THE CONTRIBUTION OF WETLAND RESOURCES MANAGEMENT TO HOUSEHOLD FOOD SECURITY IN NANGABO SUB-COUNTY, WAKISO DISTRICT, UGANDA

By

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DECLARATION

I, Teddy Tindamanyire M. Tumusiime, do declare that this work is my original write up of the dissertation and has not been submitted anywhere for any awards. I have submitted the dissertation for examination for the award of the Degree of Masters in Business Administration (Public Sector Management Option) at the Uganda Management Institute

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DEDICATION

This dissertation is dedicated to my daughters; Sharon A. Kamayangi, Judith Mary Kyarisiima, Lillian Ngabirano, Agnes Omega, Maria Nyamukuru and Monica Nyakato whose cherished fun added value to my life and encouraged me to persist up to the end.

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ABSTRACT

The study was conducted to investigate the contribution of wetlands resources management to food security in Nangabo sub-county of Wakiso district, Uganda. Specifically the study examined how planning and control systems for managing wetlands resources contribute to food security in a peri-urban area. Both primary and secondary data were used in the study from four parishes and eight villages of Nangabo Sub County. The study adopted a case study design. Out of the sample of 350, 330 responded, a response rate of 94.6%. The study found a positive correlation between control systems for managing wetland resources and food availability, thus contributing positively to food security. Systematic planning for water and soils in wetlands contributes positively to food productivity, based more on indigenous knowledge at community level than extension workers' guidance. The study concluded that there is an apparent disjointed control system for managing wetlands resources for food security that has led to reduction in wetland ecosystem quality, threatened food availability and increased community vulnerability to food insecurity. The current planning and coordination of activities related to appropriate wetland management and food productivity is dysfunctional, increasingly threatening the livelihood systems of poor community. The study recommends that the wetlands Management Department, Wakiso district and Nangabo sub county technical staff undertake serious measures to redeem the remaining wetlands through serious awareness campaigns on the economic value of wetlands resources; develop bylaws to guide better control and planning for wetlands resources and food production. The Wetlands Management Department together with Ministry of Agriculture, Animal industry and Fisheries should clearly spell out the control systems and provide coordinated guidelines to reduce the conflict of interests and ensure that food production is maintained while the ecosystem resources are also maintained in equilibrium.

ACRONYMS AND ABBREVIATIONS

CVI: Content Validity Index

FAO: Food and Agricultural Organization

GOU – Government of Uganda

MAAIF: Ministry of Agriculture, Animal Industry and Fisheries

MWE: Ministry of Water and Environment.

NAADS: National Agriculture Advisory Services

NDP: National Development Plan

NPA: National Planning Authority

SPSS: Statistical Package for Social Scientists

UBOS: Uganda Bureau of Statistics

UMI: Uganda Management Institute

UNEP: United Nations Environment Programme

US$: United States Dollar

WEDEM: Wetland Development and Management

WMD: Wetlands Management Department

WSSP: Wetland Sector Strategic Plan

CHAPTER ONE:

INTRODUCTION

1.1 Introduction

Wetlands ecosystems are among the natural resources recognized internationally for contributing to food security especially for poor communities. It is therefore worth noting that managing wetlands resources effectively is crucial to the wellbeing of society. The study investigated the contribution of wetlands resources management to food security at household and community levels in Nangabo Sub County. The independent variable looked at wetland resources planning and control systems as they relate to food availability and access, as well as adequacy in terms of quality and quantity for the population. This chapter presents the background to the study, the statement of the problem, purpose of the research, objectives and scope of the study and the conceptual framework.

1.2 Background to the study.

Managing wetlands resources contributes to attainment of benefits that include food production. Collectively, wetlands are of considerable socio-economic and ecological values. Socio-economically, wetlands support family livelihoods as bases for crop production, grazing animals, fishing, and harvesting medicinal plants, among others. Ecologically, wetlands are instrumental in water storage, filtration, supply and flood control. Wetlands ecosystems are also important habitats for bio-diversity (both flora and fauna). All these have a bearing on food availability and food security state of a country. Planning and control as management functions are critical in ensuring that the wetlands benefits accrue to the intended beneficiaries as the access and equitable availability of resources is controlled and managed effectively.

1.2.1 Historical Background

Before the 1970s, management of wetlands in Uganda was characterized by efforts to justify reclamation of wetlands. The clearest example was the policy of "Double Production through Self-reliance" of the 1970s, which created chaos in wetland management that is still felt in some parts of the country today. The government policy was to reclaim wetlands and turn them into agricultural or grazing land (WID/IUCN, 2005). This was a vision based on the need to meet food security as an objective of the country.

In 1986, the Government realised that degradation of wetlands was uncontrolled. Government with help from United Nations Environment Programme (UNEP) commissioned and undertook a study that informed management of the likely negative impacts of loss of wetlands to livelihoods and future economic status of Ugandans. This raised awareness and interest in improving the management of wetlands. As a first step, the President declared a ban on large scale drainage of wetlands as reasonable measurers to halt rampart loss of wetlands resources. Further to this, a policy development process was started to guide the management of wetlands resources and food production. This was amidst the global awakening about the need to manage natural resources, and aligning its policies with the recommendations of the Stockholm Convention (1972).

Between 1986 and 2001, there were significant advances in policy, legal, institutional frameworks as well as financial support for wetlands management. The planning and control frameworks were instituted. Despite all these efforts, the current trend is worrying, despite the policy guidance, the management guidelines and planning that has been put in place. There has been notable persistence in reclamation of wetlands for various reasons. This reflects part of the debate between conservation and development that has carried historical legacies to date.

Currently, there is experiential knowledge of physical impacts associated with loss of wetlands resources and collapse of attenuate ecosystems services. The appreciation and knowledge of managing wetlands resources for the steady provision of direct and indirect food supply to the population remains obscure and wanting in the peri-urban areas. The impacts are misconceived. This is reflected in increasing tradeoffs of wetlands resources for land for construction, to provide housing for the ever expanding population. This poses a threat to livelihood systems that are dependent on the wetlands and endangers the aims of sustainable development where a balanced economic development and wise use of ecological resources are the tenets.

There are attempts, to add value to the livelihood systems of the populations in terms of food provision, sources of products that are converted into economic goods and sources of income. The earned income is used to access food and other essentials or substitutes that improve the ability of the households to acquire the right amount, right quantity and right types of food to support the wellbeing of the community and reduce vulnerability to hunger or food insecurity.

1.2.2 Theoretical perspectives

The study on contribution of managing wetlands resources to food security was guided by systems theory developed by Von Bertalanffy's in (1968). The study based on this theory, defined wetlands as a system whose elements exist as a web of relationships among elements, with common patterns, behaviors, and properties that could be analyzed. The system connotes behavior of complex phenomena" and presupposes that the crucial assessment occurs at the interface, or transaction between the individual; their systems that are interdependent, and the environment (Gordon, 1969). The study was also guided by Vroom's expectancy theory, (Vroom, 1960). This theory proposes that the individual efforts exerted to fulfil the organisational goal depend on the expected benefits that lead to the fulfilment of the needs of the individual worker. This theory is in line with the

principle of individual aspirations as driving forces towards efforts of managing any system and will determine how much work will be applied to achieving aspirations driven by the value or benefits that are likely to be got from such endeavours. The theory was used to relate the levels of individuals' efforts in planning and controlling wetlands use, more especially in various efforts of planning and controlling water resources as the selected resource which supports food security. The level of need for benefits accruing from the wetlands resources, as well as the assumed and expected benefits and returns on effort applied were the drivers of the interest in managing the wetlands.

1.2.3. Conceptual background

MacMillan dictionary defines planning (also called forethought) as "the process of thinking about and organizing the activities required to achieve a desired goal." Planning is one of the essential inputs for sustainable development. It is a continuous process involving making informed choices and allocating resources to achieve stated goals. Managing wetlands resources and attaining food security are two interrelated goals that have been organizational functions that would be considered critical in planning and ensuring coordinated systems to achieve desired results. Planning is as old as civilizations of the world and so is food security and management of wetlands resources.

From the organizational perspective, planning is a management process, concerned with defining goals for a company's future direction and determining the missions and resources to achieve that target. Henri Fayol (1961) theorized that functions of management; namely planning, organizing, commanding, coordinating and controlling were universal, and that every manager performed these functions in their daily work. His theory presupposes that planning always has a purpose. The purpose may be achievement of certain goals or targets. In management of wetlands resources,

the targets or goals are multiple and as many as the interests, among which there has been food security among traditional societies. Other writers have indicated that "the counterpart to planning is spontaneous order". Therefore planning creates order. In the context of managing wetlands resources, the more relevant concept is environmental planning.This is the process of facilitating decision making to carry out development with due consideration given to the natural environmental, social, political, economic and governance factors and provide a holistic frame work to achieve sustainable outcomes.

Environmental Planning endeavours to manage these processes in an effective, orderly, transparent and equitable manner for the benefit of all constituents within such systems for the present and for the future.

Wetlands ecosystems are defined as, 'areas of land, temporary or permanently flooded for a period of time that long enough for plants animals to adapt to water logged conditions' (National Wetlands Policy ,1994). From the perspective of Systems theory, wetlands are made up of different components but must be looked at holistically. A Systems approach to management of wetlands resources requires clear understanding of the components and impacts of having one of the components damaged. Planning increases the efficiency, reduces the risks, facilitates proper coordination within an organization, aids in organizing all available resources, gives right direction to maintain a good control, helps to achieve objectives of the organization, motivates the personnel, encourages managers' creativity and innovation, and also helps in decision making.

Food is the basic human need for survival, health and productivity. It is the foundation for human and economic development (Lisa LC, 2006) In a broad sense, food security exists when "all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences to live an active and healthy life" (FAO, 2009). On

the other hand, food insecurity occurs when food systems are stressed such that food is not available, accessible or utilized properly.

Matt (2012), defines controlling as "a four-step process of establishing performance standards, based on the firm's objectives, measuring and reporting actual performance and taking corrective or preventive action as necessary". Effective control systems are necessary at all levels in the business, should be acceptable and flexible to those who enforce decisions to address emerging issues. Timeliness and cost effectiveness are very critical elements in ensuring that there is a balance between objectivity and subjectivity of the goals of an organization. Lack of all these elements could easily manifest in dysfunctional consequences of control and limited understanding of the business goals and objectives. Some of the dysfunctional consequences of control could manifest as employee resistance, stakeholder dissatisfaction, providing inaccurate information, sabotaging communication among managers. Both food security and wetlands resources managers need balanced planning and control systems that will deliver balanced development goals and objectives.

According to the Assessment of ecosystems services Report by De.Groot (2005). The well managed wetland resources exhibit a wealth of support to livelihoods through the direct products, indirect products, services and optional values. The food security is the focus in this study and was considered as one of the wealth of wetlands resources if planning and control systems are synergised with the other interests that communities would need.

Control at all levels of managing wetlands resources is critical in balancing the productive capacity of the wetlands as well as harmonizing the many interests in the different resources from the ecosystem. Food security in this concept is an outcome of good planning and control systems and

is dependent on the level of control as it manifests in the acceptable behavioral changes that ensure the regulations that are acceptable at all levels. Acceptability of controls to enforce decisions is another major dimension that determines the quality of the resources with less control, leading to declining levels of resources, while acceptability of the controls leads to more available resources and a food security safety net of a kind.

1.2.4 Contextual Background.

Wetlands ecosystems in Uganda are intricate and complex in nature. This implies that almost all communities directly or indirectly interface with wetland resources in one way or the other. This also presupposes that the reliability and support for managing the wetland resources is of critical relevance to the community in Uganda. There is a reliance that cannot just be ignored in planning and instituting control systems and measures for using wetlands resources while ensuring that food security options get the attention they deserve. Wetlands contribute significantly to strategies mitigating for food insecurity in Uganda. As a result, Ugandan wetlands have seen an influx of people using these resources over the last few years, while climate has become increasingly unstable. Furthermore, wetlands are also used for income generation, for example by providing clay for pottery, reed and palm mats, baskets, beehives and cultivation of cash crops. The balance of the many interests as a result of influx of people requires coordinated planning and control measures by the mangers to address the needs of the people who look at mitigating strategies for food security as critical and those who cherish development for economic reasons.

Wetlands are also of significant importance for biodiversity conservation, as many species rely on these areas for resources such as food and water, particularly during the frequent droughts. Because of this, conservation measures may be put into place such as restricting use of wetlands by humans, and creation of nature reserves to protect these important habitats. Conflict therefore arises

between conservation policies and food security strategies regarding the use of wetlands. With these two considerable pressures on wetlands, there is need for systematic planning and control systems and processes that will create a balance for the benefit of biodiversity conservation as well as ensuring that land can continue to be used to ensure food security. There is no recourse to planning and control of wetlands resources as a management practice alluded to in the current studies.

Uganda's economy is largely natural resources based, including wetlands resources that make up the natural capital. Wetlands have been considered common pool resources for a long time and support 80% of the population that is engaged in the agricultural sector. Uganda is grouped among the poorest countries in the world, with a population of about 24.7 million people, growing at a rate of 3.4 per cent per annum and a per capita income of about US$ 300 per year (World Bank-World Development Indicators Database April 2002).

The key underlying desire for the population, both the rich and the poor to derive livelihoods from the wetlands has led to activities such as reclamation for agriculture (rice in Eastern Uganda and Vegetables in South Western) and other industrial and commercial purposes (Central region). Poor use of wetland catchments, leading to siltation of wetlands, has forced people to cultivate the now fertile wetlands. This is exacerbated by the high annual population growth rate of 3.2 % (UBOS 2002). Lake Victoria and Kyoga are among to the most critical ecosystems in Uganda. The wetland catchment areas around Lake Victoria alone have shrunk by more than half its size in 20years from 7,167.6sq.km in 1994 to 3,310 sq.km in 2008. The wetland catchment of Lake Kyoga has also reduced in size from 15,008.3sqkm in 1994 to 11,028.5sq.km in 2008. While the trend in wetlands change had been documented, it was not clear how this had affected the food security scenario in Uganda.

Wakiso District, situated in the central southern part of the Central Region of Uganda, is one of the Kampala suburbs increasingly faced with a bigger population to feed, yet the farmland has significantly reduced. It is made up of 2 counties and one municipal county, with 16 sub-counties and 4 Town Councils. Most of the population lives in the peri-urban areas around Kampala city. The district has a population of 1,260,900. Nangabo is among the food insure community, part of the central region with food insecurity risen to 3% population and is likely to grow if the status remains unchanged.

The current management options for wetlands resources in the peri-urban centers are dominated by reclamation through land filling and drainage to create land for housing and construction that disregards the other important services wetlands provide, including supporting food security for households.

The current study on the contribution of managing wetlands resources to food security aimed at establishing a critical understanding of the provisioning services of wetlands and their association with food security among communities. This was in fulfilment of Guttmann's (2007) assertion that "The collapse of knowledge is good to awaken society to the need to act". This knowledge is needed to trigger action towards effective and better management of wetlands resources to attain food security goals for the peri-urban community." The new knowledge on contribution of managing wetlands resources will be a good tool to inform and address current unwanted wetland degradation in Uganda. Nangabo Sub County in particular was used in the study to examine the contribution of managing wetlands resources to food security in a per-urban environment. This was chosen as a useful representative ecosystem serving a rural –urban community.

The data generated will be shared with the Wakiso Local Government, Ministry of Agriculture Animal Industry and Fisheries, the Wetlands Management Department of Ministry of Water and Environment, as well as communities, to enhance the capacity to plan, control and coordinate efforts in managing wetlands and provide incentives for conservation of wetlands as part of the peri-urban food production systems. This serves to awaken Uganda to work towards a food secure wetland dependant community through informed planning and decision making processes.

1.3. Statement of the problem

A number of controls and planning systems have been put in place to ensure household food security, while managing wetlands resources has been considered one of the strategies to mitigate against food insecurity in Uganda (Turyahabwe *et al,* 2013). Despite these efforts, as indicated in the Africa Human Development Report 2012, one out of ten Ugandans are surviving on one meal a day and 33 percent of children under five are malnourished. Uganda is in danger of becoming a shadow of the country that was once regarded as a fat breadbasket of sub-Saharan Africa. At a local scene, currently Nangabo community is among the central region communities where food insecurity has risen to 3% and vulnerability is affecting over 19% of the population (UBOS, 2009). The wetland resources are not highly valued for the benefits they provide and as a result, rampant degradation has had a negative impact on the availability of food and other products, consequently rendering the households food insecure. There is need to restore the ecological balance of the Nangabo wetlands, and increase the productivity capacity in the coming years, so that food insecurity reduces from the current 3% to less than 1 %, (Uganda Bureau of Statistics, 2009). The planning and control mechanisms are yet to be streamlined to address the food accessibility and/ or availability, quality and quantity for Nangabo Sub County while managing wetlands resources strategically. If this trend is not halted, the current population in the peri- urban areas of Kampala,

such as Nangabo in Wakiso district, will continue to be food insecure, the poverty nexus will translate into economic crises and an environmental hazard, with a highly vulnerable and increasingly poor and food insecure community for the foreseeable future.

1.4 General objective

The general objective of the study was to investigate the contribution of managing wetland resources to food security within the Nangabo community in Wakiso District

1.5. Specific Objectives of the study

The study was guided by the following objectives

i. To examine how control systems of managing wetland resources contribute to food security in Nangabo sub county, Wakiso District.
ii. To assess how planning for wetland resources contribute to food security in Nangabo Sub county, Wakiso District.

1.6. Research questions

The study sought to answer the following questions;

i. To What Extent does control of use of wetland resources contribute to food security among the households in Nangabo Sub County, Wakiso District?
ii. To What Extent does planning for managing wetlands resources contribute to food security in Nangabo Sub- County, Wakiso District?

1.7.Research Hypotheses

In order to achieve the research objectives, the researcher tested the following hypotheses;

i. The control system in managing wetlands resources does not contribute to food availability in per-urban setting

ii. Planning for management of wetlands resources increases food security among the households

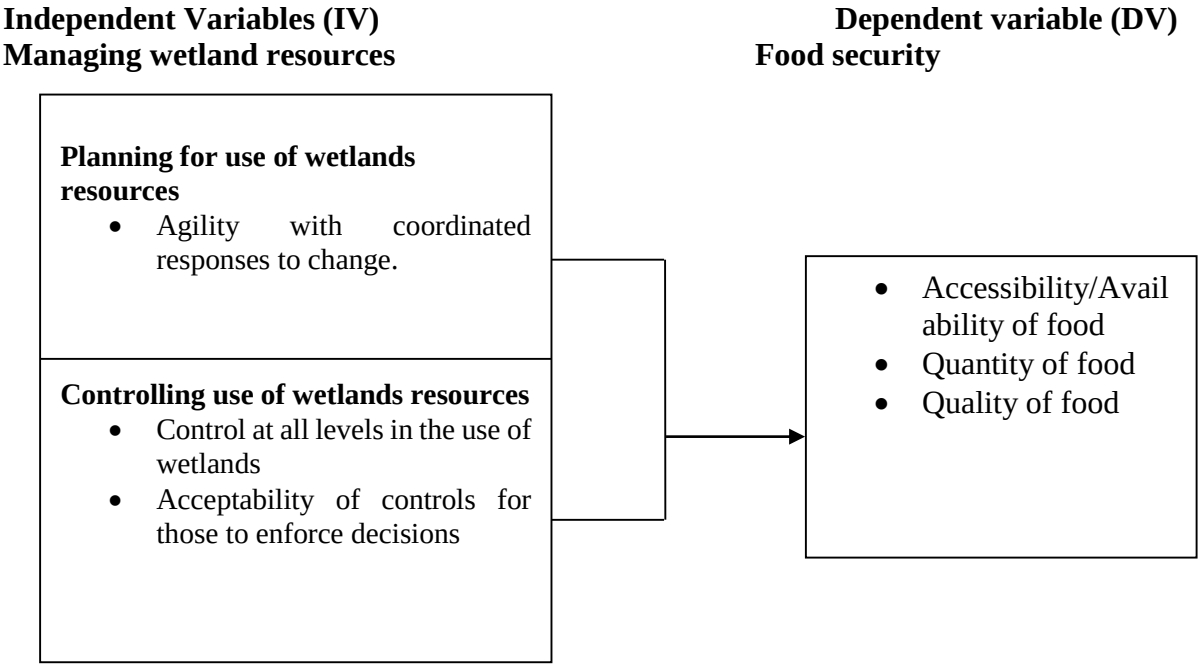


Fig.1 .Conceptual framework showing the research variables: (adapted from De Groot 2005).

The conceptual framework shows the linkages between the independent and dependent variables of the study, where planning and controlling are the two dimensions of the independent variable (managing wetland resources), food security – the dependent variable was conceptualised as accessibility to food, quantity and quality of food. The framework therefore shows that when wetland resources are well managed in terms of planning for their use and controlling their use, this can result into increased access to food and ensuring that there is availability of adequate and quality food supply. However, if the wetland resources are not well managed, there is likely to be a reduction in food availability due to the destruction of the ecosystem and resultantly, this will result into food insecurity in the affected communities.

1.8. Justification

Although there is considerable literature on the relationship between agricultural productivity and ecological health of wetlands ecosystems, at a global level, the data on contribution of managing wetlands resources for food security is still lacking and as a result, it is not reflected as important in many economies. In Uganda to date, planning and control of use of wetlands resources have received far less rigorous empirical attention than forestry and minerals resources. There is no clear planning and control evidence based tools and data to create incentive for better management and reduction of the current mismanagement and degradation of wetlands resources in the peri-urban environments.

1.9. Scope

a) Geographical scope

The study was carried out in Nangabo Sub-county in Wakiso district and data was collected from 4 parishes purposively sampled from a list of 9 Parishes with 50 villages. Two villages were then randomly selected from each of the four parishes. The four villages making up one cluster of crop producers were purposively selected from Nangabo and Kattadde, while the four villages of Cluster Two were from Wampewo and Kabubbu, representing other wetland users who derive part of the livelihood from wetland resources. The study area represented the urban setting close to Kampala city and Kasangati Township, and the community of typical rural setting as well as transitional populations of peri- urban centres. The study focused on households that depend and interact with the wetlands ecosystem and exercise due diligence to manage the wetlands for livelihoods support. Further criteria were households who had been in the area for two years and more as well as the consumption tendencies that relate to food security on one hand and income from the wetland on the other hand.

b) **Time scope**

In terms of time, the study focused on management of wetlands resources for food security in the period of 2008-2012. The scope also covers the pre-colonial period, after independence and more focus on the 1986 when the issues of managing wetlands came to be recognised in the country but refers also to periods of the 1970s which influenced the planning for wetlands addressing the planning and control systems as well as the current period after the policy for managing wetlands was in place.

c) Content scope

The study main content of the study is planning and control as functions of managing wetlands resources as well as the theories of management systems that support management of ecosystems and food production in a systems have affected the food security in the Sub County of study.

1.10 Operational definitions

A wetland: A wetland is a land area that is saturated with water, either permanently or seasonally, such that it takes on the characteristics of a distinct ecosystem. Primarily, the factor that distinguishes wetlands from other land forms or water bodies is the characteristic vegetation that is adapted to its unique soil conditions:

Wetland resources: Wetland resources are goods and services that are consumed directly or indirectly and are a result of the existence of a wetland ecosystem.

Food security: Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. It includes at a minimum, the ready availability of

nutritionally adequate and safe foods, an assured ability to acquire acceptable foods in socially acceptable ways. (Adapted from FAO)

Managing wetlands: Wetland management generally involves activities that can be conducted within, and around wetlands, both natural and man-made, to protect, restore, manipulate, or provide for their functions and values. They include planning, coordinating and controlling use of resources without changes in the ecological character of the wetland ecosystem.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Chapter two presents the review of literature related to managing wetlands resources, with a focus on control and planning systems and processes for managing wetlands resources for food security. The review also highlights the gaps that the study attempted to address.

2.2. Theoretical review

This study was underpinned by Vroom's expectancy theory of 1960 and the Systems theory.

Vroom's expectancy theory (Vroom, 1960) was used to examine the levels of individuals' efforts towards managing wetlands resources. The theory was applied to understand the incentives of various efforts of planning and controlling of water resources as the selected resource which supports food security. This theory is in line with the principle of individual aspirations as driving forces towards efforts of managing any system and will determine how much work will be applied to achieving aspirations driven by the value or benefits they are likely to get from such endeavours. The level of need for benefits accruing from the wetlands resources, as well as the assumed and expected benefits and returns on effort applied were the drivers of the interest in managing the wetlands resources, including water.

Wetlands ecosystems are defined as areas of land, temporary or permanently flooded for a period of time long enough for plants and animals to adapt to water logged conditions (National Wetlands Policy, 1994). As proposed by the expectancy theory, the population's knowledge and actions are determined by and related to the motivational factors that determine the level of involvement in management of wetlands resources. According to the traditional food production systems, the

common good of all was an overriding motivation for managing wetlands resources. This was directly linked to food security among the common property resource users. The motivational factors to plan and control wetlands resources use were in constant search for a dynamic equilibrium; while food security was (the dependent variable) was assumed to be related to the function of wetlands resources management (the independent variable), more especially water that was construed as the lifeblood of the wetlands ecosystems. The elements that relate to food security included the quantity, quality and availability of food as envisaged through the interactive processes that are a result of the control of and guided use of resources and the outputs in terms of food security or lack of food security. The underpinning principles were derived from Environmental Planning, which emphasises the process of facilitating decision making to carry out development, with due consideration given to the natural environmental, social, political, economic and governance factors .This principle provides a holistic frame work to achieve sustainable outcomes.

The Systems Theory, (Germaine, 1979) was used to explain the concept of food security in relation to wetlands resources management. Proponents of the theory liken the wetlands system to the ecological model, of the systems theory. They consider the individual components of wetlands as elements of a system, whose behavioural patterns have been observed over a period of time. Further to that, the evolution of wetlands ecosystem reflects understandable phenomena that impacts on food availability. The application of the theory stems from the idea that where there is reduction or increase in any of the elements, like soil quality, water, plant cover or number of animals, such is observed to affect the adaptive view of human beings when brought in continuous interaction with their environment. This was used to interpret the associated changes as the respondents utilise the wetlands resources or fail to manage them in search of a goodness-of-fit.

The reductionism principle formed the basis for interpretation of relational phenomena. The changes exhibited the ways to interpret new relationships and phenomena related to the functioning or properties of individual parts of the ecosystem. Apparent emphasis was put on the best ways the management of wetland water as a major resource, whose proper planning and control contributes to the wellbeing and the functioning of all its parts, namely the plants, animals and soils. All these systems phenomenally contribute to food availability, access to the benefits and resultant functions to support livelihoods.

This type of analysis coalesced in the 20th century with recognition that preservationist conservation strategies had not been effective in halting the decline of natural resources. A more integrated approach was implemented recognising the intertwined social, cultural, economic and political aspects of resource management. This is the tenet for sustainable development that underscores the achievement of ecological, economic and social benefits from ecosystems that can be associated to managing wetlands for food security.

2.2. Wetlands resource management and household food security.

2.2.1. Control systems in managing wetlands resources.

The regulations and policies form the control systems serve to ensure the sustainable management of wetlands and food security. The systems theory proponents consider “control as aiming at achieving strategic objectives”. This requires a number of processes through which control is accomplished. There are subsystems that support the structures and processes by providing the right incentives to shape the behaviour. The control process is cyclical, which means it is never finished. Controlling leads to identification of new problems that in turn need to be addressed through establishment of performance standards, measuring performance and achieving goals.

In relation to the study, the control systems put in place ensure that wetlands resources have their foundations in 'the precautionary principle' which is accepted internationally. The basis of this principle is that it is better to protect the ecosystem if the impacts of use are not understood to avoid irreversible impacts where the information available is scanty and or not fully understood.

The wetlands resources management and control systems in Uganda originally promoted natural protection, a phenomenon that was largely precautionary to ensure that the ecological integrity of the wetland was maintained and the benefits and products remained available for a multitude of users. This was the best in the absence of convincing knowledge. As more knowledge through research became available, managing wetlands resources increasingly became a debatable subject and the wise use concept was coined to the management of wetlands.

Deterling, (1994) looks at another angle of managing wetland resources through restoration. He proposes that "Wetland restoration can be an important contributor to downstream habitat and water quality recovery in urbanized landscapes". Restored urban wetlands can help protect floodplains and streambeds that are otherwise degraded by urbanization forces. They can also help to minimize downstream flooding which results from urbanization. Such wetlands can also reduce sedimentation of lagoons, bays, and other downstream water resources (Williams, 1990; Gale and Williams, 1988; Marcus, 1988). Larger restoration projects are more cost effective and are typically more beneficial ecologically as well (King and Bohlen, 1994; Lewis, 1988).

Brech, (2004) defines controlling as a systematic exercise which is called "a process of checking actual performance against the standards or plans with a view to ensure adequate progress and also recording such experience gained as a contribution to possible future needs". Controlling consists of verifying whether everything occurs in conformity with the plans adopted, instructions issued

and principles established. It ensures that there is effective and efficient utilization of organizational resources so as to achieve the planned goals; measures the deviation of actual performance from the standard performance; discovers the causes of such deviations; and helps in taking corrective actions.

The provision of food and ensuring food security is a centralized function of government, while planning for household and controlling access to food production and management is a responsibility of individual households, with the overarching guidance from central policies. The contribution of managing wetlands resources to food security is therefore a concern of individuals, local and central governments as well as national and regional organizations. This is because wetlands provide services within and outside the confines of boarders of a local government where they are found.

Self-control, sometimes called adhocracy control, is complimentary to market, bureaucratic and clan control. By training and encouraging individuals to take initiative in addressing problems on their own, there can be a resulting sense of individual empowerment. This empowerment plays out as self-control. According to Donnell, designing effective control systems will demand that managers and stakeholders in the business ensure that there is control at all levels in the business, **a**cceptability to those who will enforce decisions**,** flexibility to allow innovations in coming up with workable solutions, accuracy of information and timeliness in delivering the information. Related to the food security question and wetlands management, timeliness of information and the collectively acceptable solutions to the problem of wetlands degradation and food insecurity needs to be applied to this management and control system in organizations to ensure flexibility in use and attainment of both goals.

Nafuna, (1998) proposed that "the influence of land tenure systems on the utilization and management of Peri-urban wetlands significantly influenced access to wetlands for crop cultivation, settlement, brick making and sand mining, but did not strongly influence access rights to wetlands for grazing, fishing and collection of other resources namely; fuel wood, medicines, craft materials and building materials, fodder and vegetables. She asserted that land tenure systems significantly influence access rights, utilisation and management practices of the wetlands in Kampala District, but did not go further to explain any relationship to food security among the peri-urban communities, a scenario that needed to be underscored.

Nafuna, (Ibid) further clarified that access rights are influenced by land tenure systems. "Under the customary tenure systems, wetlands are common property resources owned and controlled by an identifiable group such as a clan, lineage or tribe. Access is free and open to all individual members in the group, but non-members are usually excluded". Where wetlands are held under private tenure systems such as *mailo,* freehold and lease hold, individual owners have exclusive rights over the resources and access is restricted through inheritance, renting, borrowing or purchase. "Legally, wetlands in Uganda are public resources controlled by the government", she asserted, and concluded that existing land tenure system and modes of access in wetland are inappropriate for the sustainable management of wetlands leading to fragmentation, excessive drainage and in-filling of wetland areas for crop cultivation and residential development. She recommended streamlining ownership and usufruct rights in wetlands so as to achieve sustainable management.

Byaruhanga, (1996) in his study on urban agriculture, explained why urban agriculture continued to persist in urban centres and evaluated the benefits obtained from urban agriculture. He indicated that the practice of urban agriculture is not consistent with urban planning and violates urban

bylaws. It also caused environmental degradation because poverty and low incomes greatly contributed to the persistence of urban agriculture since it is practised as a survival strategy, mainly by women. He recommended the integration of urban agriculture into urban planning as a way of legalising it because of the important role it plays for the urban poor. However, he is also silent on the contribution of that agriculture to food security.

Egziabher, *Et al* (1994) in n a study of five countries: Tanzania, Ethiopia, Uganda, Kenya and Malawi challenged the assumption of economic development theorists, Marxists, and modernists who see urban agriculture as the inappropriate retention of peasant culture in cities and confidently predict its disappearance; as well as development planners who perceived a dichotomy between rural and urban, between agriculture and cities and assign food production solely to rural areas. They emphasised the need to recognise urban agriculture as an important part of informal sector because it provides income or income substituting food, to a significant number of urban residents. They noted that land holding patterns were extremely confusing in Kampala as traditional land rights were contested against modern land–user rights. They discovered that many landowners worked out arrangements with urban farmers to use land they are holding until land settlements are concluded so as to prevent unauthorized squatters from occupying it. However, he does not mention food security issues as land settlements are developed in peri-urban centres.

Ssemwanga, *et al* (2002) in the study on urban agriculture in Kampala City observed that urban and peri-urban agriculture has sprung up in recent years due to socio-economic factors. Urban Productive Agriculture (UPA) is being affected by legislation inherited from the colonial period that either technically prohibits, or sets limits on the types of crops that are zoned where tolerated, reduces areas of over grown bush and justifies treating solid waste. The study does not mention

food security as an aim for urban agriculture, nor does it mention managing the wetlands resources in agricultural production in a peri-urban environment.

David & Sonia, (2003) alluded to the fact that beans are an important food security crop in Kampala and cultivation appears to have increased since the late 1980s due to an improvement in security generally, and economic hardship resulting from structural adjustment policies. The crop is predominantly grown by women farmers for household consumption, but a small number of farmers, mainly women, sell significant quantities, mainly to neighbours, but also to traders. Most bean farmers practice mixed farming, although the extent of integration between crop and livestock production is unknown.

Maxwell, et al, (1990) in their study of Urban agriculture, concluded that at the macro level, urban agriculture is a productive economic activity which makes use of otherwise under-utilized urban resources (particularly land and labour) and makes a significant contribution to the city in terms of food supply, employment and income. At micro level, the practice is largely a component of the survival strategy of middle and lower income households. This therefore ties in well with the use of urban wetlands for agriculture to support the food security but does not allude to managing the wetlands.

Eresu, et al. (2000) in a report of a baseline survey on production, food security, nutrition, gender relations and socio-economic aspects of Nabweru, Wakiso, and Muduuma Sub-Counties of Mpigi District indicated that food insecurity is rampant in the community with 79% of the households not growing enough food to meet household needs. Poor childcare and feeding practices, unequal food sharing and insufficient nutritional knowledge are among the factors contributing to high

malnutrition rates. She further revealed that the typical diet of the population is a starchy staple and beans.

Earlier to this, Maxwell, (1995) in the study on "Labour, land, food and farming" asserted that urban farming is largely a long-term adaptive strategy of women to protect household food security, either through the direct provision of supplemental sources of food, as a food reserve, or as a means of stretching other sources of income, especially among low income groups. He further affirmed that urban farming is significantly associated with better long-term food security and nutritional status of children, particularly among low-income households that make up 80% of the city's population. Gaining and maintaining access to land is identified as the biggest constraint to farming in the city. However, it was noted that he does not give due attention to the contribution of wetlands to food security.

In a related study, Maxwell, (1995) noted that alternative food security strategy has adapted farming within African cities to increase source of food for urban populations, yet little is understood about the forces behind urban farming or its impact at the household level. He cautioned that intra household dynamics and gender relations, as well as declining wages and economic formalisation, are all important to an understanding of urban farming. Like Kampala, Urban farming in Wakiso was associated with higher levels of household food security and child nutrition. He emphasized the need to match economic strategies, access to land and food security to planning and control of supporting systems. His underscored the policy implications of urban farming in Kampala. This can be translated for Nangabo as it is at a time that will require policy guidance if wetlands contribution to food security has to be enhanced.

Maxwell et al, further guided on various ways and methods used to measure food security. He emphasized the need to include caloric consumption and incorporate vulnerability elements of

food insecurity as well as the deliberate actions of household decision making when faced with food insufficiency.

Turyashemererwa, (1999) indicated that household food security is influenced by a number of variables such as socio-economic factors, coping mechanisms and constraints to production. Socio-economic factors such as sex, age, marital status facilitate or hinder food production. The study indicated that shortage of labour; land, financial resources and inputs are the major factors that constrain food production. Thus, searching for more land, sale of labour and animal rearing are among the many strategies used by peri-urban households to ensure food security. He does not mention wetlands management as a factor and therefore the need to explore this in the current study. Bernard recommended that government authorities need to improve household access to land, labour and inputs in order to alleviate food shortages. This is wanting since the urban population has expended the access to productive land by reclaiming the wetlands and harvesting resources, mention of such a sustainable strategy needs to be explored. He does not recognize the implications of managing wetlands resources to food security as a viable strategy.

Kakitahi & Zimbe, (2000) in the urban nutrition and food security assessment in Makindye Division, Kampala District, noted that food was grown mainly for family consumption. They noted that problems faced in crop production include: inadequate labour, poor soils, drought, pests and vermin, cassava mosaic virus and lack of improved seed, as well as inadequate extension services. The same foods were used for supplementary feeding of infants and feeding older children. Matooke, sweet potatoes, millet, fish and groundnuts were among the major foods given to children, but food choices varied by ethnicity and prevailing prices in the market.

Maxwell & Levin, (1999) showed that urban agriculture has a positive, significant association with higher nutritional status among children, particularly as measured by height for age. Several pathways by which this relationship is manifested are a menu for other relational studies to be done, including contribution of managing wetlands resources to food security

Nakijoba, (1996) examined the effects of wetland reclamation on women's socio-economic survival in Kampala and focused on trends in wetland resource utilisation and effects of wetland reclamation on women's activities based on wetland resources. The study concluded that women depend more on wetlands for their socio-economic survival due to the domestic nature of their activities and indicates that access to wetlands for growing food crops improves household food security, nutrition and health. In addition, women acquire income from selling crops, namely cocoyam and sugar canes, grown in the wetlands. This supplementary income reduces women's dependence on their husbands which in turn increases their decision making power within the household. The study is however silent on methods of managing wetlands for food security.

Musimenta, (1997) who investigated the forms of urban agriculture women engage in, problems they face and the importance of agriculture to women's socio-economic empowerment concluded that some farmers are not aware that they lack legal authority to practice urban agriculture. Most of them believe that the government has the capacity to solve most of their problems by making urban agriculture a planned, legal activity. The study recognized the role urban agriculture plays on ecological, social and economic grounds. It therefore recommends that government should see urban agriculture as a new vision of the city, which has multiple purposes; recommended that urban agriculture be accepted as a very important informal urban activity that calls for immediate recognition.

Kaggwa, (1994) considered land tenure rules, customs and laws, the institutions that administer rights and land access in Kampala as critical and indicated that the most common mode of land acquisition was through purchase. While the 1975 Land Reform Decree attempted to facilitate, promote and maintain better development and use of land as a natural resource by reducing dual ownership of land (land lords and tenants), development of land by absentee landlords has not been successfully implemented. Land continues to be owned under the *mailo* system and absentee landlords are the norm. The author concludes that even on public land under the jurisdiction of the Kampala City Council, individual rights to land have continued to play a dominant role in Uganda's land tenure system. However, the author is silent on managing critical ecosystems, like wetlands.

Muhereza, (1992) provided some reflections on agricultural production in Luwero District. In his study, he showed that, rather than being tenants of the state through the intermediary of a landlord, tenants preferred indigenous land tenure systems: the *Busulu (*fixed annual rent paid by the tenant to the land owner) and *Enjovu* (cash levy or tributes charged on the growing of certain commercial crops such as coffee and cotton) systems. The paper noted that the prevailing tenure system has been highly influenced by farmers' struggles to gain access to means of production, especially land. It identified conditions of access with certain degree of rights specific to each land holding system as: *ttaka, kibanja* (plot of land), renting and borrowing. It further argued that the nature of land holdings and land distribution have made the conditions of access to land more and more restrictive in a situation of relative scarcity. Where conditions of access under tenancy are inimical to the capacity of peasant households to produce their labour, the demand for land is satisfied by gaining to hitherto agriculturally marginal areas that include wetlands.

Legally, wetlands in Uganda are public resources controlled by the government. The study concludes that existing land tenure system and modes of access in wetland are inappropriate for the sustainable management of wetlands leading to fragmentation, excessive drainage and in-filling of wetland areas for crop cultivation and residential development. It recommends streamlining ownership and usufruct rights in wetlands so as to achieve sustainable management.

Emerton, Iyango, Luwum and Malinga, (1999) share that crop production in the Nakivubo wetland was estimated at Uganda Shillings 200 million a year. The report suggests that the impact of wetland degradation for different groups must be taken into account when developments are planned and implemented in and around Nakivubo. The case study emphasizes the importance of integrating wetland values into land use and development decisions, and provides estimates of the economic value of important wetland goods and services. The information it contains lends support to recommendations that Nakivubo should be fully recognized and designated as an economically important and environmentally sensitive area.

Kalyebi, (1995) in his study of Urbanization and the environment as critical conditions for the formulation of an environmental management strategy for Kampala District, suggested that in order to develop and implement environment management strategies and action plans, Kampala needs to upgrade managerial, regulatory, technical and financial capabilities; improve infrastructural arrangements, involving both the public and private sectors, and establish effective public participation. He recommended that Kampala adopts a cross-media and cross–sectional approach to environmental management, up-grades its human resource and institutions, evaluates urban environmental issues, establishes priorities for actors, resolves conflict and designs and implements appropriate policies and investments.

Ngaka, (1997) asserted that urbanization has significantly contributed to the over exploitation of the wetlands and their associated resources, destabilization of the ecosystem, distortion of hydrological systems and increase in flood frequency. He further associated lack of coordination of environmental management issues and a lot of laxity in enforcement of environmental laws. The study concluded that urbanisation has greatly contributed to the destruction of the wetlands and that the present land use patterns have failed to maintain the ecological character and biological diversity of Nakawa Division. It recommended that urban development should proceed in an environmentally sustainable manner and in full recognition of the local urban ecosystem.

National Environmental Management Authority (2001) analysed wetland degradation and noted that Nakivubo Swamp is under intense pressure for cultivation purposes, house construction, and brick making. Sugar cane, coco yam, sweet potatoes, and bananas are the main crops grown and the report estimates that in Upper Murchison Bay, bananas have already claimed more than 60% of the original swamp area.

Tumusiime, and Mijumbi's, (1999) Socio-economic survey of Nakivubo Wetland report prepared for National Wetlands Conservation and Management programme, Ministry of Lands, Water and Environment, Kampala indicated that small-scale agriculture is a major activity, accounting for 95% of the activities taking place in the wetland. The main crop grown is cocoyam. The majority of wetland dwellers live within less than 3 kilometres and have used wetland resources for at least five years. The study concludes that crop growing in the wetlands affects neither the quality of water in Murchison Bay nor the wetland's capacity to control flooding.

Davidson, (1994) in Kampala Urban Study: Phase III Report Section; Environmental action programme sought to design action programs in each sectoral area and delineate specific projects for implementation. It recommends that agriculture should be permitted in suitable locations but

notes that further investigation is needed to assess the appropriateness of specific crops and to establish guidelines to ensure the environmental sustainability of urban and peri-urban activities. The report proposes the need to establish urban agricultural standards and studies to allow appropriate management of such activities. This does not mention the wetlands planning and control systems

Ministry of Land, Water and Natural Resources (1995) sought to curtail loss of wetland resources and ensure that benefits from wetlands are sustainable and equitably distributed to all Ugandans. The report contains guidelines for wetland resource development, intended for people using wetlands for increasing food, fish and livestock production and for providing other goods and services.

Van, (1994) in reference to the future structure of Kampala proposed the protection and enhancement of urban agricultural and forestry activities within and adjacent to the city. The proposed Kampala District Plan also calls for environmental protection measures that accommodate permanent agricultural activities. The new consolidated communities in the proposed plan have an extensive system of continuous green space which is intended to provide environmental protection for important ecological areas – particularly the existing shoreline and wetlands,, but issues of food security and use of wetlands are not provided for in the plan, hence the current given due attention.

The literature reveals that critical attention had been paid to the systemic approaches to managing wetlands resources as an ecosystem but the control mechanisms in managing wetlands for food security have not been focused to harmonise the different interests in utilising the wetlands resources. Consequently, less control of use is exhibited in the management and this has had a toll on food availability and income generation for the poor communities.

2.2.2 Planning and managing wetlands resources for food security

Planning for wetlands resources for food security has been developed through local experimentation using traditional knowledge. In planning for use, traditionally wetland edges were drained for dry season cultivation and the margins used for grazing animals. This provided an important "hungry" season crops buffering the community before the upslope harvests ready and acted as food security nets for the population.

This has for a long time allowed sustainable cultivation year after year for several decades with no major reductions in crop yields. Such sustainable cultivation was usually a mixture of contributions from the wetlands. This could be possible because of values and management practices that would allow planned mixed land use, within a wetland ,with some areas reserved swamps to ensure maintained flooding using local knowledge of the hydrology, soils and vegetation, which has been built up over generations.

Cultural and traditional practices have had a bearing on planning to use wetlands for food security. The traditional practices known in Uganda include dry season grazing on the margins of wetlands, wetland edge gardening during the dry season as natural retractions to the dry lands when rains set in and wetlands became water logged. Needless to say such practices were sustained at local levels as long as the cultural values were respected and the population was still low. As the population increased, the common property resources including wetlands began to get pressures for use for the increasing population. Coupled with declining soil qualities due to poor farming methods, wetlands became more accessible for food production and eventually the carrying capacity became overstretched.

Maness and Farrell, (2004) recommended true value of wetland ecosystem. They warned that "Rushing food policies that lead to excessive use of wetlands may lead to wetlands degradation

and ultimately resulting in food insecurity". This is because wetland cultivation is an option open to some, but not all, rural farming households (due to land, labour and other asset constraints, as well as access restrictions).This implies that promotion of wetland cultivation may disenfranchise those people who use the wetland for purposes other than cultivation and in so doing may actually increase food insecurity in some sectors of society. EWRP, (2001) proposed that due to unfavourable policies advocating food security through local production, government agencies may end up urging farmers to cultivate more wetlands and for longer periods. This more extensive and permanent wetland cultivation poses a threat not only to the availability of alternative products from wetlands but also to the ecological functions of wetlands and the socio-economic well-being of the communities who depend on them. It may also threaten long-term agricultural production and the result being food insecurity.

The evidence from literature so far explains the factors that lead to wetlands degradation. This leads to system disruption and reduces effects of wetlands ecosystems on agricultural productivity. This is a manifestation of the benefits of control and good planning, although the contribution of managing wetlands to food security is not explicitly handled.

The systems theory provides a basis for reviewing how the ecosystem services can be harmonised to make meaningful contribution to food security. The expectancy theory provides a basis on the analysis for who is the main actor in managing wetlands and how these can be motivated to improve service delivery as well as manage food security issues in Nangabo Sub County. This study aimed at contributing to the knowledge that could help in improving control systems and enhance decision making for now and future planning for wetland and food security in Uganda.

There literature provides a basis for managing wetlands for livelihoods in general and historical management systems and policies that have led to the current situation in managing wetlands

resources. The literature does not give focus on control systems of managing and planning for wetland resources for deliberate contribution to food security in peri-urban environments as well as the country at large. There is a glaring shortage of analytical information that informs wetland management processes and guidance to controlled use of wetlands for food security. This lack of data has created the current mismatch of policy goals and lack of synergy to improve and harmonise the management of the wetlands ecosystems and planning development to achieve food security and better management of wetlands ecosystem as mutually beneficial outcomes.

The study investigated the control systems and planning processes to generate data and tools that will used to build relevant control systems and develop synergy between ministry of Agriculture Animal Industry and Fisheries (MAAIF) and Ministry of Water and Environment (MWE) in planning to ensure the co-existence of wetlands ecosystems and improved food productivity and security in Uganda.

While a number of studies have been conducted on the urban agriculture and food security issues, the land tenure, access and rights over the wetlands resources and causes of degradation mentioned and articulated, there is still a gap in the knowledge base that relates food security to managing the wetlands ecosystems. There is need to examine the management planning and control systems that would translate into sustainable wetlands management with a reasonable output to food security to the peri-urban community in Uganda. Understanding the management phenomena could provide solutions to Ugandans to meet their household food and nutrition needs. This could also be a basis for management bylaws on food security to take into consideration food security challenges unique to certain ecological areas or local communities and explicitly spell out strategies to overcome such challenges.

The literate expresses the views that the contribution of managing wetlands resources is a critical motivation in maintaining wetlands ecosystems services. There is evidence in literature that the failure of control systems and planning processes have a bearing on the productive capacity of the wetlands systems.

In summary, the control systems are very well articulated in the wetlands management policy and food security guidelines but the practice in following the control systems is dysfunctional as reflected in the current degradation of wetlands and mismanagement of food productive capacity to ensure food security. The current planning processes for wetlands management are provided for in the Ramsar guidelines while the food security planning is well articulated in the Ministry of Agriculture objectives. However there is a disconnection between the main planning goals for food security that seems to affect the health of the wetland ecosystem. This is exacerbated by the access and use rights of the community, consequently affecting the food security in households. There was thus need to understudy the contribution of managing wetlands resources to food security as a means of informing both the food security policy and the wetlands management goals with the aim of harmonising them and influencing future policies on both concepts of managing food security at household level as well as managing the wetlands ecosystems on which food productivity depends. This study therefore describes the contribution of planning for wetlands resources for food security and catalyst for equitable development both at community and national levels.

The literature recognises the relevance of systematic management of wetlands resources as a precursor to attainment of food security. While the economic, ecological and social benefits of managing wetlands are mentioned, the issues of control for wetlands resources remain lukewarm in the studies so far reviewed yet the contribution of wetlands resources to food security can only

be realised if controlled use of wetland resources becomes a solvable problem amongst resource users and harmonised interests are agreed on. The literature does not critically focus on the integrated planning for wetlands resources that would promote coordinated actions on both fronts of agricultural and environmental planning, with a focus on wetlands resources.

The control systems looked at in the literature emphasise direct benefits and the efforts to get as much as possible eliminate the basic control systems that are prescribed in the ecosystems approaches and make the study relevant.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter gives brief background information about Nangabo Sub County and it presents the research design, study area, study population, sample size, sampling techniques and procedure, data collection methods and instruments. It also examines the validity and reliability of instruments, research procedure, data management procedure and analysis techniques that were used in data analysis.

3. 2 Research Design

This was a case study design where the respondents represent a section of the resource users and the views generated from the respondents were used to generalise the issues for a wider ecosystem and population base. According to Odiya (2009:149) case study is chosen for detailed study to explore and understand its uniqueness or exceptionality. According to Bantin (2008) case studies are used to illustrate problems or indicate good practice. This design was therefore found suitable as the researcher examined both good management practices and as well as the problems associated with managing wetlands for food security. This study involved use of a survey tool to generate primary data. Zikumund, (1999) states that, the most common method of generating primary data is through a survey. He defined a survey as a research technique in which information is gathered from a sample of people through a questionnaire. Thus, because of the need to generate primary data, coupled with limited resources, in terms of time and finances, survey research method was adopted. The data considered in this study was those which were collected in the month of December 2012 and part of January 2013. This targeted a cross section of households that depend

on wetlands for livelihood and those who have income generating activities as well. The descriptive survey method was used to gather quantitative data and the interview, observation and document review methods were used to collect qualitative data. A descriptive approach was preferred because of its strength in identifying, capturing issues and allowing more detailed and richer depictions of the aspects of the study.

The study was used to draw attention to specific lessons that can be extrapolated and applied to other cases from a representative sample as required in qualitative and quantitative analysis as described in Barifaijo, Basheka and Ounyu (2010). A descriptive study was opted for because it involved collecting data from a large number of respondents representing bigger populations over a short period of time. The researcher simply reported the findings without manipulating the variables. The study was non-experimental.

3.3. Study population.

The study targeted 350 respondents who were selected from Nangabo Sub County. A total of 320 respondents were engaged in livelihood support activities that require interactions with the wetland ecosystems resources indirectly or directly and were able to relate the contribution of wetlands to food security issues. The other 30 were central and local government officials who are meant to oversee the planning and control systems in managing wetlands resources and food security.

3.4. Sample size selection strategies and techniques.

In line with Amin, (2005) the table by Krejeie and Morgan (1970) was used in the selection of the sample for the study. Some categories were selected using simple random sampling while others were purposively selected as shown in Tables (3.1 and 3.2). Three levels of population frames

were considered. The first was the list of parishes in Nangabo Sub County which totalled to 9. Four parishes were purposively selected on the basis of wetlands availability and levels of food insecurity. The second level was a listing village which was a total of 50 villages in the sub county. In order to reduce the biases, two villages were randomly selected from each parish. Four villages were of households dependent on wetlands for agriculture, while the other four villages were from two parishes who manipulated wetlands resources through other consumptive practices. The two parishes included Nangabo and Kattadde parishes, where wetlands use is mostly for agriculture, while Kabubbu and Wampewo Parishes were selected as parishes whose dependency on wetlands was brick making, harvesting of products, sand mining and others. In each parish, two villages were randomly selected for study. Forty respondents in each of the villages were sampled to represent the population. The third level of the sample was that of central government officials and Local level operational managers in the field of managing food security and wetlands ecosystems, respectively.

3.4.1 Determination of Parishes.

A total of four parishes were selected from a total of nine parishes through a random selection process using picked numbers after shuffling the numbers every time a piece of paper representing a parish is picked(1,2,3,4,5,6,7,8,9).The four picked papers were read out and marked off as a starting point for sampling villages. The selected parishes were as follows:

Table 1.List of parishes;

Nos.	1	2	3	4	5	6	7	8	9
Parish name	Nangabo	Katadde	Kiteezi	Wattubba	Kyetume	Wampewo	Masooli	Bulamu	Kabubbu
Selected	✦					✦			✦

Adapted from Administrative records of Nangabo sub-county, (2011)

Selection of villages was based on the clustering of two parishes. Two villages per parish were randomly selected. Therefore, eight (8) villages were zeroed on for the study. The villages included: Nangabo and Kitagobwa in Nangabo Parish, Kattadde and Mawule villages in Kattadde Parish for the wetlands resources dependent communities. The second set of villages included Kabubbu A and Kabubbu B randomly selected, while in Wampewo Parish the two villages were Wampewo and Luteete.

Table 2: Determination of Sample size in the study

Category of respondents	**Population category**	**Sample size**	**Sampling Technique.**
Policy makers and planners at central government level (strategic level managers)	20	15	Purposeful sampling
Operational staff at the central and local government level (lower level managers).	30	15	Purposive sampling
Nangabo parish resource users close to wetlands	240	80	Random sampling
Katadde Parish resource users ;Two villages	240	80	Radom sampling
Not Cultivators' as Offsite resource users Wampewo; Two villages	240	80	Random sampling
Non Cultivators in Kabubbu Parish; Two villages	240	80	Random sampling
Total	1010	350	

Source: Primary data (based on Mugenda Mugenda (2003)

The household lists were obtained from Nangabo Sub County Electoral Commission Records for 2010 and NAADS Report for 2011. The criteria of selection were the levels of use for crops and different levels of food security in the sub county, proximity to wetlands system as well proximity to urban centres and markets. The household categorised as wetland user communities from Nangabo Sub-county in Wakiso District were selected based on the proximity to the Nangabo

wetland system. Nangabo has a reasonable population depending on wetlands for food production in two parishes of Nangabo and Katadde, while the ones whose population is not so much dependant on food production but depend on supporting functions of wetlands for livelihood support were the parishes of Wampewo and Kabubbu. Qualitative and quantitative methods were used to get closer to the "whole "picture of the case in a way a single method cannot achieve (Brewerton, 2001). Generalisation of findings was done using random method. Convenience and purposive non probability methods were used for collecting qualitative data that included opinions and perspectives of different people on the subject. Such methods are expected to achieve sufficient responses thus making the study viable, fast and less costly (Sekaran2003: Amin, 2005).

3.5. Data collection methods

A number of methods and instruments were used to enable the researcher collect both qualitative and quantitative data as follows;

3.5.1. Questionnaire Survey

Under this method, both open and closed ended questionnaires were used. The close ended questions were used to ensure simplicity in areas where the anticipated answers were straight forward, while open ended questions were used to permit further in-depth responses on specialised issues. The other questions were in the five-Likert scale form to seek opinion and attitude on critical issues. This was supplemented with face to face interviews. These were conducted with the semi illiterate respondents by research assistants, to follow up on questions that needed further information from the groups, so as to enrich the understanding of the phenomenon being studied (Mugenda and Mugenda 2003; Amin 2005). All the questionnaires were hand delivered and picked after a call from the respondents who had one collecting centre in each village. Key informants

interviews by the researcher as well as focus groups discussions were used to verify some of the data collected.

Primary data was collected using the structured questionnaire that was sent to selected respondents inquiring into the planning and the control mechanisms and processes for managing wetlands for food security. This focused on policy makers and planners at central government level in the Ministry of Agriculture Animal Industry and Fisheries, National Planning Authority, Wetlands Management Department, as well as Ministry of Local Government. Appointments were made and in some cases the responses were received on the appointment date while in some cases the researcher had to collect responses later in cases where respondents were found busy and needed more time to provide responses.

3.5.2 Interview

Interviewing was done using an interview guide to enable the researcher probe further for in-depth information that the questionnaire may not have been able to obtain. Interviews also enabled the researcher to establish rapport with the strategic interviewees such as Directors at NPA and Wetlands Management Department as well as Ministry of Agriculture. The interview guide was used to obtain additional data that the questionnaire did not capture because the researcher was able to probe further and get clarification from respondents (Amin, 2005)

3.5.3 Document review

Secondary data sources like text books, dissertations and journals and sub county records were used to obtain valuable data on food security, planning and control systems.

3.5.4 Observations

Opportunist observations were made and photos taken to support evidence of the observed phenomena and add value and explanations to some of the responses from the respondents.

3.6. Data collection instruments

3.6.1. Questionnaire

A questionnaire was administered to 350 respondents selected from the four parishes and eight villages. For the respondents that knew English, the questionnaire was left and collected after two days while for those who did not understand English, the research assistants together with the researcher administered the questionnaires by interpreting the questions in the local language most understood by the respondent.

3.6.2 The interview guide (Semi structured interview for policy makers)

A semi structured interview guide was used to collected qualitative data from a segment of respondents. The semi structured interview was chosen because it was found appropriate for the category of respondents. It allowed some level of generalisation and could allow expression of different interests, rich insights into the relevant and important points of view of the respondent as proposed in (Malborn, 1999). Further still, it allowed flexibility in responses as alluded to in Beardsworth and Keil (1992). The method also allows variability in responses and opinions giving the researcher a wide scope and useful views to analyse and conclude on the aspects under study. The interview guide was used in tandem with other methods of collecting data from other categories of respondents, a good way of ensuring comparable views from respondents. The number of questions was formulated for the second category of respondents that addressed the

strategic planning level issues. A checklist of questions was used to ensure that the interviews were flowing and capturing the needed responses.

3.6.3 Observations checklist

The researcher together with the assistants deliberately observed some occurrences and recorded them using a camera in order to support the validation of some of the responses provided by the respondents. Observation and recording was mostly on the control mechanisms the farmers use in controlling and managing water in the wetland as well as markets that contribute to income. This method was used to ground truth some of the responses provided in the interviews and questionnaires.

3.7. Data Collection Procedure:

After the proposal defence and acceptance, a letter of introduction was obtained from UMI and permission to for the researcher to carry out the research at Nangabo Sub County was sought. Pre-testing the Questionnaire was done on a Pilot basis in Lubigi Wetland Community on a sample of 5-10% in order to provide useful information on any amendments that were required. The primary data was collected by using self-administered questionnaires, interview guide with a checklist of questions for interviewees as well as direct observations and recording using a camera.

3.8 Pretesting (Validity and reliability)

With the help of the staff from the wetlands management department and students doing internship, a pre-interview of the respondents was done in Lubigi wetland system and the farmers in Bulenga village provided a feedback on the questionnaire tool. A draft questionnaire was found suitable and a few questions which were irrelevant were eliminated, after which the questionnaire guide finalised.

3.8.1 Validity.

The emphasis was put on the content Validity. Guidance was sought from expert judgement of proposal reviewers, supervisors and other researchers. The expert judgement was at face value, looking at whether the questions appeared to be measuring the dimensions of variables. This was largely a "common sense" assessment but also relied on the knowledge of the way people respond to survey questionnaires and pitfalls in questionnaire design.

The content Validity test was done to ascertain if all important aspects of the research construct were covered. Four reviewers were used to give judgement of scores ranging from 5 for most relevant to 1 which meant irrelevant. The results of the scores were as presented below;

Table 3: Validity results

	Reviewers				Average score
Questions	P1	P2	P3	P4	
Q1	4	3	4	5	4.0
Q2	5	5	4	5	4.75
Q3	3	4	4	2	3.25
Q4	5	5	5	4	4.75
Q5	4	4	4	4	4.5
Q6	4	3	4	5	4.0
Q7	5	5	4	4	4.75
Q8	3	4	4	3	3.5
Q9	5	5	4	3	4.25
Q10	4	4	5	5	4.75
Total					42.5

Based on the questions reviewed per section, individual reviewers for the 10 questions were recorded in the table above. Out of the 50 scores expected, the CV was calculated as follows;

42.5 x100/50= 85% .This meant that the 85% of the questionnaire items were relevant. Based on this the researcher proceeded to use the questionnaire with minor editorial changes.

The validity of the questionnaire and interview guide was ascertained using the content validity index (CVI) method. This was done by seeking views on instruments in a community similar to the study area to test the responses expected in the questionnaire and interview guide (outside the study area).The views generated were used to determine the content validity index. The index was found to be 0.79 which was well above 0.7 proposed in (Mugenda and Mugenda 2003); the questions were fine-tuned and administered to the target sample population of 350 people. Reliability test was done by pre-testing the questionnaire on a few respondents representing 2% of the intended respondents (Kothani, 2004), randomly selected. Similar results from the pre-test were used to justify the reliability of the instruments.

3.8.2. Reliability.

To test reliability of instruments, internal consistency was used to estimate, the reliability by grouping the questions that measure the same concept in the questionnaire.

The reliability was tested using Chronarh Coefficient Alpha (a). Using 10 entries, the Cronbarch alpha was found to be 0.76. The reliability of 0.76 which was closer to 1 implied that the level of reliability of the instrument was acceptable. This was adapted from George and Mallery (2003) rule of the thumb.

3.9. Data Analysis

Data Analysis was done using both the quantitative and qualitative analysis tools since both quantitative and qualitative (descriptive) data was collected from the field as well as responses from the respondents. The responses to the questionnaires instrument were coded, cleaned, validated, labelled and thereafter entered into an SPSS programme for analysis.

3.9.1 Quantitative data analysis

The data has been presented using frequency tables, bar charts and graphs. The data was analysed using Pearson's Coefficient (r) for each of the independent variables at the 0.05 level of significance (that is planning and controlling managing wetlands with for food security parameters), to establish any significant correlations.

3.8.2 Qualitative data analysis

The data was generated, classified, coded and entered into the SPSS package that was used to generate information to draw conclusions about the phenomena in the study.

3.10. Measurement of Variables

The study focused on the extent to which the level of control and control systems as well as planning process correlated to managing wetlands resources and trends of food security in the most recent to the past 10 years. The data collection elicited opinions and impressions of community on food security of households, dependence on wetlands ecosystem for food production and the food security trends over years in the wetland user community. There was a positive correlation to the substantiality of livelihoods dependant on wetland ecosystems. Thus opinionated, factual, categorical and numerical data was collected in this study. The variables were also measured using the Likert scale of 5 – 1 (strongly agree to strongly disagree).

CHAPTER FOUR:

PRESENTATION, ANALYSIS AND INTERPRETATION OF FINDINGS

4.1 Introduction

The following Chapter presents the results as analyzed from the field using administered questionnaires, semi-structured interviews and direct observations for both qualitative and quantitative data, as well as face to face discussions among the respondents in the selected villages of Nangabo, Katadde, Wampewo and Kabubbu Parishes in Nangabo Sub County. The chapter presents the characteristics of the respondents, looking at age, level of education, occupation, and the period of stay in the locality. The chapter then analyses the responses on issues of managing wetlands resources and attainment of food security in the four sampled parishes, with the focus on contribution of control systems in utilizing wetlands for food security as well as the contribution of planning processes in conservation of wetlands for food security. Frequency tables, Graphs, charts, regression analysis and coefficient tests are used in showing the strengths of the relationships in the study.

4.2. Response rate

The response rate shows participants that were involved in the study. According to Mugabi (2003) response rate presents the validity of the study. Studies that have high response rate provide a measure of reassurance that the findings that are obtained can be projected to the population from which it was sampled. The total number of respondents reached in this study was 330 out of the 350 respondents, giving a 94.6% response rate. This was because the research was done parish by parish and at the management level all the respondents were cooperative. However in general, the

male respondents were more than the female respondents; 61% and 39% respectively. Alternative responses were sought in the villages in cases where the sampled household was uncooperative.

4.3. Characteristics of Respondents in the study area

4.3.1 Age structure

The respondents' distribution according to age structure is shown in the figure below;

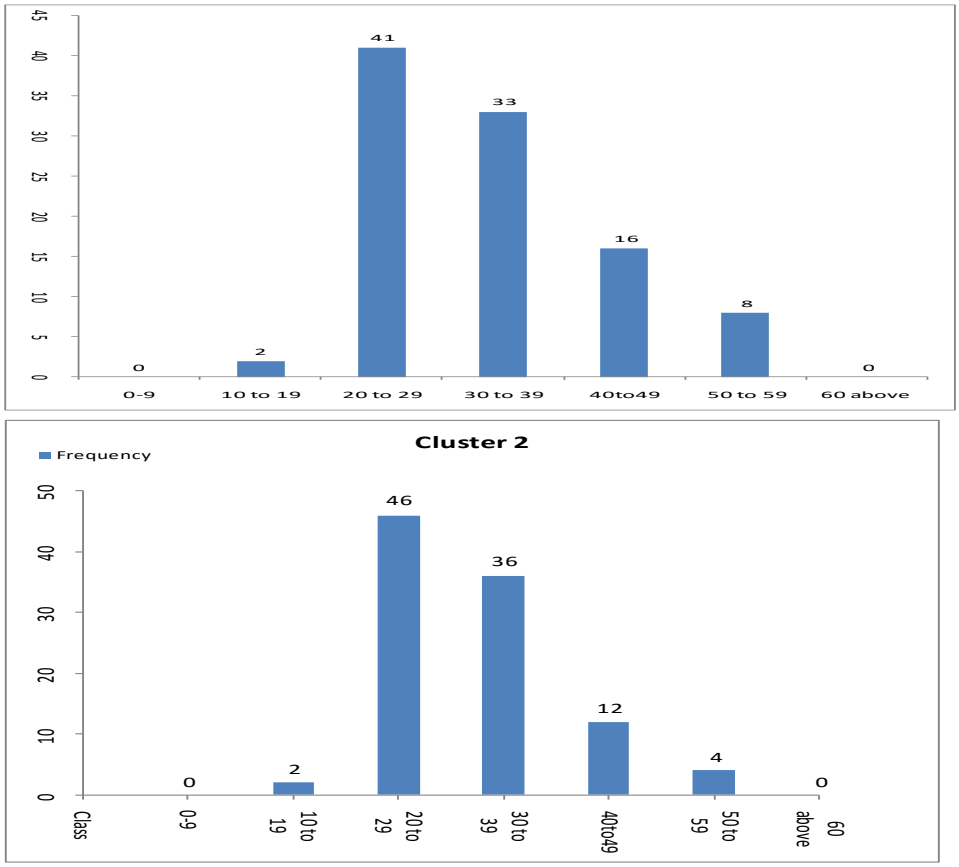


Figure 4.1.1 Age groups of respondents showing frequency

The study showed the majority of the respondents were in the 20-29 age bracket, followed by those in the bracket of 30 to 39 and 40-49. There were no respondents of above 60 years of age. (fig.4.1).This is trend was attributed to the fact that the sampling was based on users of wetlands resources, so the very old and the very young were not directly engaged in wetland use activities, although the food security scenario could affect them. This is typical age structure for Uganda

where the youth make the bigger proportion of the population. The range of 20 -59 are the most active in the utilization of the wetlands resources. This represents the age group that is productive in Uganda.

4.3.2. Education level

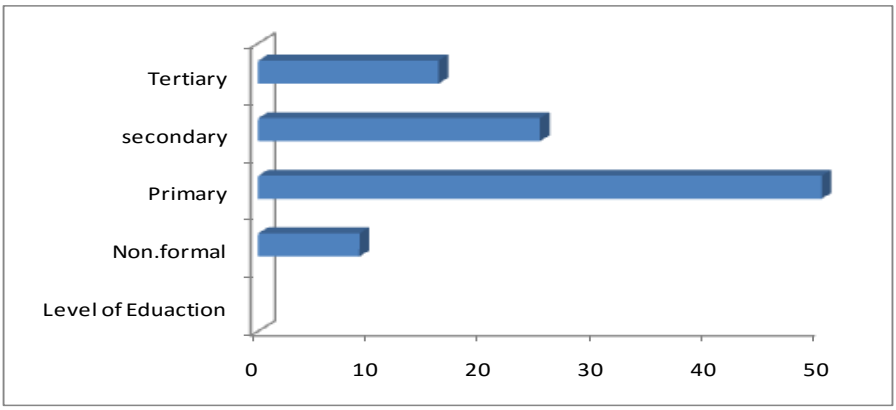


Fig.4.1.2.Education level of respondents in the Nangabo Sub county study area

The respondents were of mixed education backgrounds. Fifty percent (50%) of respondents had attained Primary level education, 25% secondary education and 16% had tertiary education while only 9% of the wetlands resources users had no formal education. Nangabo Sub County is near the city centre, most of the wetland dependant/users have attained education and therefore are informed. This gives the group of users added advantage in understanding the value of the wetland resources. This is in line with findings in Muchapodwa, (2003) who concluded that "prevalence of food insecurity is lower among households with older and better educated household heads because ability to access assets needed to secure livelihoods increase with seniority. He also noted that education makes it easier for households to comprehend negative externalities and be able to generate cash for buying food. This implies that planning and control functions of managing wetlands resources could be delegated to the old and educated stakeholders in the community to

ensure that food productivity is balanced with conservation as was the culture in early civilization where the old were custodians of plans and regulated use of resources for the society.

The findings indicated variations in occupation among the respondents. The majority, 74% of the respondents were farmers, 20% engaged in formal employment (teaching and administration at local government) while about 5% were self-employed (Fig.4.1.3). The self - employed include artisans engaged in brick making, sand mining and small businesses related to selling products like grass, vegetables, maize and other crops in the city for a profit. About 45% of the formal employed respondents also engaged in vegetable growing in the wetlands to supplements their meagre incomes**.**

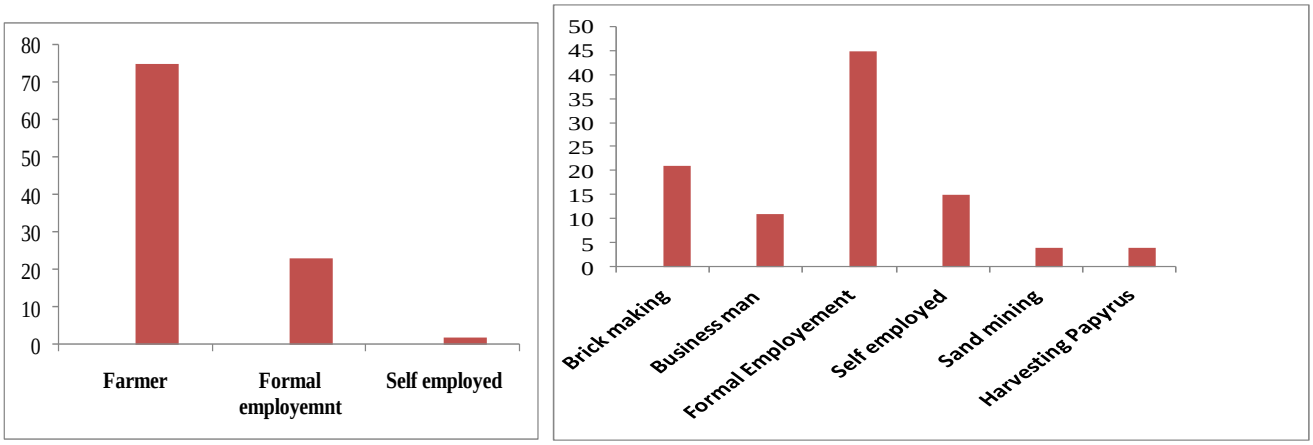


Figure 4.1.3 showing respondents Occupation

(Primary data from the questionnaires)

The 10% of the businessmen are middle men taking the goods from Nangabo to the city as well as retail traders based on wetlands products like crafts (mats and pottery) and good from farmers like vegetables, maize, sweet potatoes that find their way to markets in Kampala suburbs. Prominent among these were teachers in both primary and secondary schools whose income from the

wetlands is much bigger compared to the salaries they get from the privately owned schools, as admitted by one Ms. Namyalo in Nangabo village who relies heavily on growing vegetables together with her husband Ssemanda to make ends meet.

4.4. Wetland resources for food security and household livelihood support.

The respondents were asked what they considered to be the cause of food insecurity in Nangabo Sub County. In terms of ranking of the causes of food insecurity (**table 4)**

Table 4: Showing the known causes of food insecurity in Nangabo Sub County.

Nangabo Sub county Wakiso District	***Responses per village***				
Causes of food insecurity	Nangabo	Kattadde	Wampew	Kabbubbu	Total responses and ranking
None	0	1	2	0	3(14)
Low harvest	42	61	23	19	145(2)
Prolonged droughts	41	22	12	30	105(3)
Crop diseased/ infections	12	23	41	20	96(4)
Migrations	51	56	75	24	206(1)
Laziness	32	11	11	2	56(8)
Lack of perennial crops	0	0	4	0	04(13)
Buying food	16	5	20	15	56(8)
Nothing in store	12	14	10	11	47(10)
Theft	7	10	9	1	27(12)
No land for digging	5	9	12	15	41(11)
Infertile soils	25	30	10	16	81(5)
Having little food in the home	30	20	10	12	72(6)
Prolonged rainy seasons	23	13	14	11	61(7)
Total responses	296	262	254	176(ranks)	

(Source: Questionnaire responses December 2012.)

Study indicated that 'migrations' is ranked 1st, 'Low harvests' as ranked 2nd, 'prolonged droughts' ranked 3rd 'crop diseases' and 'infertile soils' ranked as 4th and 5th, respectively. On the other hand, having little food and prolonged rain seasons are also mentioned as causes of food insecurity, ranked sixth and seventh respectively (Fi.4.1.2). Surprisingly, there is no mention of wetlands degradation as a direct cause of food insecurity in Nangabo Sub County. The prolonged rains are mentioned, but there is no relation made between the prolonged rains damage and the ability of wetlands to control flooding which makes crop growing difficult. This implies that the community does not link food security to the wetlands resources. There is no direct understanding of the two relational correlations at first glance.

4.5 Management planning for wetlands resources for food availability.

In order to establish the extent to which planning for wetlands resources has contributed to food security, a Likert score was used to assess the respondents attitudes on the extent to which they agree with the statement.

4.5 .1 Attitude of the respondents on contribution of planning for wetlands resources to food security-09821

Table 5: Views on the contribution of planning for wetlands to food security

Whether planning for wetlands resources contributes to food security	Strongly agree (5)	Agree (4)	Not sure/don't know(3)	Disagree (2)	Strongly disagree (1)	Score ranking
Nangabo	28 (140)	3(12)	1(3)	2(4)	1(1)	160
Katadde	29(145)	1(4)	4(12)	4(8)	2(1)	170
Kabubbu	14(70)	5(20)	16(48)	4(8)	1(1)	147
Wampewo	10(50)	12(48)	24(72)	2(4)	1(1)	175
Sum of Responses ranks	405	84	135	24	4	654

Source: Primary data from field survey December 2012**.**

The majority in all the parishes strongly agreed that planning for wetlands resources contributes to food security with a score of 405 out of 654 scores, representing 62% of the respondents strongly in agreement and 84 scores representing 13% who agree, giving a total of 75% of the respondents in agreement that planning for wetlands resources contributes to food security. A score of only 84 (20%) of responses are those who don't know or not sure while only 3% of the respondents do not agree that planning for wetlands resources contributes to food security and 2% did not respond. Follow up with individual interviews for those who did not agree revealed that 3% of the respondents buy food from the markets and so wetlands have nothing to do with their food security.

Further inquiry revealed that the 87% and 85% respectively were dependant on wetlands to support their livelihood but for the last three years have had less access to the wetlands products as a result of property ownership changes, which has resulted in high costs of renting use of the wetland for agriculture or sand mining. Twelve percent (12%) and 11% respectively indicated that the products had increased; 1% and 4% were not sure. They alluded to the fact that there are few

people allowed to enter Nangabo wetland so the few of them who can afford the rent can harvest as much as they can to make profits out of the products.

4.5. 2. Planning for wetlands resources and availability of food in Nangabo sub-county

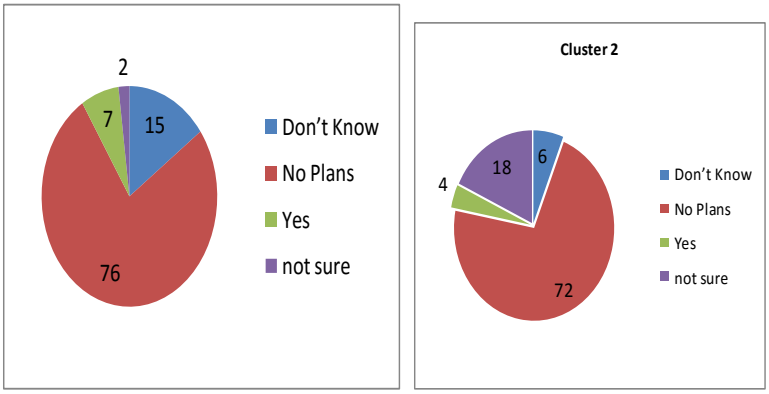


Fig.4.4.1 Existence of plans for managing wetlands for food production

The majority 76% and 72% respectively, indicated absence of plans while the minority said yes to existence of plans and on further inquiry on the types of plans known, they mentioned the guidelines for growing vegetables in the wetlands that had been developed by the Wetlands management department. While 2% of respondents were not sure in cluster one, there was up to 18% of respondents who showed ignorance of any plans for managing wetlands for food security, while 15% in cluster 1 only 6% indicated they did not know of any plans.

The management of the activities was further scrutinised to understand if there is deliberate planning to sustain the activities mentioned above. Further inquiry into the issues of food security revealed different opinions on the level of food availability and level of planning. In each of the villages, more than 50% of the respondents in all parishes agreed that food is available when proper planning for wetlands resources is done well. In the villages where agriculture is not rampart; the respondents did not care if food was available. The minority either did not know, were not sure or did not care

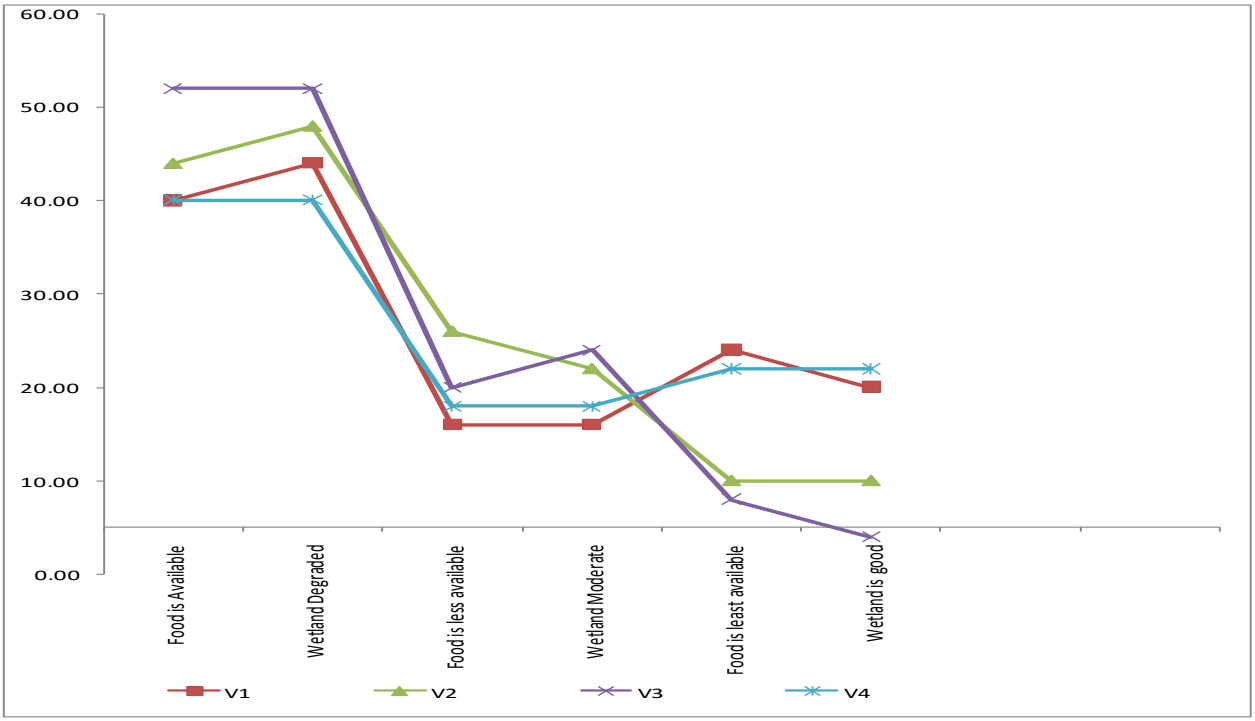


Figure 4.4.2: Relationship between food availability and wetlands health (Field data from Questionnaire survey)

KEY: VI is Nangabo Village, V2 is Katadde Village, V3 is Wampewo Village and V4 is Kabubbu Village. (Reference to table 4.2.4) Appendix 4 (Page 104)

The study findings indicated that the healthier wetlands were associated with less food (good have less quantity of food) while the degraded wetlands have more food available (fig.4.5.).The more the papyrus and wetland vegetation, the less food is planted in them.

A number of factors need to be better understood if planning is carefully done and the level of equity in food access is to be better achieved. This makes the sharing of resources more equitable and the control measurers became even more streamlined.

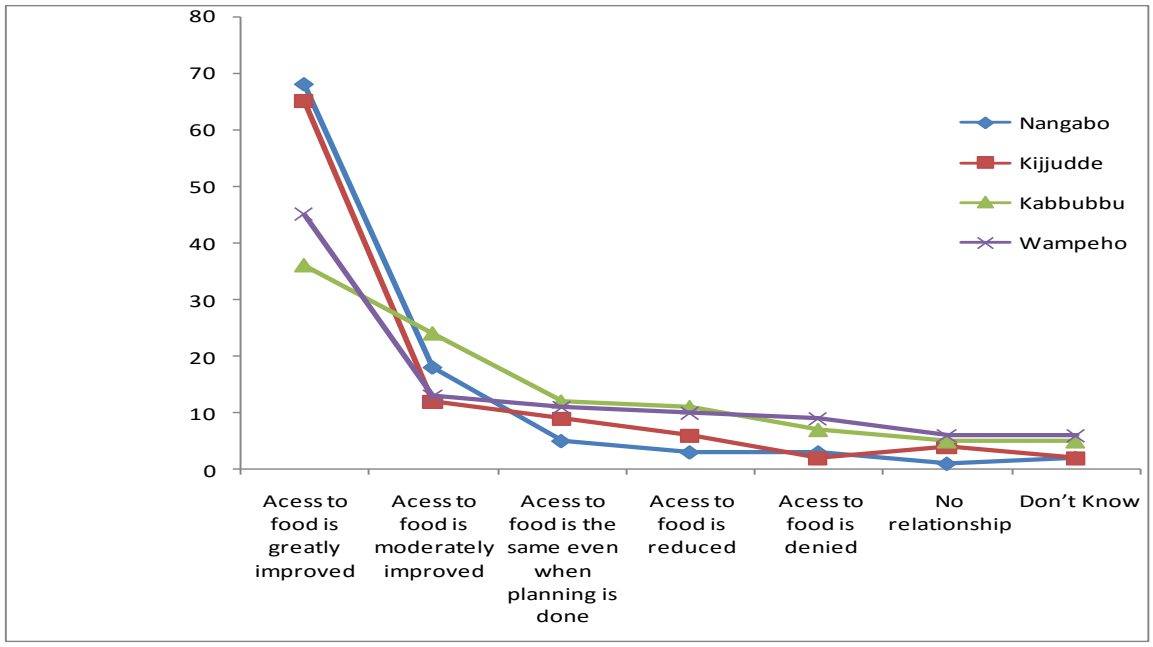


Figure 4.4.3.Food access and wetlands planning

With better planning in managing wetlands resources, access to food from wetlands is greatly improved and food security improved as whole in Nangabo Sub County.With better planning in managing wetlands resources, access to food from wetlands is greatly improved and food security improved as whole in Nangabo Sub County.

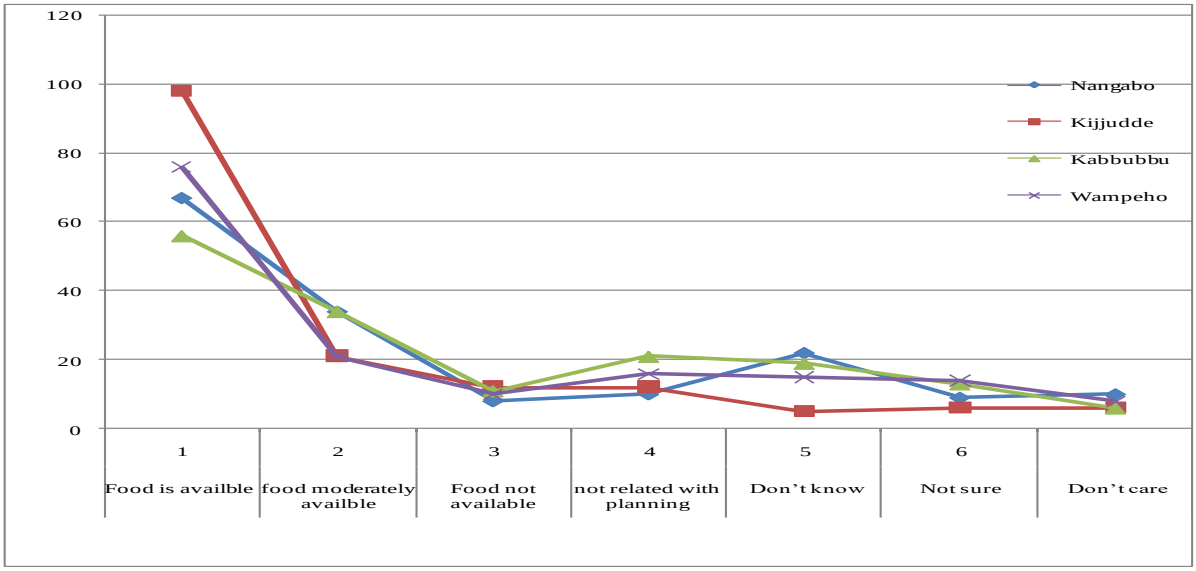


Figure 4.4.4.Food security and planning for wetland resources

In all the villages ,the general trend is that wetlands resources planning results in more food availability, Kabbubbu 55%,Wampewo,76%,Nangabo 68% while Kijjudde ,99%This is an indication on the level of dependency on wetlands by the different villages. Looking at the trends and villages, there was more dependence on wetlands among the villages in Kijjudde, Wampewo and Nangabo, respectively. The general trend therefore is that the more the planning for wetlands resources, the better the availability of food. A similar trend was shown in the relationship between planning and food quality as well as wetlands management planning, food quantities and food access (Fig.4.6.2, 4.6.3 and 4.6.4).

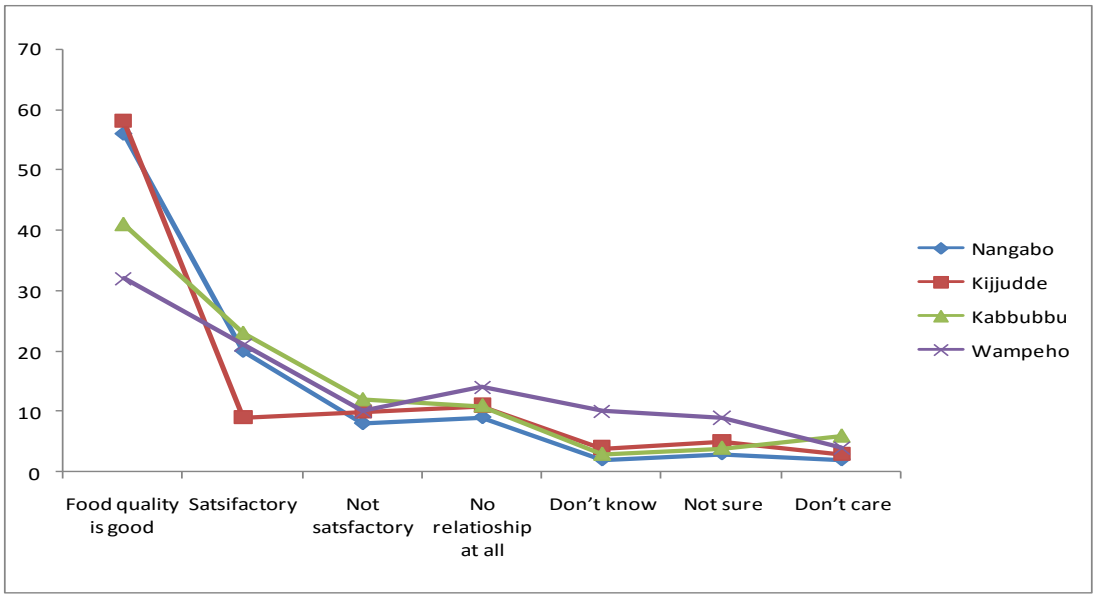


Figure 4.4.5 Relationship of wetland planning and food quality

While lack of planning was alluded to as a reason contributing to food quality, a number of respondents also indicated that lack of proper planning has led to wetland degradation.

Table 6: Whether problems being experienced or observed are due to wetland degradation

Response	Nangabo		Katadde		Wampewo		Kabubu Total	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
1.Strongly agree	50	62	44	55	56	70	42	52
2.Disagree	20	25	22	27.5	18	17.5	12	15
3. Don't know / not sure	6	7.5	8	4	6	7.5	16	20
4.No answer	4	5	6	3	4	2.5	10	12.5
Total	80	100	80	100.0	80	100.0	80	100.0

Source of primary data from field survey December 2012

On average, 60% of the respondents strongly agree that food shortage and problems faced are due to the level of wetland degradation. The finding shows 62% of the respondents in Nangabo, 55% of respondents in Katadde, 70% of respondents in Wampewo and 52% of respondents in Kabubbu

villages strongly agree, 21% of the respondents don't agree while the remaining 19% do not know or did not answer. The situation is attributed to lack of planning and control of wetlands resources use in Nangabo Sub- County. The paradox is that this awareness does not translate into concrete efforts to reverse the trend among the community members .There is no evidence that the community are trying out practices to better manage the degradation of wetlands and make the difference in planning.

4.5.3 Agility of planning and food security in Nangabo sub county.

Interactive discussions with strategic level respondents were agreeable to the need for the integrated planning for food security and the management of wetlands resources. There was a general agreement that strategic and operational level planning does not merge into a unified system of operations and controls as afar as managing wetlands resources for food security was concerned. The self-interests in the benefits override the systematic and unified planning framework for the wetlands users and food producers.

The discussion revealed that the National Development Plan focuses on infrastructure development and considers agricultural productivity as an infrastructural element while environmental resources including wetlands ecosystems are supporting factors rather than stimulus to development. While food security is focus in the development plan, the planning systems to ensure quality and quantity of food through access to wetlands resources do not match with the resources allocated to provide for better planning of environmental resources.

Ranking of Wetlands resources for food security

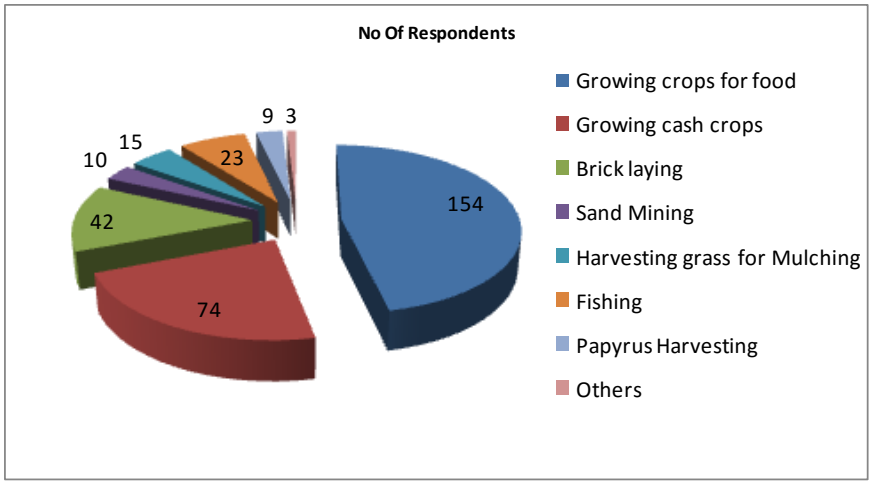


Figure 4.4.6: Ranking the use of wetlands resources by the respondents
(Source: **Primary Data from the administered Questionnaire December 2012.)**
Source: Field data (2012)

Growing crops for food and cash was named the most important activity by the respondents in Nangabo Sub County; (154 and 74 respondents respectively), accounting for 69% of the respondents. Brick-laying and fishing, harvesting grass were also named among the important activities for the respondents respectively. Harvesting papyrus was the least among the activities while brick laying and sand mining were noted to be increasingly becoming lucrative businesses due to growth of the construction sector in the sub county as the business extends in the outskirts of Kampala. This implied that the wetlands resources contributed to direct food production and to some extent, availability of cash revenue from other activities to access food.

Results indicate that about 92% and 95% of the households derive their income and food from the Nangabo wetland resources respectively. Main products of socio-economic values from the wetlands as ranked by the respondents indicate that 71% ranked farming in wetlands as number One. The crops, especially vegetables, maize, beans, yams and sugarcane were the major crops sold for generating income.

4.5.4. Planning and its effects on the management of wetlands and food security

The responses indicated a general agreement on the positive effects of planning and coordinated control of resources on the increase of food security. More than 50% of respondents in all the parishes were of the view that wetlands contribute to food security. Less than 10% of respondents were not sure and less than 40% of the respondents were of the view that there was no impact on the food security. The majority of respondents in all the villages were affirmative on the impact and on further inquiry the reasons for the affirmative responses as well as mixed reactions were as follows;

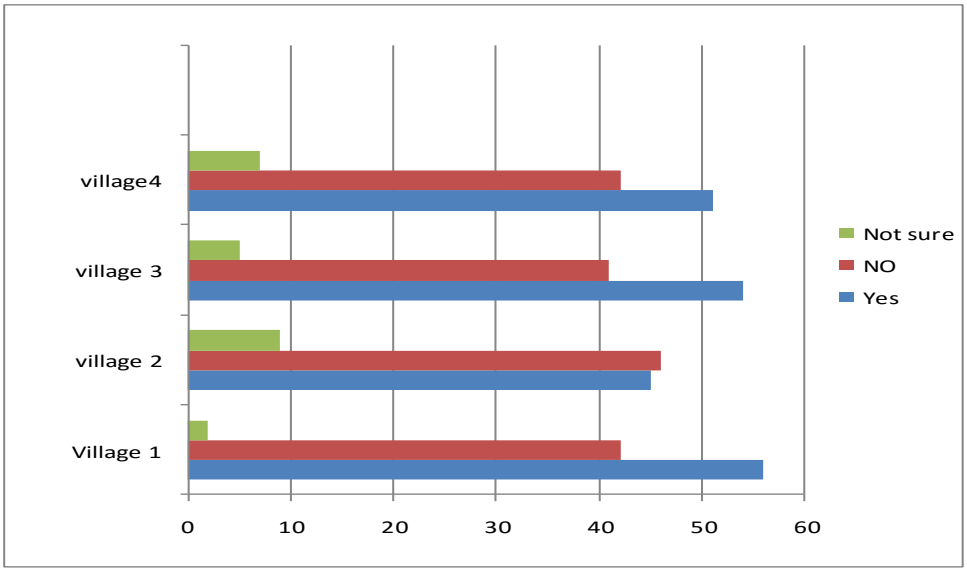
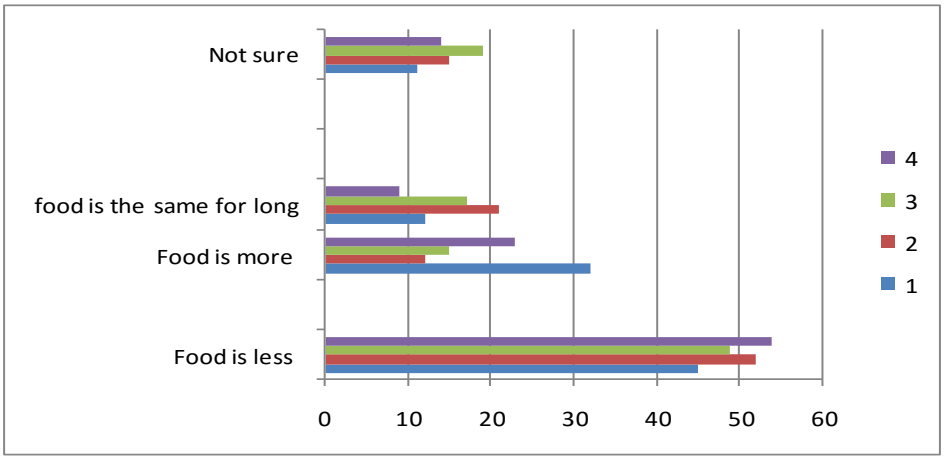


Figure 4.4.7: Impacts of planning for wetlands resources
Source: Primary data

The other issue in this study was the attitude of respondents if they think that lack of planning has had on food situation in the sub county



Source: Field data (2012)

Figure 4.4.8 Planning and wetlands resources contribution to food security changes

Further inquiry revealed that; there is less available food because most of the wetlands have been degraded and there is no deliberate planning for wetland. Each family cares for the food they produce and there is no due to lack of guided planning. Therefore there is fear that the situation will be worse if nothing happens to the current planning and control systems. One Ssemwanga in Maule Village alluded to the fear that the investors are increasingly coming up to take over land and there is fear that even the current land will be taken away and consequently there would be less food productivity. This will impact negatively on food availability and will translate into vulnerability of the population.

In the study, the results indicate that there is a positive relationship between planning for wetlands resources, food availability, improved access to food and the quality of food. The planning aspect therefore contributes significantly to the food security system of the population dependant on wetlands in Nangabo Sub County. However, lack of planning has led to degradation and reduction in livelihood opportunities more especially the availability of food and other resources that can be sold to help the community earn income to be able to purchase food. There is a weak connection

between strategic planning and operational planning that supports management of wetlands resources for food security in Nangabo sub-county.

4.6 Controlling systems for wetlands management for food security

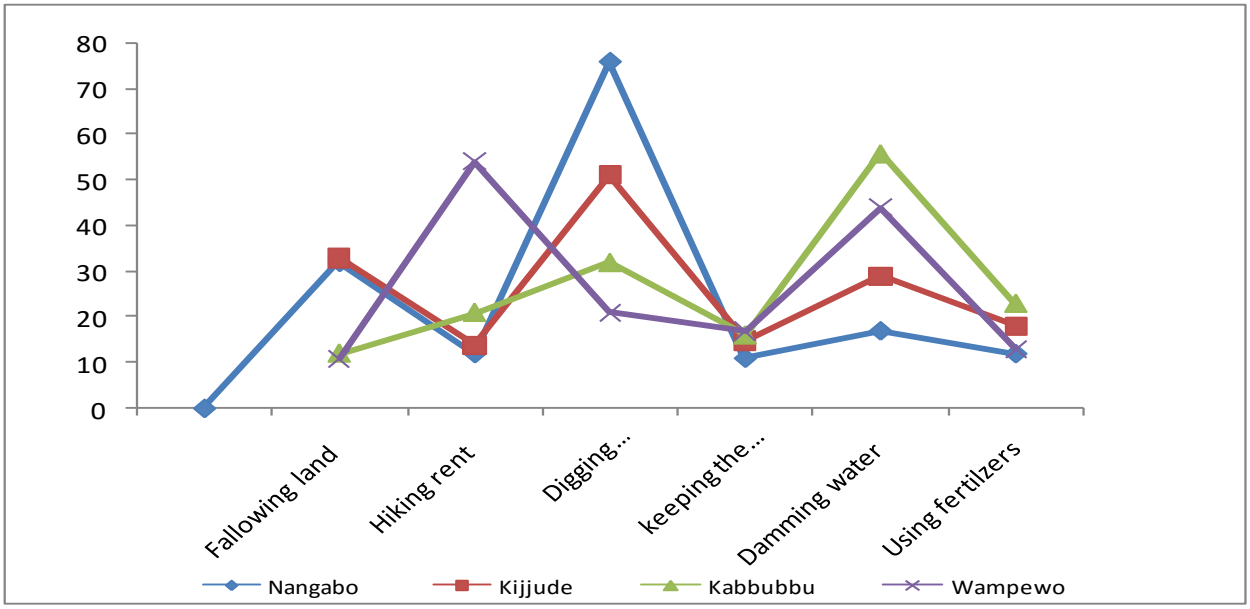
Under the control systems of managing wetlands for food security, the responses focused on control systems of water for agriculture and grazing of animals. The water resource was the most critical for the community. The community have used the indigenous knowledge to control the use of wetlands resources particularly water (Table 7)

Table 7: Coping strategies to ensure water is controlled

Strategy	Nangabo	Katadde	Wampewo	Kabubbu
Putting Mounds	33	26.	18	39
Putting smaller channels	24	10	9.	14
Digging temporary wells	8	16	15	30
Leaving a piece of intact wetland	12	08	08	14
Fallowing the wetland for a period	06	12	07	21
Intercropping	12	11	09	08

Source: Field Survey December 2012

The results through observations of direct phenomena indicated that water control was the most common practice amongst the farmers in all the clusters who depended on wetlands for crop growing. A number of practices associated with managing land fertility and water availability, as shown in fig.4.4.9.



Source: Field data (2012)

Fig.4.4.9. Responses for control systems of wetlands for food security

Further discussions onsite with farmers revealed a number of techniques used in controlling water and soil fertility while other resources like the vegetation, fish and sand were not of concern. Plate.1.below. shows the control systems for water observed in the Villages in Nangabo.

Plate 1.Water channeling in a vegetable garden (Picture by the researcher in December 2012) Kattadde village

Plate.2. Use Local Dykes to control water in the gardens in Maule Village (photo by Researcher December.2012

Water control system, in Maule village involved using local dykes and channels to control and manage water resources in a wetland system. The exposure of wetlands soils causes loss of fertility but the water is the main concern for the community in this village. The ultimate impacts of channeling water and clearing the vegetation up to the core of the wetland is not a concern either due to lack of knowledge or lack of alternatives. Comparison of the water management dykes and supply to wider areas of the cultivated land in Maule village in Kattadde Parish shows the limited control systems in managing the water in agriculture and dependence on the traditional knowledge to manage water. This is because water is the most critical resource for food production in the community. Observations reveal that the water usage is the most critical element in the wetlands for the two parishes' dependant on wetlands. The opinion about the current level of control of wetland use was mixed. However the majority of the respondents (67%), alluded to the lack of

control measures in use of wetlands and the emerging degradation of the wetlands that has left very small parts of the wetlands for communal use.

Plate 3: Standing crops of vegetables, yams and maize and sugar cane on small holder lands acquired by hiring (photo by Researcher from Nangabo Village, December 2012).

Plate 4 Market for the vegetables and Maize on the roadside (taken from Nangabo Village Roadside market December 2012.

Plate 5.Roadside market –make shift for the crops grown in Ngangabo-Kept fresh using water from the water in the roadside channel.

The state of the wetlands is looked at differently but the majority of the respondents have indicated a big decline in the size and quality of wetland available for communal use.

Plate 6.A wetland prepared for potatoes growing and the one next is already planted.

The respondents indicated that the soils had become less fertile but they still could obtain enough produce for sale and family consumption. Some of the changes included the decline in water quality. Formerly flooded areas with sticky soils are declined in water quantity and require fertilisers to improve on productivity. The formerly thick papyrus and palm rich wetland has scanty vegetation remaining and shows very dry soils remaining for agriculture. The other emerging

response was that wetlands were owned and the landlords had more say of what to do in the wetlands as opposed to the principles of the wetlands being common property resources. The 23% of the respondents indicated that the control measures were in place, 9% of the respondents alluded to individual owners having their way of regulating use mostly by letting and revoking the permission to rent for the land to be on fallow so that soil fertility is regained and for food production enhanced.

The respondents further revealed that the products obtained from wetlands were decreasing (Fig.4.6). Eighty five percent (85%) respondents in cluster two all revealed that the products obtained from wetlands were decreasing. Less than 20% said the products were increasing while a very small number were not sure of the status of the products.

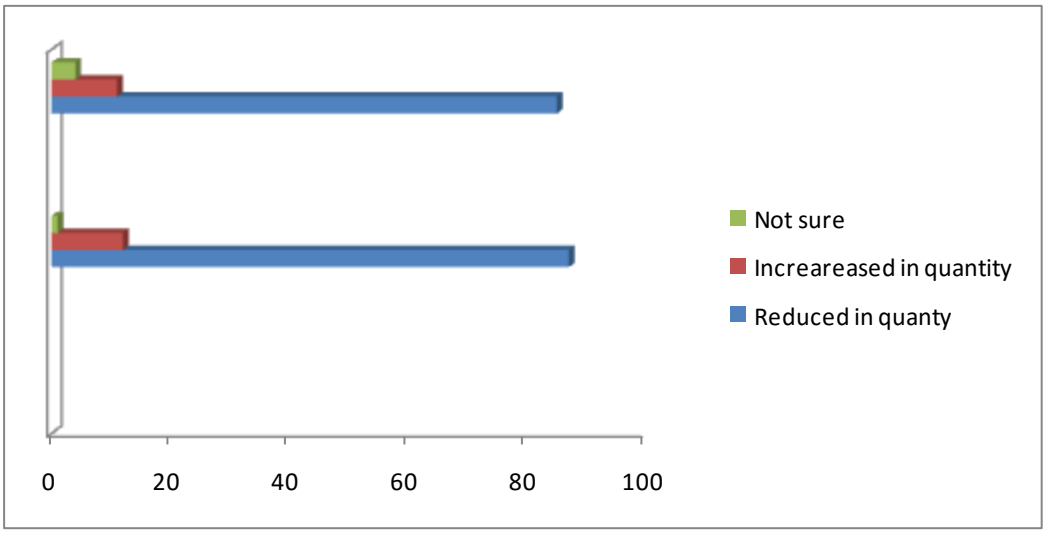


Figure 4.4.10: Responses on observed changes in wetlands products availability

Further inquiry on what reasons the two groups had for the response revealed that 87% and 85% respectively were dependant on wetlands to support their livelihood but for the past three years had less access to the wetlands products as a result of property ownership changes that had resulted in high costs of renting the wetland for agriculture or mining sand. Other respondents in cluster 1

and 2, 12% and 11%, respectively indicated that the products had increased; 1% and 4% were not sure. They alluded to the fact that there are few people allowed to enter Nangabo wetland so the few of them who can afford the rent can harvest as much as they can to make profits out of the products.

In a regression analysis to establish the relationship between wetlands resources and food security (fig.4.10) below.

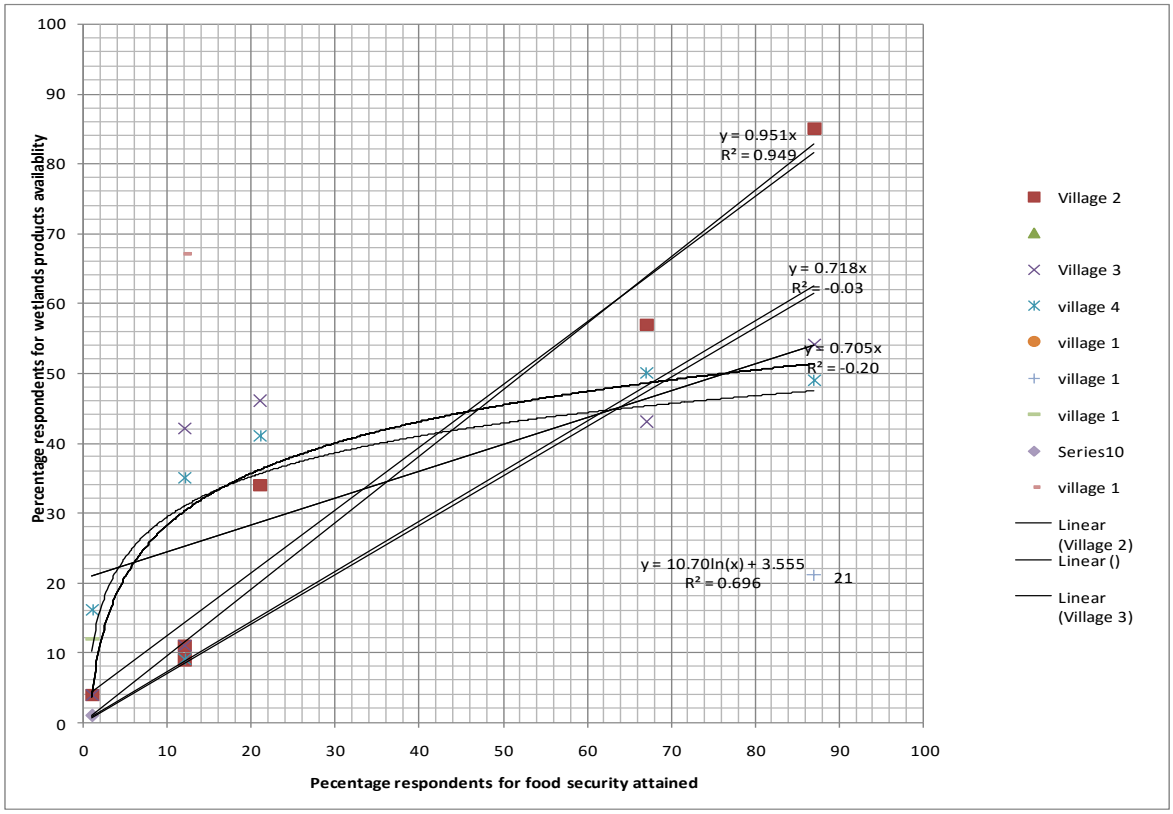


Figure 4.4.11 .Relational values for the managing wetlands and attaining food security. Source: Field data (2012)

The figure above indicates a positive relationship between the availability of wetlands products and the attainment of food security Nangabo Sub County.

Tabulated results of the association between food security attainment and availability of wetlands resources dependent and independent variables

Table 8: Results of associations

Village	Y Value	R^2	Interpretation
Parish 1	-2.289x	0.035	Availability of wetlands resources reduced food availability negatively impact
Parish 2	0.951x	0.949	Significant positive correlation
Parish 3	0.718x	0.003	Weak but positive correlation
Parish 4	0.705x	0.20	Strong positive correlation

Source: Field data (2012)

Therefore the Null Hypothesis is accepted. The more the control of use of wetlands resources, the more food productivity and food security attained. In all the these villages the value of R^2 is less than 1 indicating that there is a relationship between the independent variable of managing wetlands and the dependent variable of attaining food security. The study further related planning as a management function necessary in organisational development and growth and how it can determine the level of management and productivity of wetlands for food security.

If the villages are treated individually they will have simple linear relations and when at the parishes are combines with the averages for each village, the values change accordingly figure 4.5 where the average of squares is used. The R^2 positive values are an indication of the positive correlation between planning, control processes and food security attainment in Nangabo Sub County. The aggregation of the squares helps in giving the average situation and removal of biases in the data sets. However when all the sample villages are brought together on the same scale and Logarithm value calculated, there is a net positive relationship between food security and the

availability of wetland products. This is evidence that managing wetlands resources contribute to food security, though the current trend is not favourable.

4.6.1 Control systems and co-ordination of managing wetlands for food security.

There are guidelines for wetland edge gardening that provides the community with feasible good practices to control degradation of core wetlands resources like water and attenuate vegetation. The other control measure is in wetland fishing guidelines that provide the communities with tips to make use of available water and fish resources for the livelihood support. There is no strict regulation that compels community to abide by the guidelines and planning for the wetland resources in an integrated manner. The actual planning for the wetlands resources and control of use are still “laissez faire”. This has compromised the level of food productivity that would otherwise be achieved if the planning and good controls were implemented at all levels of society as exemplified in Nangabo Sub County.

CHAPTER FIVE
SUMMARY, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary of the findings of managing wetlands for food security and the description of ideas generated and documented in the study as 5.1. The discussion on issues related to control as a management function are presented in 5.2, while the discussion on planning is summarised in 5.3; conclusions and recommendations are presented in 5.4 and 5.5, respectively.

5.2. Summary of key findings.

The major activity in the wetlands ecosystem for now is farming supporting 74% of respondents, who are engaged in farming for both home consumption and sell of surplus produce. This implies that wetlands soils are critical resources that contribute directly and indirectly to food security of the community in Nangabo as well as offsite communities in the city suburbs who depend on the produce for survival.

The respondents were of mixed education backgrounds; 50% of respondents had attained Primary level education, 25% secondary education and 16% with tertiary education, while only 9% of the users of had no formal education. The range of 20 -59 are the most active in the utilization of the wetlands resources. This represents the age group that is productive in Uganda. The age category and education level of respondents has a bearing on the management and use of the wetlands. This was alluded to in Muchapodwa, (2003) who concluded that “prevalence of food insecurity is lower among households with older and better educated household heads because ability to access assets needed to secure livelihoods increase with seniority. This implies that planning function of managing wetlands resources could be delegated to the old and educated stakeholders in the community to ensure that food productivity is balanced with conservation as was the culture in

early civilization where the old were custodians of plans and regulated use of resources for the society.

The findings confirmed the dependence of community on wetlands resources; 87% and 85% respectively were dependant on wetlands to support their livelihood but for the past three years, they had registered less access to the wetlands products as a result of property ownership changes that had resulted in high costs of renting the wetland for agriculture or mining sand. Other respondents in cluster 1 and 2, 12% and 11 respectively indicated that the products had increased 1% and 4% were not sure. They alluded to the fact that there are few people allowed to enter Nangabo wetland so the few of them who can afford the rent can harvest as much as they can to make profits out of the products. The migration that is ranked as the Number One cause of food insecurity implies that there is a causal relationship between migrations, land scarcity and availability of land for food crop production. Nangabo being one of the outskirts of the Greater Kampala is experiencing the migrations never than before and this is affecting the food security. The management of wetlands is more difficult with increasing pressure for development. This is in agreement with previous studies on "valuing of wetlands resources in which the contribution to household food security was alluded to by WMD,(2009) and Karanja *et al* (2001),50] who concluded that , "A vast majority of people were directly dependent on wetland resources for food security, particularly among resource poor and larger households for whom wetlands become a major source of cash and subsistence income that supplements other sources".

5.3. Discussion of findings

5.3. 1.The relationship between planning in managing wetlands resources.

Despite the reliance on wetlands resources as alluded to by the findings, the community still have limited understanding of the direct link between wetlands health and food security. This is seen in the results where the lowest ranked cause of food insecurity is lack of agricultural land, lack of perennial crops and the lack of storage facilities at household levels. In the hindsight, the lack of agricultural land has led to increased pressure on wetlands and therefore a relationship of rains and growing crops in low lying areas is not well appreciated as a possible cause of low yields and consequently food insecurity. This is clearly illustrated when the availability of food was positively related to the area of cleared wetlands vegetation. The more the wetland is cleared, the more the food availability. This is a paradox to the wetland management principles and sustainability of ecosystem resources as alluded to in the systems theory where all components of a system are important to ensure equilibrium.

The responses appeared inversely proportional when the respondents further associated the less food availability to the healthiest wetlands and more available when the wetlands are cleared. The relationship of the two can be explained by the dire need for agricultural land that leads to clearance of wetlands. This is in line with the findings that wetlands degradation was not reflected as reason for food insecurity. The assumption in this is that food availability is better when the wetlands are degraded - drained or reclaimed for agricultural land. The upland is thought to be less fertile and the fertile soils are available in the wetlands. This can be explained by the fact that the wetlands remain the freest available land for agriculture for the poor and less affluent who have limited access to the other lands.

This further reflects weaknesses in planning for managing wetlands resources in the National Development Plan (NDP) in which the "egg" analogy places agriculture as a primary growth sector and wetlands management as an enabling sector (page 411 of the NDP).The NDP recognises the interdependence of the two sectors and alludes to the support that wetlands resources provide to agricultural productivity, provide water for livestock and. Contribute to human welfare by providing a course of goods that support subsistence income generation estimated at 11.4 million per annum for rural households(page 326).

Despite this contribution, the planning processes for wetlands and the control systems are disconnected at the central government level and local government levels. At the central government level, framework plans attempting to provide for wetlands ecosystems and control measures are done through zoning and allocating activities in zones as demarcated by community on agreed social boundaries. Despite these efforts, there has been large-scale conversion of wetlands to agricultural land and this has reduced the level of contribution to food security in Nangabo Sub County and Uganda as a whole. While not easy to perceive, the conversion has also implied that nature's capacity of reduction and retention of nutrients has diminished. A decline in agricultural productivity is the result, accompanied by serious household food insecurity. This is well alluded to in the NDP which attributes the degradation of wetlands to undervaluation of products, resources and services as well as poor marketing strategies for wetlands resources that makes them less competitive on both local and international markets.

The control functions is left to the individual "assumed land owners" although the responses at local government level confirmed lack of guidance from extension workers on how to control use of resources to support food production and conservation of wetlands resources. This has led to

individualism in irking a living from the wetlands either by growing vegetables, maize, beans, rice and sweet potatoes or harvesting the resources that can provide economic benefits. The systems theory that should guide the management functions does not trigger action in the control and management of wetlands resources, but the benefits at individual level are the main drivers of actions in the management of wetlands so far. The common good and common goal in this case is unattainable. This is in agreement with the expectancy theory where the control of use of resources is based on the benefits expected in the short term and little attention is paid to the long term benefits' ecosystems do provide.

5.3. 1. Planning processes for wetlands management in Nangabo Sub-county.

Managing wetlands resources is an environmental planning dimension that entails balancing the ecological and social and economic benefits from the wetlands resources. Food security is among these social and economic benefits that Nangabo sub county population alluded to. This is reflected in the ranking of growing crops as the most used resource by 69% and others as supporting livelihoods (Fig.4.1.2). Seventy five (75%) of the respondents strongly agreed that Nangabo wetland resources contribute to food security (Table 4.1) and 85% of the respondents were dependent on wetlands resources as sources of livelihoods,(Fig.4.6). The respondents alluded to the fact that there is less available food because most of the wetlands have been degraded (Table 4. 2 and Table 4.3.3) and there is no deliberate guidance for planning for wetland resources at the sub county. The respondents attributed limitations of access to wetlands resources to governance structures of the land in the sub county and the county as a whole. The contribution of managing wetlands resources to food security can be enhanced through better planning mechanisms at different levels and integrated approaches to wetlands management. The practice of growing crops in wetlands may be the preponderance of rural households with limited access to other productive

assets (such as land) or sources of income. Studies conducted elsewhere in Uganda indicated that in situations of inadequate land, people resort to natural resources including wetlands as alternative sources of land for crop and livestock farming. Studies carried out elsewhere in Africa also report rural dependence on wetlands for food production (Turyahabwe, et al 2013). This is mainly because wetlands have some relatively higher levels of water/moisture, particularly in the dry season, compared to the surrounding catchment areas. In some cases, wetlands have some relatively high levels of fertility due to the silt accumulated by run-off from surrounding catchments. Given the current unpredictable rainfall, it is inevitable that local communities will largely rely on wetlands for food security, especially during prolonged dry periods, a situation also noted by Grimble, *et al* (2012), which justifies the need for research in more technological and social innovations to improve sustainable use of wetlands for improved food security.

Planning for wetlands is a critical process in ensuring that food security is attained from the wetlands resources especially by the pro-poor community in Nangabo sub county and applicable to Uganda as a whole. Among the critical resources to plan for are water and the soils that have a direct bearing on food productivity.

More than 50% of the respondents in all parishes agreed that food is available when planning for wetlands resources is done well. The general trend therefore is that the more planning for wetlands resources, the better the availability of food. The similar trend was shown in the opinion on the relationship between planning and food quality as well as wetlands management planning and food quantities.

Management planning for wetlands ecosystems is among the strategic objectives for the Environment and Natural Resources. However, a number of Sub county Wetlands Action plans developed to address wetlands management challenges show that there are still disconnections

between the national planning and strategic policies regarding management of wetlands as special ecosystems that support the livelihood of the poor in the wetlands dependent communities. Management planning for wetlands enhances food productivity through the maintenance of a water table that recharges the roots for crops but little effort is realized in control of use of wetlands for food production and other benefits on the household planning level for use of wetland resources. The only resource that seems to be planned for and controlled is water. This is because water is the most critical resource for food production in the community. Observations reveal that the control of water usage is the most critical element in the wetlands for the two parishes dependent on wetlands (Plates no.1, 2, 3, 4.).

The systems concept and Vroom's theory provide the basis for planning. The basis is that wetlands are systems which are composed of soils, fauna, flora and water which interact in particular ways. The removal of or dysfunction of one or more parts of the wetlands system affects the functioning of the whole system and affects the productivity capacity for food.

This is revealed in the study in which the planning and food availability and access are positively correlated. (Fig.4.2, 3, 4).The results further indicate a weakness in the planning system. The planning and control mechanisms that enhance the co-existence of wetlands and agricultural land reclaimed from wetlands are wanting. There is no clear evidence of a planned interaction between conservation efforts and other management principles applied to enhance food productivity or livelihoods improvement through income generation to enable households maintain the capacity to grow, buy, or acquire enough food from different places outside of Nangabo.

This would require that the programmes build on and enhance the existing subsistence mechanisms of the community in Nangabo Sub County and roll it over to other parts of the country where food security is becoming a challenge. This could be one way of illustrating how innovations in the

subsistence farming systems can be improved to promote successful solutions to conservation and food supply problems. There is need for deliberate efforts in Uganda to establish expanded and systematic networks of communities and institutions, with ability to properly plan and manage their natural resources' as a mechanism to achieve food security for the most deprived sections of populations and maintain the wetland ecosystem. This should be merged with bylaw formulation to enhance compliance to planning and control systems.

5.3.2. Control systems for wetlands resources for food security.

Whereas results showed that water had reduced in volumes and the community tried to manage the water by holding it for periods long enough for the crops to get adequate water within the root regions, there is no systematic management of the water for all users,(plates 1,2,3).The is evidence of dry soils (Mounds for potatoes awaiting rains). This often results into some loss of crops if water is not managed and floods the crops or if too much of the water is drained out and cannot be retrieved due to rudimentary use of drainage channels without control mechanisms to maintain the water within the same wetland ecosystem. This in practice differs from the proposals that some scholars under the Wetlands international have alluded to namely; "that the needs for food and water by communities are real and need to be addressed systematically". The same scholars have admitted that most past global programmes to improve food security have relied heavily on modern technological and, market forces. This is in agreement with Onek's proposal of the need to develop complementary programmes for food security, for large sections of communities dependent on wetlands, as the most practical way to enhance control and systematic planning, to ensure food security for large sections of communities not yet part of the market economy.

The other emerging response was that wetlands were owned and the landlords had more say of what to do in the wetlands as opposed to the principles of the wetlands being common property resources. Land lords had ability to evoke the permission to rent for the land to be on fallow so that soil fertility is regained and for food production to be enhanced. The practice of control is undermined by the assumed ownership of wetlands adjacent to the peri-urban areas. These are landlords who have a bigger say on control measurers than the central government level. The effort to decentralize the management of wetlands has not been matched with the competencies in controlling resources that are constitutionally under trusteeship of government and therefore the control of use is regulated by the constitutional provisions. Nangabo Sub county wetlands like other Lake Victoria wetlands have increasingly been facing serious problems of degradation. There has been large-scale conversion of wetlands to agricultural land. While not easy to perceive, the conversion has also implied that nature's capacity of reduction and retention of nutrients has diminished and thus the need to add fertilizers (Plate 2.).

The majority of the respondents, 67% alluded to the lack of control measures in use of wetlands resources and the emerging degradation of wetlands as causes of reduced contribution of wetlands to food security. A limited 23% of the respondents indicated that the control measures were in place, while 9% of the respondents alluded to individual owners having their way of regulating use mostly by letting and fallowing the wetlands to improve on productivity. This implies that there is no agreement on the control system pursued in Nangabo, despite the national guidance.

The results are in agreement with Ngaka, (1997) who asserted that urbanization has significantly contributed to the over exploitation of the wetlands and their associated resources, destabilization of the ecosystem, distortion of hydrological systems and increase in flood frequency. This further

confirms the conclusion made and alluded to by Byaruhanga, (1996) that the practice of urban agriculture is not consistent with urban planning and violates urban bylaws and further causes environmental degradation because poverty and low incomes greatly contributed to the persistence of urban agriculture since it is practised as a survival strategy mainly by women.

More importantly agreement on lack of coordination of environmental management issues and a lot of laxity in enforcement of environmental laws, consequently lead to the destruction of the wetlands. The present land use patterns have failed to maintain the ecological character and biological diversity that support food availability, quality and quantity needed in an urban setting. Although Maxwell, Levin, and Csete, (1999) showed that urban agriculture has a positive, significant association with higher nutritional status, the pathway that would cement the this relationship is not manifested in a relational attribute that supports the contribution of managing wetlands resources to food security as is the expectation in the hypothesis.

Managing wetlands resources for food security will require a number of interventions in order to secure the wetlands functions. Among these interventions will be better control for use of wetlands resources by the population since the population pressure particularly in peri-urban centres will continue to cause erosion of the available land and exert more pressure on the available wetland ecosystem, thus compromising its ability to support livelihoods as well as food security. There is need to improve on the level of knowledge required to ensure productive and balanced exploitation of the wetland resources, establish control systems to address the dynamics of the local management institutions and reduce shocks that emanate from the very natural existence of wetlands Provide adequate information on the impacts of accumulation, consumption and diminution of livelihood assets at micro and even macro-levels on food security attainment, since

conversion of wetlands to uses other than conservation is determined by household pursuit of welfare improvement, which in turn, is influenced by households' asset possession and vulnerability shocks.

The contribution of managing wetlands resources to food security is on a declining trend in Nangabo Sub County. The food security dependence on wetlands is not well appreciated just like other functions of wetlands. This deviates from the findings of Ochola et al (2010), who proposed that "ecosystem functions or benefits constitute the core of life supporting systems on earth and cater for the wellbeing of humanity through "resources and opportunities for livelihoods", concluding that "ecosystems are linked to economics". Therefore managing wetlands resources would ideally contribute to livelihoods if some of the resources and opportunities were not monopolised by a small section of society as it is the case of Nangabo wetlands where degradation is now rampart.

The central government through the wetlands management department need to build the capacity for coordinated planning at all levels, popularise agreed mechanisms of control, provide timely information and technical support on the best use practices to ensure connectivity between the central and local users as well as agreed benefits sharing amongst the community as a motivation to support self-regulating and control systems among the communities affected by poor management of wetlands resources for food security. According to the expectancy theory, the management of the wetlands resources would be ideal if the populations expectations are met in due consideration of better utilisation of the resources. Unfortunately, the expectations vary from household to managers and to planners. Household size and leadership have a relative impact on food security needs, implying that that as the household size increases, so does the need for more

land, more encroachment is experienced and the status of wetlands increases. Again this is against expectations as an increase in household size is a proxy for population size which is expected to lead to overutilization of wetlands resources hence poor more degradation.

There is increased use of fertilisers in the wetlands soils, a practice that puts the access to clean and safe water at stake. Yet, wetlands can be productive if local management plans are coordinated with central government and harmonised with local level users, their needs and interest.

5. 4 Conclusions

The contribution of managing wetlands resources to food security is critical in Nangabo Sub county and Uganda as a whole. However, the current study reveals that the control and planning processes are disjointed at different levels and as a result, the contribution of wetlands resources to food security is on a declining trend. The utilisation of wetlands for food production is aimed at making measurable and sustainable improvements in farming production to increase food availability in not supported by the current regulations and land use planning systems. The decline in food security is a reflection in the decline of the wetland ecosystem health and productive capacity. The findings indicate laxity in enforcement of laws that makes the control of systems poor and disincentive to managing wetlands for food security.

5.4.1. Planning for use of wetland resources

Planning for wetlands resources for food security has been developed through local experimentation using traditional knowledge. In planning for use, traditionally, wetland edges were drained for dry season cultivation and the margins used for grazing animals. As Maness and Farrell (2004) recommended, true value of wetland ecosystem must be brought in the limelight of planners and plan implementers to address the attainment of an equilibrium between wetlands use

for food security and other functions. There is need to avoid “Rushing food policies that lead to excessive use of wetlands may lead to wetlands degradation and ultimately resulting in food insecurity”, since it can lead to promotion of wetland cultivation and may disenfranchise those people who use the wetland for purposes other than cultivation, and in so doing may actually increase food insecurity as alluded to by (EWRP 2001). This can only be avoided if access restrictions for wetlands either through customary land tenure or otherwise is addressed to balance the ecological functions of wetlands and the socio-economic well-being of the communities who depend on them.

5.4.2. Controlling use of wetland resources

The control systems and measurers for wetlands resources have their genesis in the systems theory that promotes the working of systems as a unit and reductionism theory that further expounds on the impacts of reducing the quality of a system either by reducing the capacity of one or more parts to function and in the long run affects the whole system functions. The control system also finds its basis in the policy on wetlands management that highlights one of the principles as no drainage of water is allowed in wetlands (National Wetlands Policy 1995). This first principle underpins the importance of water as a big component and lifeblood of a wetland system. In terms of food production, the control of water use in wetlands is the main basis of contributions to food security since without water, agricultural productive capacity of wetlands soils is limited. The results point to the lack of acceptability of the social and legal control system.

The control systems are adapting traditional knowledge, administered at individual level, which makes it counterproductive for a system to operate in harmony. In order for the control systems to be harnessed, there is needed to come to agreement with the different stakeholders in a coordinated

manner. However to date, there is disjointed effort in control of wetlands resources, resulting in overharvesting, over use of some resources and extinction of some of the unique flora and fauna in wetlands resources that contribute to livelihoods for the majority of communities, as indicated in the focus groups and in the interviews during the study.

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5.5 Recommendations.

5.5.1. The contribution of managing wetland resources for food security.

The contribution of managing wetlands resources for food security should be enhanced through improved utilisation of wetlands resources for food production. This should be further geared towards making measurable and sustainable improvements in farming production to increase food availability and food access through improved farming systems and invigorated entrepreneurship

for the community in Nangabo Sub County. Emphasis must be put on coordinated planning that engages all stakeholders and dissemination of timely technical information to the resources users to be able to act according to the agreed planning principles while enhancing farmer skills in agriculture based on wetlands ecosystem.

5. 5.2 Control systems and managing wetlands for food security

Comprehensive control systems in managing wetlands resources for food security are lacking. As a result the current control systems are more individualistic and do not take care of the ecosystem as a whole. As a result, reductionism in ecosystem quality is at pray and consequently food availability is being threatened. The control systems provided for in the policy and guidelines developed over years coupled with the capacity of the staff in the trade of managing wetlands for food security is being threatened by a number of development pressures both in peri-urban and urban areas of the country. The staffs in organizations related to control systems have been seen to be compromised in pursuing the goals of managing wetlands. There is therefore need to develop motivational incentives through participation of all stakeholders in bye-law formulation to enhance the control systems and encourage compliance to systems that promote increased productive capacity of the wetland ecosystem for food security.

5.5.3. Planning and contribution of managing wetlands for food security.

The current planning and coordination of activities related to appropriate land and water management practices to maintain productive capacity of land and generate income as well produce food enough to reduce the vulnerability of the community is disjointed. Water use and control is the single, most important aspect of managing wetlands resources. Through this, control of the contribution of wetlands resources to food security is enhanced; vegetation is maintained

through an enhanced fallowing system, leaving a core wetland margin to maintain the functional ecosystem and equilibrium of the functions. There is need to conduct campaigns to help the wetland dependent communities visualize the levels of scarcity that will be created in the current development progress so that the important control systems are put in place to ensure limited wetlands damage, limited water use and change of consumption patterns, while promoting trade between the water rich dependent community and water scarce dependant community. To ensure food security, it is important for decision makers to planning for training in management of wetland ecosystems, land and adaption of approaches and technologies that support more sustainable agricultural practices.

The control systems should consider having and strengthening bylaws on food security take into consideration food security challenges unique to certain ecological areas or local communities. These should explicitly spell out strategies to overcome such challenges and penalties for breach. Enactment of bylaws for managing wetlands resources should equally be provided for in the legislation as a control system for managing common property resources to ensure equitable benefits and as an incentive for better access and use of such resources. Nangabo sub-county had no evidence of these bylaws as control measures for the management of wetlands for food security. There is an apparent disjointed control system between the food security systems and the wetlands resources management system, resulting in degradation of wetlands resources and vulnerability of communities depending on them for food security. Further still, the control mechanism for urban planning and wetlands management seem to have dysfunctional consequences, where the urban poor are being axed out of the productive land and so they are being made more vulnerable to food insecurity.

5.6 Areas of further research

Further research will be needed to needed to analyze the impact of the new estates development phenomena that is taking up land including wetlands, for establishing developments and the fate of wetlands contribution to livelihoods as a necessity in the next planning for the sub county. A cost benefit analysis is needed also to establish the costs of losing wetlands ecosystem services with focus on water availability and costs of supplying or accessing safe clean water and efficiency in food production.

5.7 The contribution of the study

The study finding should be incorporated into a review for the planning procedure and control systems through interventions on policy that will focus on rate of degradation of wetlands that inhibit accumulation of livelihood assets from the wetlands and increase vulnerability to food insecurity. Policy dialogue is necessary between the ministry of Agriculture and Ministry of Water and environment to harmonize the policy direction for the benefit of the nation and the world at large.

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Appendix 1.Questinnare guide

QUESTIONNAIRE FOR THE INVESTAGATION OF CONTRIBUTION OF MANGING WETLANDS RESOURCES TO FOOD SECURITY, NANGABO SUBCOUNTY, WAKISO, UGANDA

DATE: ___/___/_____

DAY MTH YEAR

Questionnaire No.: ……Parish----------Village…….....

Confidentiality and consent:

This questionnaire is strictly confidential. It is to be filled by a few randomly selected residents of your village. We are going to ask you some personal questions on what you think about the contribution of managing resources to food security. Your answers are completely confidential. We will not ask your name and will not record it anywhere. We will not tell anyone else your answers to the questions. You do not have to answer any questions that you do not want to answer. However, your honest answers to these questions will help us to better develop an information base that can help inform policy at different levels and action program for attainment of both a food secure country/community and a sustained wetland ecosystem base. We would greatly appreciate your taking part in this survey. It will take about 30 minutes to fill out this questionnaire. Thank you for your participation!

Name of the interviewer……

Section 1.Demographic information

Section 1: Socio-demographic Information			
No	**Question**	**Response categories**	**Tick**
1	Sex of respondent	1. Male 2. Female	
Marital status		1. Married 2. Single 3. Divorced 4. Separated	
How old are you?		Age in years [_ _] Don't know	
What is your level of education?		1. None 2. Primary 3. Secondary 4. Tertiary 5. Others	
What is your primary occupation?		1. Farmer 2. Formal employment 3. Business 4. Other (specify:_____)	
What are your other sources of income?			
How many people stay with you?			
For how long have you been in the current location?			

Section 2. Planning for managing wetlands for food security			
1	Are there plans for managing wetlands for food production in your area?	1. Yes 2. No 3. Don't know 4.	
2	If yes, what are plans? List at least two plans known to you?		
3	If No, Why do you think there are no plans? Give reasons	----------	

4.	Does planning for wetlands resources contribute to food security in your community ? Give a score of scale of 5- 1 where 5 is strongly agree and 1 do not agree.	1.Not agree 2.Slightly agree 3.Agree 4.Stongly agree 5.Very strongly agree	
4	If score e is 5-2 agree, explain your reason.	1. Grow crops on the margins 2. Directly harvest fish for food & sale 3. Communities sell wetland products and get money to buy food 4. Provide water 5. Others (Specify	
5	If you don't agree, why does planning for wetlands resources affect food security?	1. They occupy useful agric land 2. Not good for growing food crops 3. Useless places 4. Have poor soils 5. Others	
5	In your opinion, is the current use of wetlands appropriate?	1. Yes 2. No 3. Don't know 4. Not sure	
6	If no, give the reasons		
7	If Yes, Give reasons		
8	What is the state of your wetlands?	Intact for now	
		Has been drained	
		Moderately drained	
		Completely drained	
	Section 3. Controlling in wetlands management for food security		
1	Are there policies, regulations, guidelines for managing wetland resource that help achieve food security?	Yes NO Don't Know	
2	If yes, name them		
3	What mechanisms are there for to controls use of the wetlands in your village		

4	In your view does control of use of wetland resources help in food production?	not agree(1), Agree(2) slightly agree(3)Strongly agree(4)very strongly agree(5)	
5	What systems do you know that help you grow food in wetlands? Name some if any		
6	Are the control systems known to all the wetlands users?	Yes No, Not all but some	
	Section 4. Food security general questions		
1.	When do you consider your household to be food secure? Explain?	**1.Yes**	
		2.No	
		3.Not sure	
2.	When do you consider your household to be food insecure? Explain		
3.	What kind of food and cash crops do you mainly produce in wetlands	1. Vegetables	
		2. Maize	
		3. Beans	
		4. Sugar cane	
		5. Yams	
		6. Bananas	
		7. Rice	
		8. Others (specify)----------	
5.	Do you consume all the food you produce?	1. Yes	
		2. No	
6.	If no, do you sell some foods that you produce?	1. Yes 2. No 3. Not always	
7.	What proportion of the money obtained from sale of wetlands products is used for buying food?	1. One quarter	
		2. One quarter to a half	
		3. A half to three quarters	
		4. Three quarters to all	
		1. Wetlands have more water than and more vegetation	
8.	Are wetlands use for food production sustainable	1.Yes 2.No 3.Not sure	

		4. Don't Know	
9	Are there changes in use of wetlands that have affected food production?	Yes No Not Sure Don't know	
10	If Yes, What are the changes (briefly describe the changes	---------- ---------- ----------	
11	What factors do you think are responsible for the above changes	1. Over use for food production 2. Drainage of water 3. Filling the place with soil or murram 4. Changes in climate 5. Poor farming practices 6. Changes in soil structure 7. Other (specify) 8. Don't know	
12	Are the products obtained from wetlands in your area increasing or decreasing	1. Increasing 2. Decreasing 3. Constant	
13	If increasing, what could be the reasons for the change?		
14	If decreasing, what could be the reasons for the change?		
15	Has the change in wetland affected availability of food in your place?	1.Yes------ 2.No----- 3.Don't Know	
17	If Yes ,explain how this has happened	----------	
18	If No, Explain how the situation has remained the same?	----------	

Thanks for taking part in this interview.

Check list of questions for the policy makers and planners in the study

This is a small interaction with you in regard to a study that I am conducting on the issues of managing wetlands for food security.

I would like to request you to respond to a few of the questions in this study. I thank you for availing time for this interaction.

Wetlands resources' have for decades been used in several ways by the communities to access food.

1. As a policy maker/planner, are you aware of any plans that have been put in place to guide the farmers in using wetland to produce food? What are these plans?
2. At the local Government level a number of plans have been drawn and budgets allocated. How are the budgets allocations addressing plans to use wetlands for food production to ensure food security?
3. How is growing food in wetlands controlled?
4. How is it guided in the local areas where farmers on a day to day basis find themselves resorting to grow food in wetland area?
5. Explain some of the policies and regulations that help farmers use wetlands wisely to produce food while protecting the ecosystem services.
6. How is compliance achieved in the agriculture in wetlands to ensure food security and sustainable ecosystem services

NB. The same questions can be used to guide a focus group discussion bringing two groups of people from each of the sample areas.

Appendix 2.The distribution of Uganda's wetlands

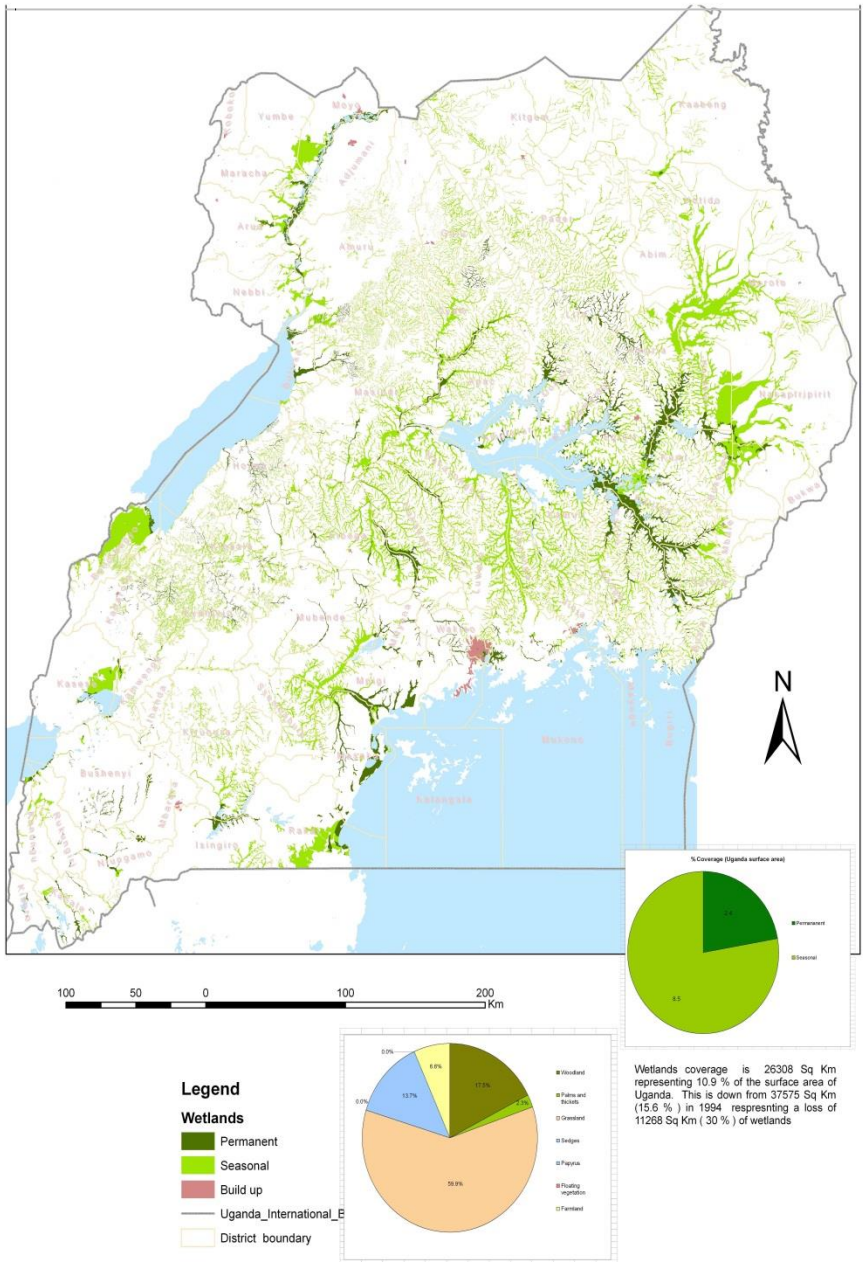

Fig.2. Map showing the distribution of wetlands in Uganda.

Appendix3. Determination of Sample size in the study

The sampling Frame used is shown in table below. Category of respondents	**Population Sampled**	**Actual respondents**	**Response rate**
Policy makers and planners at central government level (strategic level managers)	15	15	100
Operational staff at the central and local government level (lower level managers).	15	12	80%
Nangabo parish resource users close to wetlands	80	74	92.5
Kattade Parish resource users Two villages	80	70	87%
Not Cultivators' as Offsite resource users Wampewo Two villages	80	69	86.25
Non Cultivators in Kibbubbu Parish Two villages	80	71	88.75
No.of respondents.	350	331	94.6%

Adapted from Mugenda Mugenda 2003.

Appendix 4: Relating the status of wetlands and food availability

Response	Nangabo		Kattadde		Wampewo		Kibbubbu	Total
	Frequency	%	Frequency	%	Frequency	%	Frequency	% Total
Degraded	44	55	48	60	52	26	40	50
Moderate	16	20	22	26.9	24	12	18	22.5
Good	20	25	10	21.6	4	12	22	27.5
Total	80	100.0	80	100.0	80	100	80	100.
Response	Nangabo		Kattadde		Wampewo		Kibbubbu	Total
	Frequency	%	Frequency	%	Frequency	%	Frequency	% Total
Food available	40	50	44	55	52	65	40	50
Food is less in the gardens	16	20	26	32.5	20	25	18	22.5
Food least available	24	30	10	13.	8	10	22	27.5
Total	80	100.0	80	100.0	80	100	80	100.

Appendix 5:A wetland ecosystem picture: Source: Field Survey, December 2012

Figure 1A wetland ecosystems