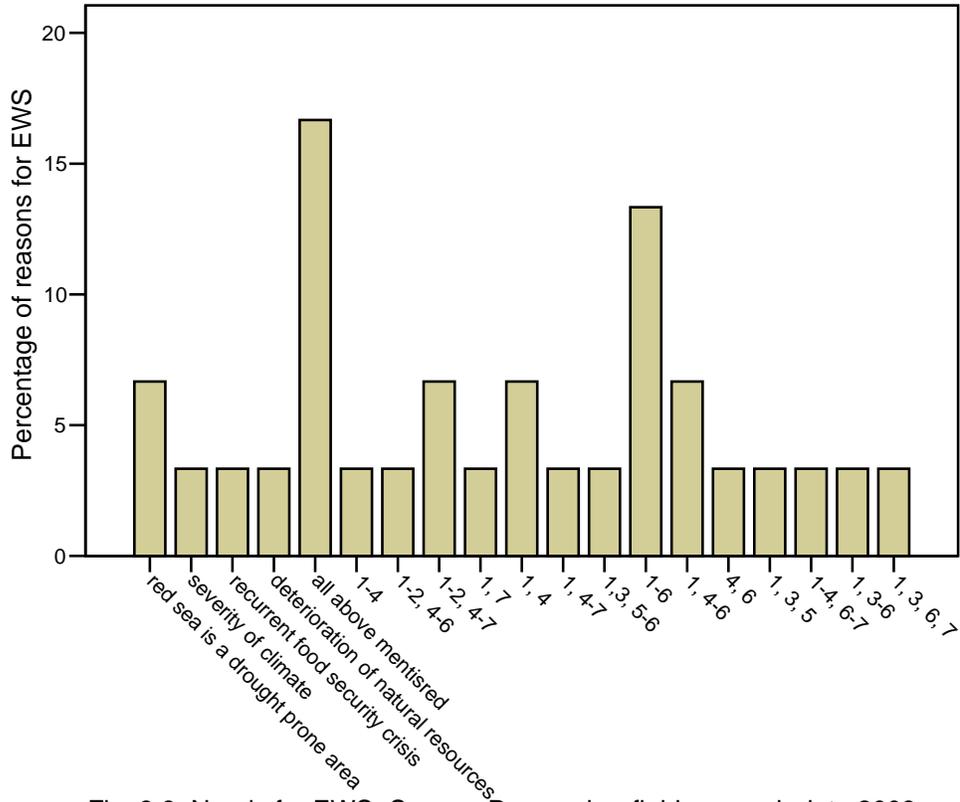


Fig. 3.9. Needs for EWS- Source: Researcher field research data 2009

Knowledge and perception of early warning among the key informants was obviously very high and they have indicated the complexity nature of knowledge and perception.

Key informants believed that the complexity and association of all factors leading to food insecurity in Red Sea State.

Among the most prominent information, poor governance and poor management was reflected during food crisis.

### 3.2.4. Food security information

Results pertaining to food security information regarding key informants are tabulated in tables 32,33 and 34. More than 70% of the respondents have information on early warning (table 32) such as market prices, goat/grain term of trade (Fig.3.10) while 30% related it to availability of food and fodder in the local markets, and accessibility of food.

**Table 32: EWS information in RSS (q8)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Market prices (grain, livestock, fish)	1	3.3	3.4	3.4
	All of above	6	20.0	20.7	24.1
	1-2	6	20.0	20.7	44.8
	1-3	3	10.0	10.3	55.2
	1-2, 5	2	6.7	6.9	62.1
	1, 5	2	6.7	6.9	69.0
	Others	1	3.3	3.4	72.4
	1, 3-4	1	3.3	3.4	75.9
	1-3, 5	3	10.0	10.3	86.2
	1-4	2	6.7	6.9	93.1
	2-3, 5	1	3.3	3.4	96.6
	1,4	1	3.3	3.4	100.0
	Total	29	96.7	100.0	
Missing	System	1	3.3		
Total		30	100.0		

### EWS information

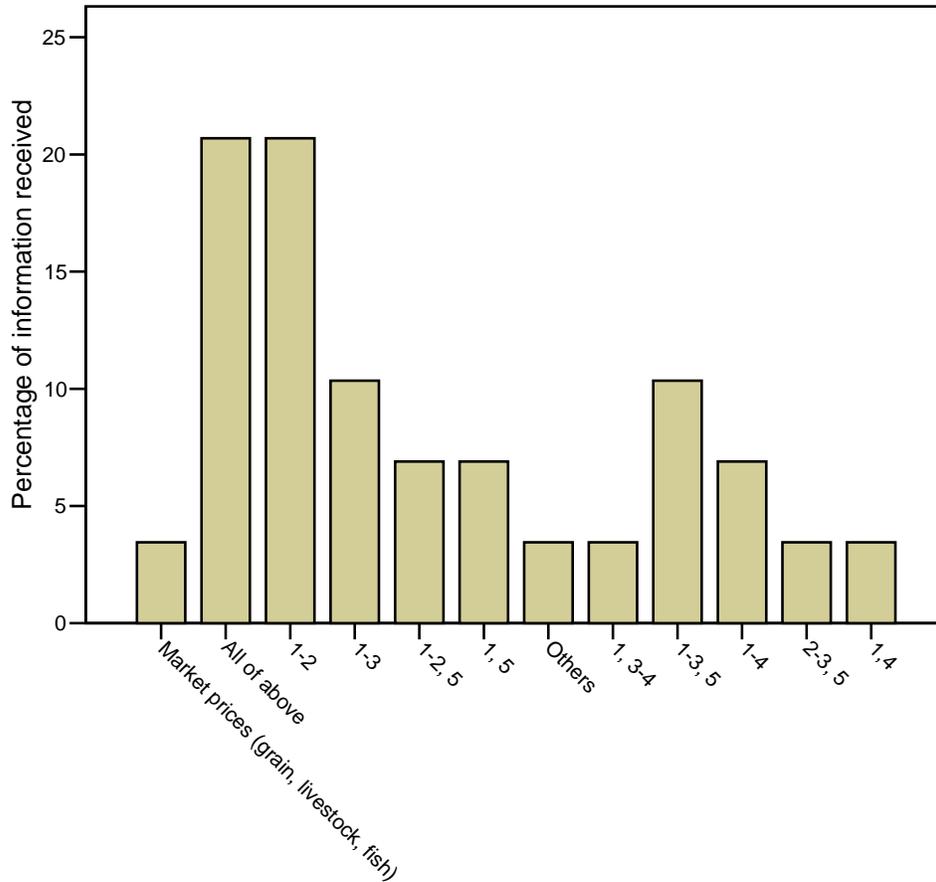


Fig. 3.10. EWS information \_ Source: Researcher field reasearch data 2009

The key informants were aware of EWS information of food insecurity reflected in market prices, goat/grain terms of trade, availability of food and fodder in local markets and accessibility of food. This may enable key informants to takes actions and be prepared before the food crisis.

Key informants gave high score to market prices and goat/grain terms of trade as an important information of the EWS.

Out 83% of respondents (table 33) have access and familiar with EWS information publication particularly food security quarterly bulletin and Bi – weekly market prices. Out of the 83% (25%) have indicated that monthly food security and nutrition report is more

familiar to them compare to Bi-weekly market prices publication. While 10% have no access to EWS publication.

**Table 33: EWS information publications (q9)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Food security quarterly bulletin	7	23.3	25.0	25.0
	Bi - weekly market prices	3	10.0	10.7	35.7
	Monthly food security and nutrition report	4	13.3	14.3	50.0
	All of above	3	10.0	10.7	60.7
	Others	1	3.3	3.6	64.3
	1-2	4	13.3	14.3	78.6
	1-2, 4	2	6.7	7.1	85.7
	1,3	1	3.3	3.6	89.3
	no access	2	6.7	7.1	96.4
	No	1	3.3	3.6	100.0
	Total	28	93.3	100.0	
	Missing	System	2	6.7	
Total		30	100.0		

Although food security information is high among key informants yet they considered the publications are not the most effective means for food security information.

Out 33% of respondents (table 34) indicated that the current EWS is influential in convincing decision makers and other stakeholders to respond on time to food crisis. While 30% indicated that the EWS is not influential. In the other hands 30% indicated that they are not sure.

**Table 34: Is EWS influential in convincing decision makers (q10)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes definitely	2	6.7	7.1	7.1
	yes	8	26.7	28.6	35.7
	not sure	9	30.0	32.1	67.9
	no	4	13.3	14.3	82.1
	definitely not	5	16.7	17.9	100.0
	Total	28	93.3	100.0	
Missing	System	2	6.7		
Total		30	100.0		

### 3.2.5. Response to food crisis

Results pertaining to response to food crisis are tabulated in tables 35 and 36. More than 73% of the key informants (table 35).indicated that the response to food crisis by state government, donor and NGOs is slow. While 17% indicated that the response is quick.

**Table 35: Stakeholders response to food crisis( q11)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	quickly	5	16.7	17.9	17.9
	slowly	11	36.7	39.3	57.1
	very slowly	11	36.7	39.3	96.4
	doesn't respond	1	3.3	3.6	100.0
	Total	28	93.3	100.0	
Missing	System	2	6.7		
Total		30	100.0		

During food security crisis key informants believed that state government and donors are very slow in responding to food crisis. This is mainly due to government and donors bureaucracy. The government system needs to go through many official channels before taking a decision. The donors and NGOs need to contact their mothers donors organizations before taking the final decision. The lag of time can lead to a significant difference between reaching the needy and alleviating the food security crisis.

Out 83% of key informants (table 36) indicated that in food crisis prediction they took action and measures such as coordination with others, assessment of situation, food aid for the affected as well as release food reserve in local markets.

**Table 36: Actions and measures taken by key informants in food crisis (q12)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	coordinate with other stakeholders	3	10.0	10.3	10.3
	assess the situation ( need assessment)	2	6.7	6.9	17.2
	release food reserve in the local market	1	3.3	3.4	20.7
	food aid for the affected people	1	3.3	3.4	24.1
	1-2	3	10.0	10.3	34.5
	3-4	1	3.3	3.4	37.9
	2, 4-5	2	6.7	6.9	44.8
	1-5	4	13.3	13.8	58.6
	1,3,5	1	3.3	3.4	62.1
	1, 4-5	1	3.3	3.4	65.5
	1, 5	1	3.3	3.4	69.0
	1-2, 5	2	6.7	6.9	75.9
	2, 5	1	3.3	3.4	79.3
	1, 3-4	1	3.3	3.4	82.8
	1-4	1	3.3	3.4	86.2
	1-2, 4-5	3	10.0	10.3	96.6
	1, 2, 4	1	3.3	3.4	100.0
	Total	29	96.7	100.0	
Missing	System	1	3.3		
Total		30	100.0		

Need assessment techniques seem to be highly popular as a choice in the locality to address crisis pertaining to EWS. Also release of food reserve in the local market was one of the popular choices by the key informants. Food Aid for affected people seem to be a choice specially at the beginning of crisis.

### 3.2.6. Food reserve

Results pertaining to food reserve in the Red Sea State is tabulated in (table37). Almost 77% of the respondents stated that food reserve stock should be renewed to the local community once a year. Out 10% of key informants were not sure about renewal period of food reserve.

**Table 37: Food reserve in Red Sea State**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	once / year	23	76.7	85.2	85.2
	once/ 2 years	2	6.7	7.4	92.6
	once / 3 year	2	6.7	7.4	100.0
	Total	27	90.0	100.0	
Missing	System	3	10.0		
Total		30	100.0		

The result indicated the cyclic nature of the crisis which occurred at intervals. The experience of the RSS has rarely shown that the crisis go beyond the first year although the after effect of the crisis might last for couple of years.

### 3.2.7. Food security impact

Results pertaining to food security impact was tabulated in tables 38. More than 50% of the key informants (table 38) indicated that (Fig. 3.11) the most negative impact of early warning on food security was the funding problem as well as poor governance, changing political, economic, environmental context and inter – agency coordination.

**Table 38 Negative impact of EWS on food security in RSS (q14)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	lack of continuous funding	2	6.7	6.9	6.9
	political economic and environmental changing context	2	6.7	6.9	13.8
	poor governance	1	3.3	3.4	17.2
	1-2	1	3.3	3.4	20.7
	1-2, 4-5	1	3.3	3.4	24.1
	2,4,6	1	3.3	3.4	27.6
	1, 3-4, 6	1	3.3	3.4	31.0
	4-7	1	3.3	3.4	34.5
	3-4, 7	1	3.3	3.4	37.9
	1, 3, 6-7	2	6.7	6.9	44.8
	1-3, 6	1	3.3	3.4	48.3
	1-2, 5-7	1	3.3	3.4	51.7
	1-3, 5-7	2	6.7	6.9	58.6

	1, 4	1	3.3	3.4	62.1
	1-7	3	10.0	10.3	72.4
	1-2, 4, 6-7	1	3.3	3.4	75.9
	1-2, 4, 6	1	3.3	3.4	79.3
	1,4,6	1	3.3	3.4	82.8
	1, 3-4	1	3.3	3.4	86.2
	1-4	1	3.3	3.4	89.7
	1-2, 4-7	1	3.3	3.4	93.1
	1-6	2	6.7	6.9	100.0
	Total	29	96.7	100.0	
Missing	System	1	3.3		
Total		30	100.0		

The lack of commitment from the local government side towards all the ongoing programmes advocated by the food security committees were really felt by stakeholders to be the number one impact crisis. The creation of enabling environment for food security which is the role of government seem to be absent also the stakeholders felt that poor governance and lack of transparency by officials in localities of the RSS state was cited to be one of the negative impact of the EWS on food security.

Poor communication within the localities have aggravated the impact. The lack of basic data on poverty and vulnerability levels were also cited as a negative impact.

The role of the local communities inform of poor participation and involvement during the food crisis was given a minimum percentage although this role was cited to be a very strong tool for alleviating food security in other similar studies.

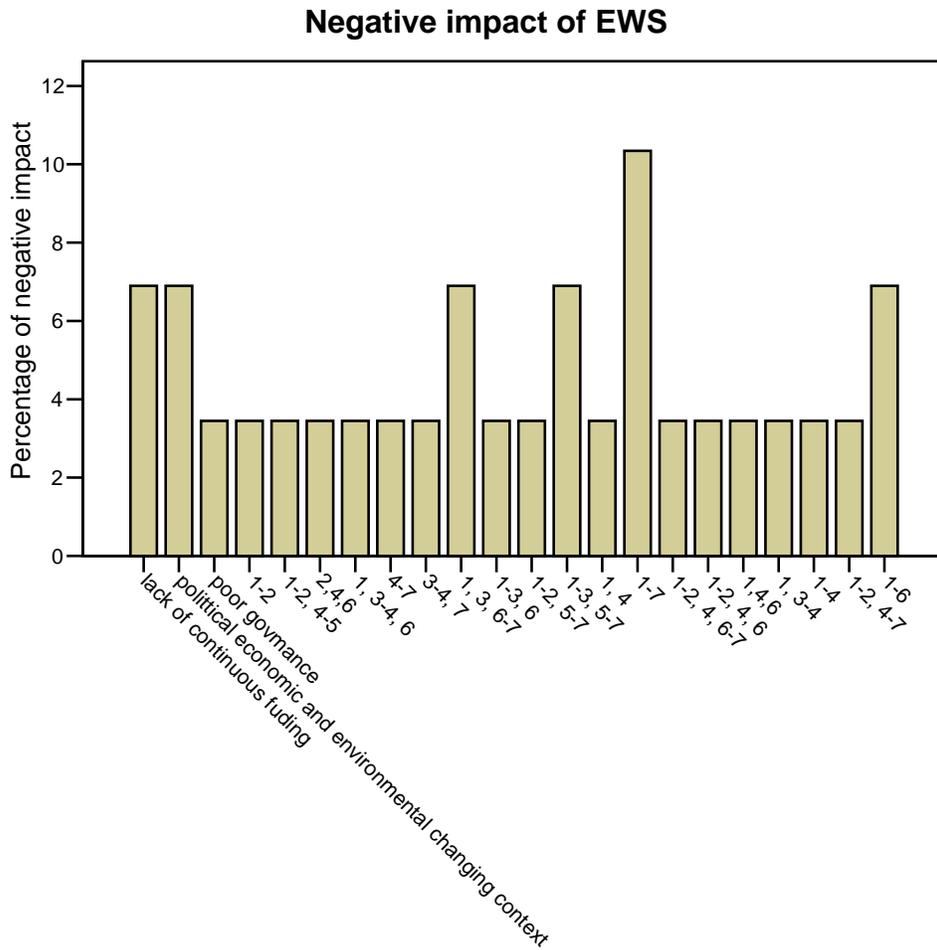


Fig.3.11. Negative impact\_ Source: Researcher field research data 2009

Impact of food security seem to be complex. Lack of funding is most significant option. The political, economic and environmental changing context represented negative impact on EWS.

### 3.2.8. Coordination and decision making

Results pertaining to coordination and decision making on early warning tabulated in tables 39 and 40. More than 33% of the key informants (table 39) stated that for coordination among decision makers and different partners and stakeholders joint alternatives could be used (Fig.3.12) such as periodic meetings, sharing of information, joint strategic planning and market monitoring. While 67% of respondent choose between different alternatives. Periodic and regular coordination meetings leading to

joint strategic planning was a combination which receive the highest priority for partners and stakeholders.

Table 39 **Coordination among different stakeholders (q15)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	periodic and regular coordination meeting	3	10.0	10.0	10.0
	sharing of information among stakeholders	1	3.3	3.3	13.3
	joint and strategic planning	1	3.3	3.3	16.7
	constant market monitoring	1	3.3	3.3	20.0
	All	10	33.3	33.3	53.3
	1-2	2	6.7	6.7	60.0
	3-4	1	3.3	3.3	63.3
	1-3	5	16.7	16.7	80.0
	1,3	6	20.0	20.0	100.0
	Total	30	100.0	100.0	

### Stakeholders coordination

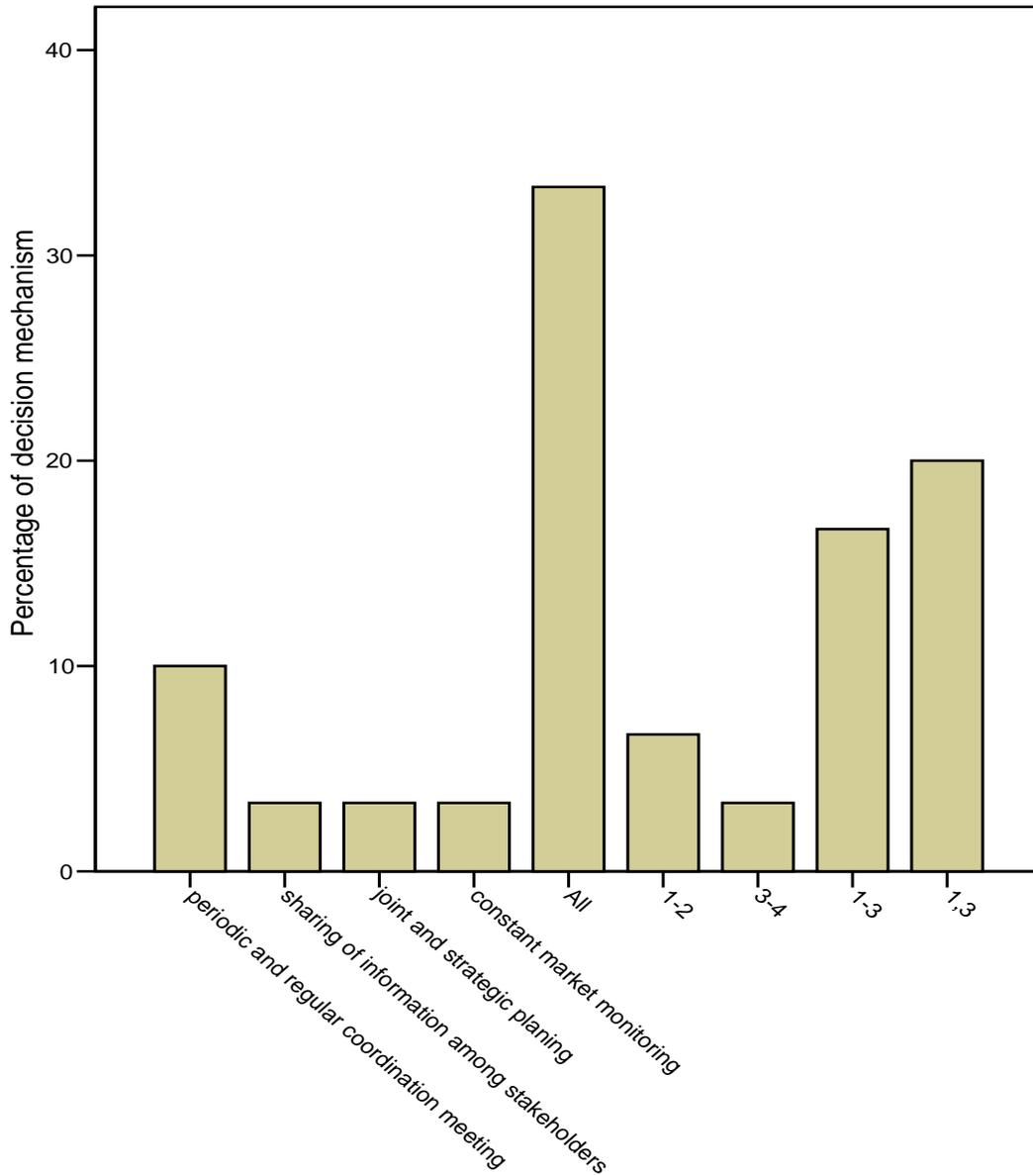


Fig. 3.12. Coordination \_ Source: Researcher field research data 2009

The stakeholders has clearly pin pointed that using of more than one path way for coordination among decision makers and different partners may lead to better coordination.

The periodic and regularly coordination meeting together with strategic planning had scored very high as a choice for coordination among stakeholders.

Sharing of information between regular coordination meetings and joint strategic planning together with periodic and regular coordination meetings seem to be the best choice in the coordination mechanism. Surprisingly no other path way was identified by stakeholders to be used for coordination.

Results pertaining to final decision making to achieve a sustainable impact in the RSS were tabulated in table 40. More than 50% of Key informants indicated (Fig.3.13) that state government will make the final decision on EWS for sustainable impact.

Stakeholders believed that the state government and food security committee were effective in decision making. International donor, UN/NGOs received the least priority (3.3%) for sustainable impact in EWS in the RSS .

**Table 40 : EWS decision making and management (q16)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	state government all together	13	43.3	43.3	43.3
	1-2	11	36.7	36.7	80.0
	1-3	1	3.3	3.3	83.3
	1-3	3	10.0	10.0	93.3
	1, 3	1	3.3	3.3	96.7
	2, 4	1	3.3	3.3	100.0
	Total	30	100.0	100.0	

### EWS decision making and management

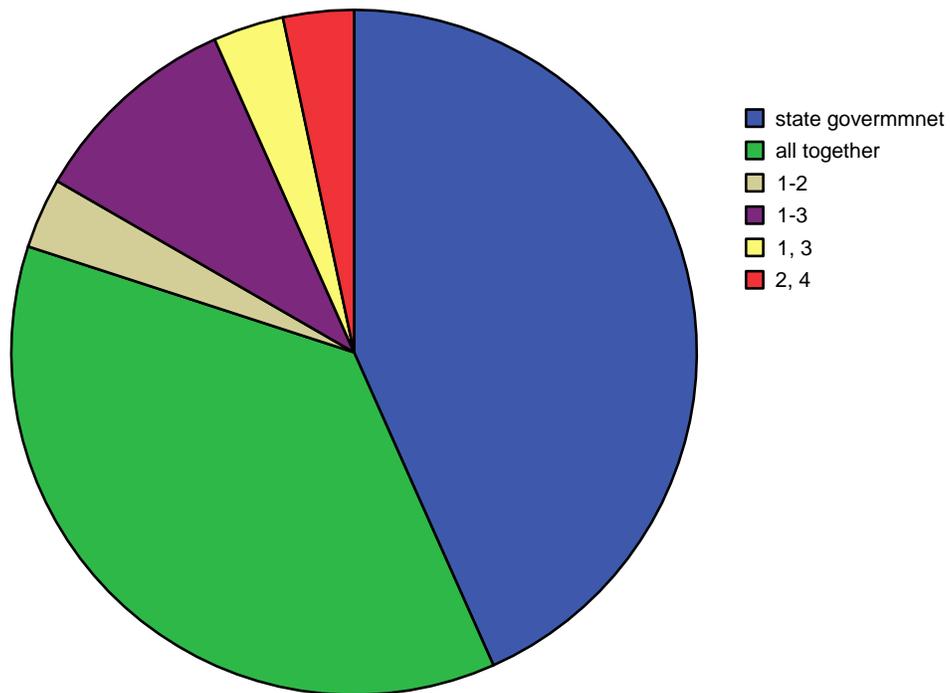


Fig. 3.13. Decision making \_ Source: Researcher field research data 2009

The stakeholders believed that the three partners (state government, international bodies and RSS food security committee) could participate in the decision making process on the EWS for a sustainable impact in the RSS.

### 3.3. EWS team result and discussion

#### 3.3.1. Location and language

Results pertaining to location and language were tabulated in tables 41, 42 and 43. The 10 respondents of this study represent the sample of the EWS team in the Red Sea State (table 41). Within the Red Sea State the study covered Port Sudan town (table 42). The EWS team are based in Port Sudan the major city Red Sea State.

**Table 41: Red Sea State**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Red Sea	10	100.0	100.0	100.0

The EWS team interviewed were in Red Sea State, the focus area of the study.

**Table 42: Town**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid P. Sudan	10	100.0	100.0	100.0

EWS team were based in Port Sudan town. They carried out a regular monitoring visit for data and information collection from the sentinel sites within the Red Sea State and reported the monthly bulletin.

Almost 100% of EWS team interviewed responded in English (table 43). No facilitator was used to communicate their views.

**Table 43: Language**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid English	10	100.0	100.0	100.0

#### 3.3.2. Population trend and sample:

Results pertaining to population parameters regarding sex and occupation are tabulated in tables 44 and 45. Samples have shown that 60% of EWS team (table 44) were female while 40% were male. Although this figure seem to depart from 1:1 ratio which is

a general trend yet it was considered as a positive result to have female in the EWS team to communicate and interact with the conservative Beja women in RSS. Out 50% of EWS team (table 45) were government officials representing seconded staff from different governmental departments. While the other 50% were Oxfam staff. The programme was being operated jointly with State line ministries.

**Table 44: Sex of EWS team (q1)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	4	40.0	40.0	40.0
	Female	6	60.0	60.0	100.0
	Total	10	100.0	100.0	

The females in the EWS team represented the high percentage, this would facilitate the communication and interaction with the conservative Beja community in particularly the Beja women.

**Table 45: Occupation of EWS team (q2)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Nutritionist	1	10.0	10.0	10.0
	Statistician	1	10.0	10.0	20.0
	Information officer	1	10.0	10.0	30.0
	Agriculturalist	2	20.0	20.0	50.0
	Ohters	5	50.0	50.0	100.0
	Total	10	100.0	100.0	

The EWS program operated jointly in conjunction with states line ministries such as Ministry of Health, Ministry of Agriculture, Ministry of Finance – planning department and Oxfam GB staff. The main objective was to activate and improve the performance of the EWS and make it influential.

The nature of food security activities dictated that almost 50% of EWS team is from agriculture.

### 3.3.3. Early warning knowledge and perception:

Results pertaining to food security and early warning knowledge and perception of the EWS team are tabulated in tables 46, 47 and 48. Almost 100% of EWS team (table 46) indicated clearly that the Red Sea State needs an EWS for food security.

**Table 46: RSS needs for an EWS for food security (q3)**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	10	100.0	100.0	100.0

All the EWS team felt that there was strong need for an early warning system for food security in the RSS.

Out of the 70% of the EWS team (table 47) indicated that the complex nature of knowledge and perception (Fig 3.14) although the prevailing condition of drought was the most significant factor associated with food security perception. Out of the 20% of EWS team think that the severity of climate and recurrent food security crisis and low productivity were very important factors in relation to food security. Poor governance and poor management were cited in conjunction with other factors to widen poverty in RSS. Out 90% of EWS team have clearly indicated the complexity and association of all factors leading to food insecurity by dully selecting factors which were interrelated.

**Table 47: Reasons RSS needs an EWS for food security (q4)**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Red Sea is drought prone area	1	10.0	10.0	10.0
2, 3	2	20.0	20.0	30.0
1-2, 7	1	10.0	10.0	40.0
1-2, 4-6	1	10.0	10.0	50.0
1-7	1	10.0	10.0	60.0
1-4, 6	1	10.0	10.0	70.0
2, 5, 7	1	10.0	10.0	80.0
1, 3, 5	1	10.0	10.0	90.0
1-5, 7	1	10.0	10.0	100.0
Total	10	100.0	100.0	

In general the need for an EWS as indicated by EWS team steamed from severity of climate and the recurrent drought which caused the recurrent food insecurity.

### RSS needs of EWS for food security

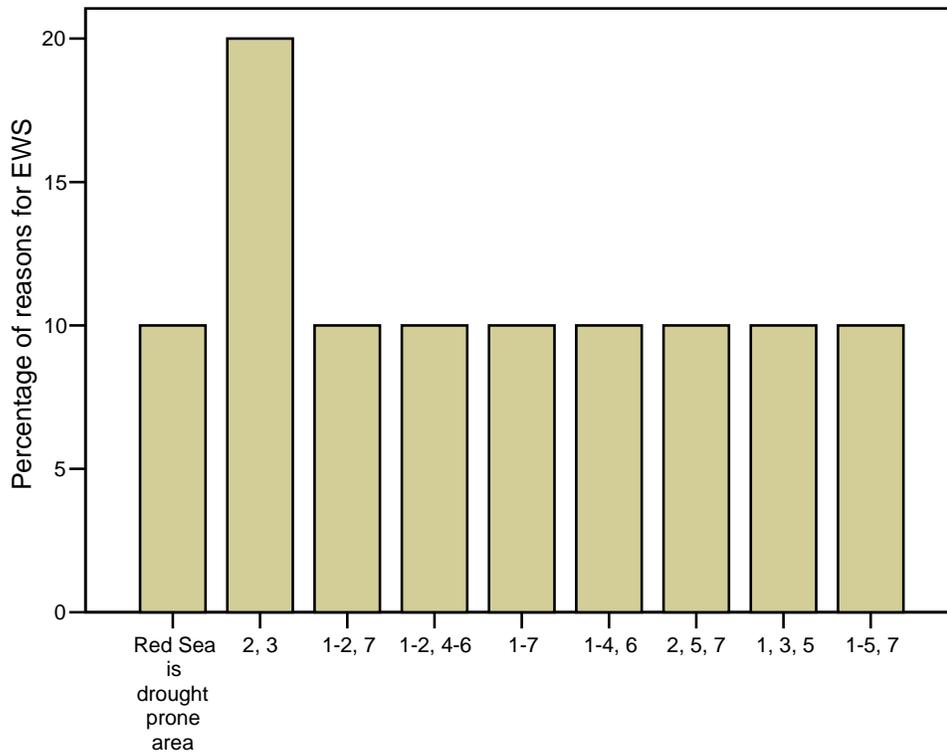


Fig. 3.14. Needs for EWS - Source Researcher field research data 2009

EWS team think the need for EWS arises from large numbers of factors associated with climate which led to deterioration of natural resources linked to low productivity and poor governance.

The EWS team believed that severity of climate together with recurrent food security crisis (2,3) were the most significant need for EWS for food security in the RSS, cited as a high priority.

The concerted factors leading to food insecurity seem to carry the same work as seen by figure 1.4.

The EWS team did not specify other factors relating to food insecurity in the state, among the seven choices which were studied through the questionnaire.

More than 40% of EWS team (table 48) indicated that the functions of early warning were a combination of activities such as monitoring food security and nutrition, raise awareness to institutions, empower communities, provide relevant information to donor and NGOs. At least 40% of EWS team shows that monitoring food security is important function for EWS.

**Table 48: EWS functions in Red Sea State (q5)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Empower communities to highlight their own needs to Gov. an	1	10.0	10.0	10.0
	All together	4	40.0	40.0	50.0
	1,3,5	2	20.0	20.0	70.0
	1,2, 4, 5	1	10.0	10.0	80.0
	2-5	1	10.0	10.0	90.0
	1-4	1	10.0	10.0	100.0
	Total	10	100.0	100.0	

EWS team focuses the functions of EWS on monitoring food security and nutrition status, empower communities to highlight their need and in turn create awareness to institutions and localities.

The two most significant function of the EWS as seen by the EWS team were the combined effect of all functions and also the combination of monitoring, community empowerment and provision of information regarding revolving food insecurity and nutrition situation.

### 3.3.4. Challenges

Results pertaining to challenges and gaps facing the early warning system in Red Sea State were tabulated in tables 49, 50 and 51. Data shows that 100% of EWS team (table 49) think that the EWS was facing complex challenges pertaining to the function of EWS.

**Table 49: Challenges facing EWS in RSS (q6)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	10	100.0	100.0	100.0

More than 70% of EWS team (table 50) indicated clearly that lack of funding was the main gap facing the EWS program (Fig. 3.15). While 20% think that geographical coverage was another difficulty facing the EWS. The accessibility to remote areas seem to create an additional elements to the geographical coverage to various localities in the Red Sea State. The Technical abilities also constitute 10% as a gap which was an indicative to the availability of leadership and technical staff in RSS.

**Table 50: Prominent gaps in existing EWS in RSS (q7)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Technical abilities	1	10.0	10.0	10.0
	Lack of continuous funding	4	40.0	40.0	50.0
	2, 3, 5	2	20.0	20.0	70.0
	2, 5	1	10.0	10.0	80.0
	All together	1	10.0	10.0	90.0
	1, 4, 5	1	10.0	10.0	100.0
	Total	10	100.0	100.0	

Lack of funding constituted the most significant gap facing the EWS in RSS. This could be attributed to lack of commitment by state government to allocate funds in its financial and development plans for EWS in addition to lack of long donors funding commitment. Remoteness of vulnerable communities and the wider geographical coverage widen the gaps.

### EWS challenges and gaps

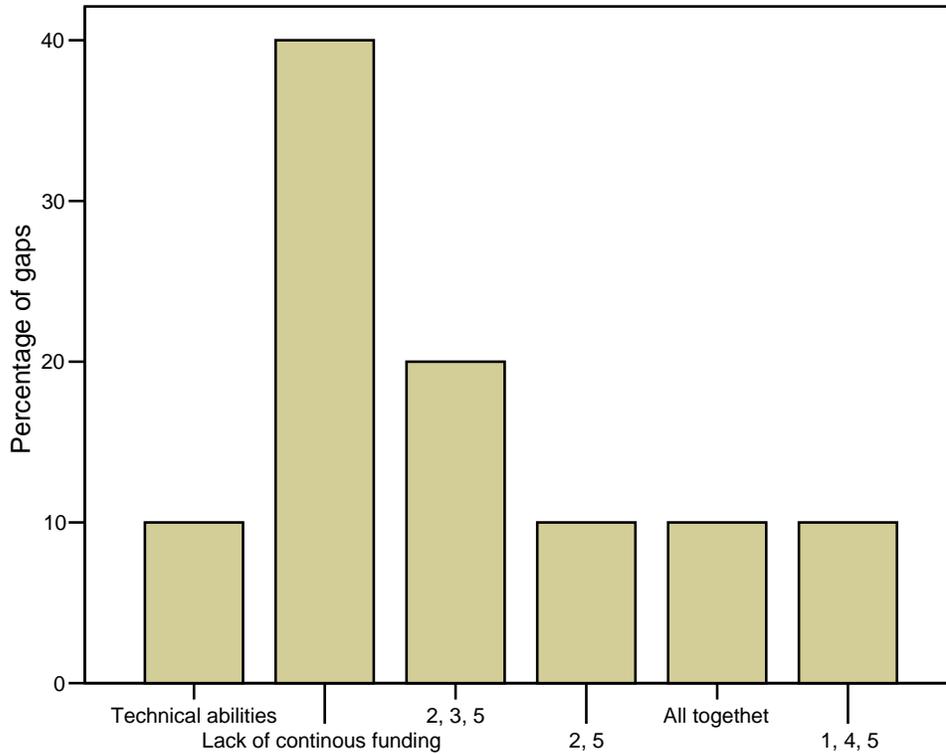


Fig. 3.15. EWS gaps - Source: Researcher field research data 2009

The EWS team believed that the prominent gap and challenges which faced by EWS, was lack of funding, in addition to remoteness of vulnerable communities and the wider geographical coverage.

To activate the EWS in RSS more than 30% of EWS team (table 51) suggested that a combination of related themes will activate the EWS such as linkage between national and regional bodies, coordination with relevant stakeholders, technical and political commitment and funding increase by RSS government and donors. While 30% think that coordination, commitment and increase funding are the most relevant functions. Also linkage between national and regional bodies constitute 30%.

**Table 51: Activation of early warning system in RSS (q8)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strengthen the linkage between national and regional bodies	1	10.0	10.0	10.0
	Provision of technical and political commitment to EWS	1	10.0	10.0	20.0
	All	3	30.0	30.0	50.0
	1,4	1	10.0	10.0	60.0
	2-4	3	30.0	30.0	90.0
	1, 6	1	10.0	10.0	100.0
	Total	10	100.0	100.0	

The EWS team strongly suggested that the political commitment to EWS and strengthening coordination between relevant stakeholders at state level together with other factors were among strong measures to be taken to activate the existing EWS.

### 3.3.5. Local community response

Results pertaining to local community response to food security crisis in Red Sea State are tabulated in tables 52 and 53. More than 70% of the EWS team (table 52) indicated that local community can be prepared to face food crisis (Fig 3.16), that they will be able to reserve food and can get support earlier. 10% indicated that local community will be able to cope with situation. While 20% indicated that all the mentioned means combined will make the community to respond and be prepared to face the food security crisis based on the early warning system communicated information to local community.

**Table 52: Community preparedness for food crisis (q9)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Be able to reserve enough food for the lean time	1	10.0	10.0	10.0
	Be able to cope/ adopt with the situation	1	10.0	10.0	20.0

Others	2	20.0	20.0	40.0
1, 4	4	40.0	40.0	80.0
2,4	1	10.0	10.0	90.0
1, 2, 4	1	10.0	10.0	100.0
Total	10	100.0	100.0	

Local community preparedness to food security problems lied in its ability to manipulate the local reserve and develop other coping mechanisms earlier before the crises.

### Community preparedness for food crisis

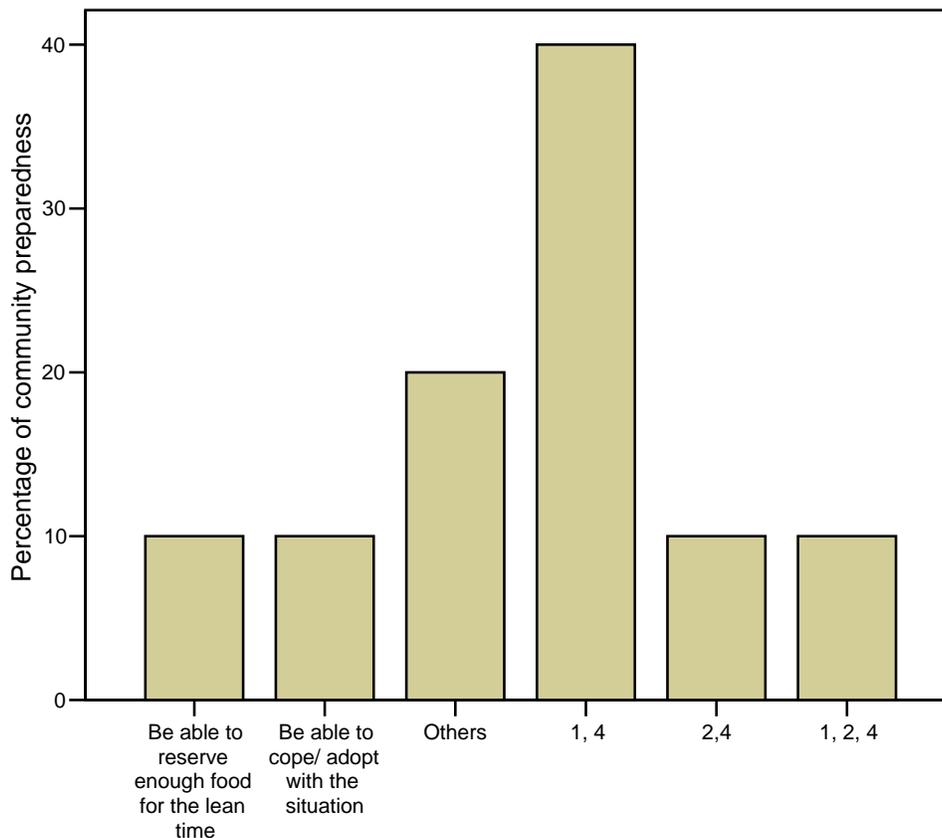


Fig. 3.16. Preparedness - Source: Researcher field research data 2009

EWS team believed that local community were able to reserve food at times of crisis and together with getting support from donors institutions and the government as early as possible had scored very high as a choice of preparedness for food security crisis.

Others means of preparedness cited by EWS team include increase food productivity and sell animals to buy enough food for the lean time.

Out 100% of EWS team (table 53) indicated that the most prominent food security impact in the local communities was the combination of joint factors such as low productivity, poor nutritional status, low food reserve, goat/grain term of trade and lower animal prices. Data shows that the EWS team had the same vision and thoughts .

**Table 53: Prominent food security impact (q10)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	All of the above	10	100.0	100.0	100.0

EWS team listed a number of impacts related to food security on the local community in form of lower productive capacity, poor nutritional status, changes in commodities prices and low food reserve availability at community level.

The trend emphasized the complexity factors related to food insecurity impacts. These factors independently showed that local communities were vulnerable to food insecurity in affected localities.

### 3.3.6. Information

Results pertaining to early warning system relevant and timely information in the Red Sea State are tabulated in tables 54 and 55. Almost 100% of EWS team (table 54) indicated that the EWS provides relevant and timely information to stakeholders such as policy makers and market actors.

**Table 54: EWS timely and relevant information (q11)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	10	100.0	100.0	100.0

According to information provided by EWS team in form of quarterly bulletin, monthly nutrition report and bi – weekly market prices the team believed that this information was timely and relevant to stakeholders.

Result pertaining to EWS influence to convince decision makers to respond on time during food crisis was tabulated in table (table 55). Almost (80%) of EWS team indicated that the EWS was not influential in convincing decision makers such state government, donors and NGOs to respond on time. While 10% indicated that the EWS was influential in convincing decision makers to respond on time. Other 10% of the team didn't respond to this question.

**Table 55: Whether EWS influential in convincing decision makers (q12)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	10.0	11.1	11.1
	No	8	80.0	88.9	100.0
	Total	9	90.0	100.0	
Missing	System	1	10.0		
Total		10	100.0		

Although the EWS provided relevant and timely information to decision making mechanism the team felt that EWS was not influential in convincing stakeholder to respond on time during food security crisis. Experiences of the EWS had shown that most of time the response by stakeholders was very slow. This was mainly attributed to bureaucracy of stakeholders ( government and donor community).

### **3.3.7. Food security impact**

Results pertaining to food security impact is tabulated in table 56. More than 70% of the EWS team indicated that the most appropriate functions to substantiate the impact of early warning on food security (Fig.3.17) was dependent on central government reserve, increase storage facility at state level and move storage facilities to localities. While 40% suggested giving the authority of distribution to local communities. Also 10% indicated that all the combined functions mentioned in the questionnaire would substantiate the impact of EWS on food security.

**Table 56 : Substantiate the impact of early warning system (q13)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Increase storage facilities at State level	1	10.0	10.0	10.0
	Give authority of distribution to local community	1	10.0	10.0	20.0
	All	1	10.0	10.0	30.0
	1-3	3	30.0	30.0	60.0
	2,3	1	10.0	10.0	70.0
	1, 3-4	1	10.0	10.0	80.0
	1, 2, 4	1	10.0	10.0	90.0
	2, 3, 4	1	10.0	10.0	100.0
	Total	10	100.0	100.0	

The EWS team considered that giving the authority of distribution to local community was the most appropriate function so as to ensure community participation and involvement in food security crisis.

### Substantial Impact of EWS in RSS

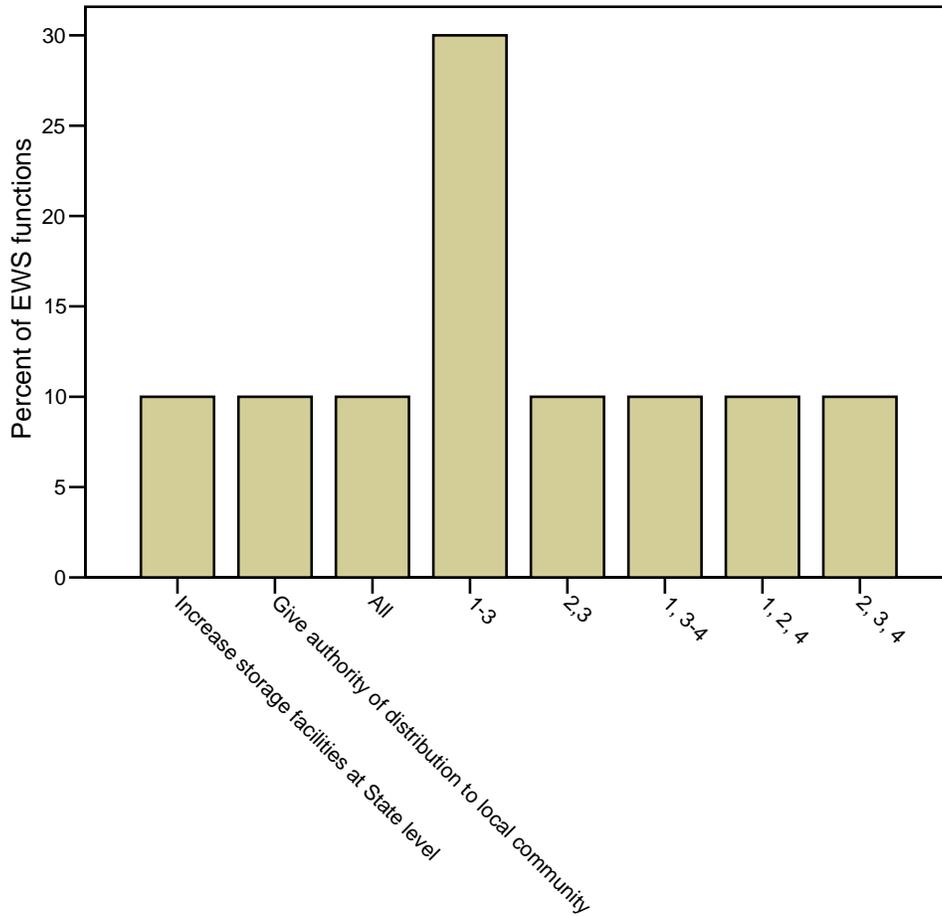


Fig. 3.17. EWS functions - Researcher field research data 2009

EWS team believed that a combination of functions including government reserves, increase storage facilities at state level as well as moving the storage facilities to localities were the most appropriate functions to substantiate the impact of the EWS.

Central government reserve together with moving storage facilities to locality level was a choice as appropriate functions by EWS team. This will give more authority to community at locality level to participate in food security crisis.

All the other factors received the same weight in the response of the EWS team.

### 3.3.8. Response to crisis by decision makers

Results pertaining to decision makers response to food crisis are tabulated in table 57. More than 70% of the EWS team indicated that the response to food crisis by state government, donor and NGOs is very slow. While 20% indicated that the response is quick.

**Table 57: Decision makers response to food crisis (q14)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very quickly	1	10.0	10.0	10.0
	Quickly	1	10.0	10.0	20.0
	Slowly	2	20.0	20.0	40.0
	Very slowly	5	50.0	50.0	90.0
	No respond	1	10.0	10.0	100.0
	Total	10	100.0	100.0	

The EWS team clearly indicated that the response was very slow and therefore the timely availability of information which was mentioned earlier in table (54) was questionable and there was a real gap between information availability and real response to the crisis.

### 3.3.9. Decision making

Results pertaining to decision making are tabulated in table 58 and 59. EWS team (table 58) indicated that their satisfaction with decision making process of the existing EWS was low which constitute (60%). While 40% indicated medium satisfaction.

**Table 58 : Degree of satisfaction with decision making process (q15)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Medium	4	40.0	40.0	40.0
	Low	6	60.0	60.0	100.0
	Total	10	100.0	100.0	

EWS team stated clearly that state government and NGOs respond very slowly to food crisis and there is very low satisfaction with decision making process. This may be attributed mainly to the bureaucracy of local government and international community in taking immediate actions to alleviate food security crisis.

None of the members of the EWS team gave the high satisfaction priority with the decision making process. This can be mainly attributed to many factors including the recent establishment of the EWS steering committee which may not have the experiences related to decision making process.

The EWS team (80%) indicated that (table 59) all the partners including state government, UN/NGOs, Food security committee and donors were partners for the decision making of EWS in the Red Sea (Fig.3.18).

**Table 59: EWS decision making (q16)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	State Government	1	10.0	10.0	10.0
	NGOs	1	10.0	10.0	20.0
	All together	8	80.0	80.0	100.0
	Total	10	100.0	100.0	

Stakeholders believed that the state government and food security committee were effective in decision making. International donor, UN/NGOs received the least priority (3.3%) for sustainable impact in EWS in the RSS .

### EWS decision making

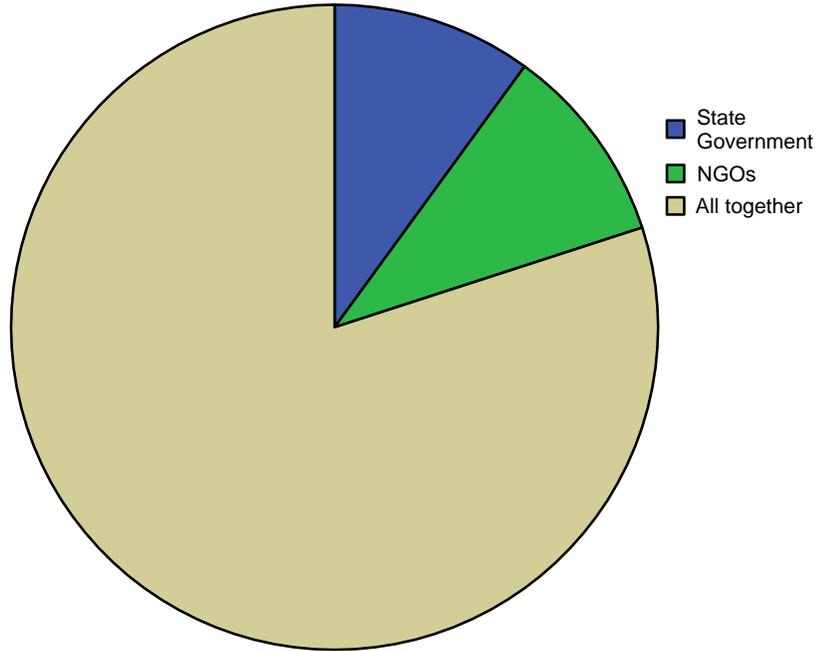


Fig. 3.18. Decision Making - Source: Researcher field research data 2009

Also about 10% of the EWS felt that state government has a role to play and another 10% feel that the international community (NGOs) should be involved.

The EWS team think that the final decision on EWS should lie on collective decision by state government, donors, NGOs and food security committee.

In contrast to community perception (table 20) and key informant (table 40) ideas about the decision making process which clearly advocated the government as the sole play. the EWS team sought the involvement of the RSS food security committee and the NGOs together with the government in decision making process.

## Chapter 4

### 4.1. Conclusion

The problem of food security in Red Sea State is a complex issue. Common vision for problem solution seems to be lacking as different partners perceived the problem of food insecurity differently. The apparent overlapping of efforts for problem solution could be attributed to the lack and/or inadequate coordination between governmental or non governmental institutions including INGOs in working towards the solution for the problem. The current coordination system which is supposed to be managing food insecurity seem to be not efficient and lack staff and technical knowledge. Community base organizations were not fully involved in the problem solution.

Several factors contributed to the almost constant food gaps in the Red Sea State . A part from the drought cycle that are perceived and reacted to as individual crisis, the issue of governance, funding commitment and changing political, economic and environment all indicate the most prominent effect on food security in RSS .

The EWS for food security in the Red Sea State seems to had limited impact over time, the program had encountered different problems since its inception in 1984, which could be classified as institutional, technical and operational.

Based on community interview the food security impact was limited they felt that measures taken by government , donating institutions and other partners did not alleviate the food crisis situation.

Also based on the key informants response, the food security impacts were complex. The lack of continuous funding and the low commitment of the political and economic environment together with poor governance were noted as key factors relating to negative impact of early warning system on food security.

The EWS team respective on food security impact was also low because as the whole system use to depend on central government reserve and mobilization of food aid during the crisis.

The institutional and human capacity building was of paramount importance in connection with a response to temporary food insecurity incidence and to the long term food security programme planning and implementation.

Food security information validation/verification and communication to the decision-makers and communities. The use of early warning information was conditioned by its relevance, accuracy, credibility and timeliness, how effectively it is communicated and how comparable it was over time and space.

Generating information that is relevant hinges largely on the degree to which it is coherent with users' information needs. To ensure that the early warning information and triggering appropriate responses, the EWS in RSS should communicate the technical information in a format that meets decision-makers' needs and draws their attention.

The existence of effective early warning and forecasting would facilitate the implementation of better food security measures, with other factors. Mostly if, the more food secure and less vulnerable communities were, the more effective will such systems be in preventing food insecurity.

Women access in decision making process and also in participating in the communities seems to be limited, the activation of such roles may improve the situation of food security at community levels since the household food security was primarily run by women.

## 4.2. Recommendations

EWS should extend to cover all the different localities in the state including the urban areas of Port Sudan (Shanties), following poverty assessment and choices of sentinel sites for frequent studies.

The recurrent drought in the RSS which cause loss of physical and or material capacity need to address:

- The weather forecasting technology which need to be based at various sites within RSS.
- Accurate and reliable statistics on actual causes, scale and impact of poverty.
- Creating a conducive environment for macro and micro economic problems related to activation of the main livelihood structures.

Frequent baseline surveys to be conducted to address food production capacity and other poverty indicators (therapeutic feeding) to be able to continuously monitor food availability and accessibility situation.

Proxy – indicators of poverty such as education improvements, create opportunities for alternative livelihoods and therefore should be used as one of the tools to alleviate food security

Government interest – it is paramount that the government agrees and supports that an EWS for Food security is necessary in the RSS and that the information provided by the EWS will be reliable enough to help in government planning and action.

Concerted efforts by the government should be persuaded to activate the role of local communities in food production, food accessibility, storage, market behaviour and the decision making process during food security crisis.

Linkage of key informants with the role of EWS team for the purpose of enhancement of dialogue and the decision making process with community creates and enabling environment for quick response during food crises.

There must be commitment to the EWS by all different stakeholders in the state. Every stakeholder needs to be aware of the existence of the EWS and to understand its function clearly. The different stakeholders in the state should be willing to share information regarding food security and nutrition with the EWS unit readily.

There is need to have funding for longer durations to ensure continuity of work especially staff retention. This can be achieved by ensure long funding commitment by decision makers particularly state government with support from donors, NGOs and other relevant bodies .

Effort should be allocated towards standardization and cooperation with other national and international information systems. This will not only improve the technical proficiency of the EWS, but also improve its capacity to attract external funding.

Recognize that timely responses to food security shocks and threats in order to safeguard livelihoods depend on effective EWS that provide information for decision-makers namely state government, partners and relevant institution involved in food security programming.

State government to allocate budgetary resources to EWS and food security analysis as an investment in generating a regular and timing information for emergency and development programming.

Links should be built between EWS and long-term development programming.

The strategic grain reserves available in the state to be monitored regularly for quantity and common losses due insects. Locality head quarters need strong base of storage facilities so that food can be closure to the needy.

The bulletins should be translated in Arabic and a summary distributed and discussed with local resource people. It would reinforce local community sense of ownership about the EWS project.

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# Annexes

## Survey Questionnaire – The impact of early warning system on food security at Red Sea State

Dear Sir/ Madam,

This is interview aims to collect information and data on the impact of early warnings on food security in your area. Kindly note that this information is top confidential and only for the purposes of the study research.

### Key informants interview

#### Section 1 - Classification questions:

Date of interview: \_\_\_\_\_

State: \_\_\_\_\_ Locality: \_\_\_\_\_

Village/town: \_\_\_\_\_

Name of interviewer: \_\_\_\_\_

Language of interview: : Beja. : Arabic. : English : Others

1. Age:  20-30  31-40  41-50  50+

2. Sex:  Male  Female

3. What is your occupation?

- Minister.  Governor  Executive Officer  Government Official  
 Community leader  Trader  Pastoral union Official  
 Farmers union  Council Officer  UN/ NGO official

#### Section 2 - Knowledge and perception questions of food security and the early warning system:

4. Do you know whether an early warning system exists for the food security in Red Sea State?

Yes  No

5. If your answer in question 4 is yes, does the EWS provides relevant and timely information to all stakeholders such as policy Makers, traders, and market actors?

1	2	3	4	5
Yes definitely	Yes	Not sure	No	Definitely Not

6. Do you think RSS needs an early warning system for food security?

Yes                       No

7. If your answer is yes to question 5, why do you think so?

- Red Sea is a drought prone area
- Severity of climate
- Recurrent food security crisis
- Low production compared to total consumption
- Wide spread of poverty
- Deterioration of natural resources
- Poor Governance
- Others, specify \_\_\_\_\_

8. Indicate any information you know about the EWS in the RSS?

- Market prices (grain, livestock, fish)
- Goat/grain terms of trade
- Availability of food in local markets
- Availability of fodder in local markets
- Accessibility of food
- Others, specify \_\_\_\_\_

9. Are you familiar with any early warning information publication?

- Food security quarterly bulletin.
- Bi – weekly market prices
- Monthly food security and nutrition report
- Others – specify \_\_\_\_\_

10. In your opinion is the current early warning system influential in convincing the decision makers particularly State government, donor and NGOs to respond on time in food crisis?

1	2	3	4	5
Yes definitely	Yes	Not sure	No	Definitely Not

11. How does the State government or donor/ NGOs respond to food crisis (food shortage or gaps) based on the EWS alert information?

1	2	3	4	5
Very quickly	Quickly	Slowly	Very slowly	Doesn't respond

12. If food crisis were predicted in your Locality/area by early warning system. What actions/ measure will you take ?

- Coordinate with other stakeholders
- Assess the situation (need assessment)
- Stabilize grain prices.
- Release food reserve in the local market
- Food aid for the affected people

Others, specify \_\_\_\_\_

13. In the existing food reserve system, how often do you renew the stock to the local community?

- Once / year
- Once / 2 years.
- Once / three years
- Once / 4 years
- Other, specify \_\_\_\_\_

14. In your opinion which of the following represents a negative impact of the early warning system on food security?

- Lack of continuous funding
- Political, economic and environmental changing context.
- Inter – agency coordination
- Poor communication and dissemination of early warning
- Poor community participation and involvement
- Poor data on poverty and vulnerability level.
- Poor governance
- Others, specify \_\_\_\_\_

15. In your opinion which of these systems can be used for coordination among decision makers, different partners and stakeholders?

- Periodic and regular coordination meetings
- Sharing of information among stakeholders
- Joint and strategic planning
- Constant market monitoring
- Others, specify \_\_\_\_\_

6. For a sustainable impact; which institution makes the final decision on warning system in Red Sea State?

- State government
- UN/NGOs
- RSS food security committee
- Donors
- All together
- Others, Specify \_\_\_\_\_

**Any additional comment:**

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*Thanks for your response, the time, energy and valuable information you provided for this study/ research.*

## **Survey Questionnaire – The impact of early warning system on food security at Red Sea State**

Dear Sir/ Madam,

This is a direction to collect information and data on the impact of early warning on food security. So this information is totally confidential and only for the purpose of study research.

### **Community interview**

#### **Section 1** - Classification questions:

Date of interview: \_\_\_\_\_

State: \_\_\_\_\_ Locality: \_\_\_\_\_

Village: \_\_\_\_\_

Language of interview:  Beja  Arabic  Others

1. Age:  10-20  21-30  31-40  41-50  50+

2. Sex:  Male  Female

3. How long have you lived at this village? \_\_\_\_\_

4. What is your occupation (tick relevant boxes)?

- Farmer
- Herder
- Fisherman
- Trader
- Charcoal / firewood seller
- Livestock owner
- Other – specify \_\_\_\_\_

#### **Section 2** - Knowledge and perception questions of food security and the early warning system:

5. a. Do you know whether an early warning system exists for the food security in Red Sea State?

Yes  No

5.b. If your answer is no to question 5.a. do you think RSS needs an early warning system for food security?

Yes  No

5.c. If your answer is yes to question 5.b. are you familiar with any of early warnings information on the activities below (you can choose more than one)

- Fish prices
- Grain prices
- Livestock prices
- Goats/grain term of trade
- Availability of grain in local markets
- Availability of fodder in the local markets.
- Others, specify \_\_\_\_\_

6.a. Do you receive information on early warning system?

- Yes                       No

6.b. If your response is yes, in what form/kind?

1. Sakanab
2. Community resource persons
3. Early warning system team
4. Radio
5. Television
6. Newspapers

7. Does the early warning information satisfy your needs?

1	2	3	4	5
Definitely yes	Yes	Not sure	No	Definitely Not

8. Have you any access for information on food security?

1	2	3	4	5
Definitely yes	Yes	sometimes	No	Definitely Not

9. Which one of these methods is used for early warning system in your community?

1. Sakanab
2. Birds migration
3. changes in animal behavior
4. Others, specify \_\_\_\_\_

10. From the actions below, which one predicts the food crisis in your community?

- Lack of rain
- Poor production
- Lack of grain in the local market

- Goat/grain terms of trade
- Lack of fodder in the local market
- All of the above
- Others, specify \_\_\_\_\_

11. (a) Have you ever being prepared or took an action in advance for food crisis predicted by EWS in your area ?

- Yes
- No

11. (b) If your answer is yes in question (11.a) what measures/actions have you taken according to EWS prediction?

- Store available food.
- Buy enough food from the local market and store for lean time.
- Sell animals to buy food
- Goat/sorghum terms of trade
- Seek additional/ alternative income source
- Reduced numbers of meal.
- Eat poor quality food
- Tap food reserves available within the community
- Borrow food from relatives and friends

12. Do you think that this actions has reduced the effect of the food crisis for you and your local community?

1	2	3	4	5
Definitely yes	Yes	To some extent	No	Definitely Not

13. Who do you thinks should be responsible for the leadership of early warning system in the Red Sea State?

- State government
- UN/NGOs
- RSS food security committee
- Donors
- All together
- Other, Specify \_\_\_\_\_

Any additional comment:

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*Thanks for your response, the time, energy and valuable information you provide for this study/ research.*

## **Survey Questionnaire: The impact of the early warning system on food security at Red Sea State.**

Dear Sir/ Madam,

This is interview aims to collect information and data on food security and early warnings in your area. Kindly note that this information is top confidential and only for the purposes of the study research.

### **EWS team interview**

#### **Section 1 - Classification questions:**

Date of interview: \_\_\_\_\_

State: \_\_\_\_\_ Locality: \_\_\_\_\_

Location: \_\_\_\_\_

Name of interviewer: \_\_\_\_\_

Language of interview:  Beja  Arabic.  English  Others.

1. Sex:  Male  Female

2. What is your occupation?

- Nutritionist
- Statistician
- Information officer
- Agriculturalist
- Other, specify \_\_\_\_\_

#### **Section 2 - Knowledge and perception questions of food security and the warning system:**

3. Do you think RSS needs an early warning system for food security?

Yes

4. If your answer is yes to question3, which of these ideas is your choice?

- Red Sea is a drought prone area
- Severity of climate
- Recurrent food security crisis
- Low production relative to total consumption
- Wide spread of poverty
- Deterioration of natural resources
- Poor Governors
- Others, specify \_\_\_\_\_

5. The functions of the early warning system in the Red Sea State are?

- Monitor food security and nutrition situation in Red Sea State.

- Raise awareness to institutions in and around the RSS about the number of people in need of food.
- Empower communities to highlight their own their own needs to government and other stakeholders.
- Provides donors and NGOs with relevant information to advocate and lobby for appropriate and timely response and assistance to the area.
- Provide information about revolving food security and nutrition situation.
- Others, specify \_\_\_\_\_

6. In your opinion which of the following gaps are prominent in the existing early warning system in RSS?

- Technical abilities
- Geographical coverage
- Hazard mapping and vulnerability zoning
- Accessibility to remote areas
- Lack of continuous funding
- Others, specify \_\_\_\_\_

7. At the moment do you think the early warning system face any challenges?

- Yes                       No

8. Which of the following suggestion will activate the existing EWS?

- Strengthen the linkage between national and regional bodies and projects related to food security early warning system .
- Coordination with relevant stakeholders at State level.
- Provide technical and political commitment to EWS.
- Request increasing RSS Government and/ or donor funding
- Other, specify \_\_\_\_\_

9. How can the local community be prepared on the early warning and information communicated on food crisis?

- Be able to reserve enough food for the lean time.
- Be able to cope/ adopt with the situation
- Be able to seek another alternatives
- Be able to get support earlier
- Others, specify \_\_\_\_\_

10. Which of the following impacts of food security is more prominent in the local communities?

- Lower productivity
- Poor nutritional status
- Local food reserve availability is low
- Goat/grain terms of trade

- Lower animal prices
- All of the above
- Others, specify \_\_\_\_\_

11. Does the EWS provide relevant and timely information to all stakeholders such as policy Makers, traders, and market actors?

- Yes       No

12. Is the existing early warning system influential in convincing the decision makers' particularly State government, donor and NGOs to respond on time?

- Yes     No

13. To substantiate the impact of the EWS, which of the following functions is appropriate ?

- Depend on central government reserve
- Increase storage facilities at State level
- Move storage facilities to Localities
- Give authority of distribution to local community.
- Others, specify \_\_\_\_\_

14. In case of food shortage how often does the State government or donor/ NGOs respond to food crisis based on the EWS alert information?

1	2	3	4	5
Very quickly	Quickly	Slowly	Very slowly	No response

15. The degree of your satisfaction with decision making process of the existing early warning system?

1	2	3
High	Medium	Low

16. For sustainable impact, which institution do you think should make final decision on early warning system in the Red Sea State?

- State government
- NGOs
- RSS food security committee
- Donors
- All together
- Others , Specify \_\_\_\_\_

Any additional comments:

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*Thanks for your response, the time, energy and valuable information you provided for this study/research.*

