APPLICATIONS OF GIS AND AGRO ECOSYSTEM MANAGEMENT PRACTICES TO SURVEY AND IMPROVE SOIL FERTILITY, INHIBITED NEMATODES ACTIVITY USING NATURAL FERTILIZERS ON CUCUMBER PLANT UNDER GREEN HOUSE IN TAINAL WATERSHED (BAZIAN)

Akram Muhildin ABDULRAHMAN

MASTER THESIS

Department of Soil Science and Plant Nutrition
Supervisor: Prof. Dr. Alaaddin YUKSEL

2017

REPUBLIC OF TURKEY
BINGÖL UNIVERSITY
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This thesis was unanimously approved by the following Jury on 07.06.2017

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Prof. Dr. Ibrahim Y. ERDOGAN
Director of the Institute

PREFACE

Twenty five month before now I came to this country holding kinds of felling and touts about what I will see here most of it were negative but after this aim returning with another felling and touts all of it are positive but sad an happy, sad because I will leave this atmosphere of kindness and high athics and in a different ways happy becouse aim here writing this. Twenty five months befor now I start this journey as a scientist learning journey but it turned on to a battel against falls of difficults I loss in some of these battels but now here aim writing the final worlds of this small work and all because of you my loard (يا أله الرحمة) all the favour return to your endless mercy when you help me to stand up each time I fall by your mercy and by putting great people in my live who help me perhaps in a different way like my dear supervisor Prof. Dr. Alaaddin YÜKSEL you do a lot to me I pray to Allah to give you what you wish. First person: was you Assoc. Prof. Dr. Abdulkadir SÜRÜCÜ, I learn alot from your kindness, Assoc. Prof. Dr. Ali Riza DEMIRKIRAN, you came later but you put the last stone, thank you. Bingol university managments from the head of university until the gurders and labers thanks for make it easy on me. My dear sister Dr. Nassren ABDULRAHMAN and brother Dr. Alla ABDULRAHMN we start this to gather it is yours, my dear cousin Mekdad OMER. Assoc. Prof. Dr. Dulshad Rasoul AZIZ Dim of agriculture faculty / Kirkuk university thank you Sir. For your support. My dear mother, father, sisters, brothers, thanks for your supports, friends in Bingol univertisy, I never forget the most beautiful treatments from Bingol's people in the city and governments directories like you my dear friend Nooralttın beh, thank you so much people of Bingol city. My friend Mr. Rizgar ABDULRAZAK, you help a lot in the soil survey and metting the farmers in Bazian city. My dear wife and baybes Shahan, Raman, Ahmed, hakan, Oween, the most suffering was on yours. Spatial thank to you who read this humble work or at least for reading this lines in this page.

Akram Muhildin ABDULRAHMAN

June 2017

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LIST OF SYMBOLS

ArcGIS10.1	:Program of ArcGIS 10.1
GIS	:Geographic information system
GPS	:Geographic position system
CEC	:Cation Exchange Capacity
CRP	:Conservation Reserve Program
NPS	:Nonpoint Source
CRP	:Conservation Reserve Program
USDA	:U.S. Department of Agriculture
DSS	:GIS Decision Support System
AFIRS	:Automated Feature Information Retrieval System
SWAT	:Soil and Water Assessment Tool
SDSS	:spatial decision support system
WRP	:Wetland Reserve Program
WHIP	:Wildlife Habitat Improvement Program
GRP	:Grassland Reserve Program
EQIP	:Environmental Quality Incentives Program
TMDL	:Total Maximum Daily Load
RS	:Remote Sensing
PH	:Potential of hydrogen
AEIS	:Agricultural Environmental Information System
SJP	:Sanjiang Plain
UTC	:(Universal Time Coordinated
RBV	:Return Beam Videcon
IFOV	:Instrument Field of View
NDVI	:Normalized Difference Vegetation Index
TDS	:total dissolved solids
G	:Gram
EC	:Electronic Conductivity
$CaCO_3$	:calcium carbonate
°C	:Degrees Centigrade
MS	:Mean Square
K	:Potassium
MSE	:Mean Square of Error
Meq	:Mille equivalent
Mg	:Magnesium

Na	:Sodium
OM	:Organic Matter
P	:Phosphorus
Ph	:Power of Hydrogen
PPM	:Part Per Million
BAF	:Bio accumulation factor
TF	:Translocation factor
Ni	:Nickel
Zn	:Zinc
Cr	:Chromium
Co	:Cobalt
Fe	:Iron
Mn	:Manganese
%	:Percentage
WQI	:water quality index

TAINAL HAVZASINDAKİ (BAIZAN) SERALARDA YETİŞTİRİLEN SALATALIK BİTKİSİNDE DOĞAL GÜBRELER KULLANARAK NEMATOD ETKİNLİĞİNİN AZALTILMASI VE TOPRAK VERİMLİLİĞİNİN GELİŞTİRİLMESİNDE GIS VE AGRO-EKOSİSTEM YÖNETİM UYGULAMALARI

ÖZET

Agroecosystem yönetim agronomik vizyonu, canlı, abd ve isteyin çöpe korur, doğal kaynakların (su, toprak, bitki), doğal kaynaklar gibi bazı toprak gelişmeler, bu küçük çalışma biz tekrar bunun için yeni teknoloji, ArcGIS 10,1 ve bir plan arasında iki yönde, öncelikle bir anket, Öncelikle toprak verimliliği için bir anket yapmak ve zararlı bir böcek adı Nematode 12km^2 alanı N 35,5731, E 45,1798, ardından, Tainal havzasi noktası Bazian Şehir, Batı'Sulaimaniyah , Kuzey irak, Biz keşfedilen, araştırmalarımız %30, bu yeşil evler toprak bulaşmış nematode ve çoğu bu topraklarda, bereketli Bagajani hariç oturduğu N 0,22%, P 92,6 ppm, K 0,038m.eq/l,O.M 2,85%, AK.0,23ds.m. Aynı bölgede 35,750 N, 45,354 E bir araştırma, salgın yeşil ev toprak nematode biz analist su kalitesi ve toprak verimliliği ve nematode enfeksiyon önce tüm uygulama Biz dört tür toprak biyolojik benzeri Saccharomyces cerevisiae maya'da iki konsantrasyonu , biofertilizers , organik madde gibi humic asit , extract, bitki ve mantarların artıkları Nemakey denir kimyasal gübre daha fazla karşılaştırma ve su bir tanık olarak. Bu yedi tedavi uygulanır R.C.B.D. tasarımı salatalık bitki BAHARA F1 üç çoğaltma her birim bu 21 unite çizim bağımsız 18 salatalık bitki seçtik 10 bitki olarak veri parametreleri.. Kullanarak program XLSTAT biz analist istatistiksel sonuçlar show ile kuru maya 10gm/L. önemli farklılıklar $P \leq 0,05$, toprak ph, azalan 7 ,N içeren , mevcut p, K . Ayrıca humic asit önemli bir $P \leq 0,05$ etkisi AK, P, OM, Ca Mg. biofertilizers de önemli bir etkisi $P \leq 0,05$. Bitki üzerinde maya 10gm/L önemli farklılıklar $P \leq 0,05$ ürün 71.8kg/5m2 karşılaştırarak kontrol 48,73kg/5m2 , toplam yaprak alanı 1,5m2 karşılaştırarak Karşılaştırarak, tanık 1.16m2 , TSS, numarası çiçek iptal edildi Gelişmeler kuru maya, humic asit; biofertilizers önemli farklılıklar $P \leq 0,05$ nematodes etkinliği tüm aşamalar larvalara, eggmass, Galla.

Anahtar Kelimeler: Agro-ekosistem yönetim, toprak verimliliği, nematode, ArcGIS 10,1 Saccharomyces cerevisiae, organik madde , humic asit.

APPLICATIONS OF GIS AND AGRO ECOSYSTEM MANAGEMENT PRACTICES TO SURVEY AND IMPROVE SOIL FERTILITY, INHIBITED NEMATODES ACTIVITY USING NATURAL FERTILIZERS ON CUCUMBER PLANT UNDER GREEN HOUSE IN TAINAL WATERSHED (BAZIAN)

ABSTRACT

Agroecosystem management from agronomic vision it is live that contain us and ask for a maintains throw it is natural resources (water, soil, plant) by it on natural resources like some soil improvements , in the present work a new technology of ArcGIS 10.1 and a plan include two direction used, firstly making a survey for soil fertility and a harmful insect called Nematode in 12 km^2 area N 35.5731, E 45.1798 followed to Tainal watershed (Bazian City, west of Sulaimaniyah, north of Iraq) that we discovered from our investigation 30% of these greenhouses soil are infected with nematode and most of these soils are not fertile except Bagajani sits (N 0.22%, P 92.6 ppm, K 0.038 m eq/ l, O. M 2.85%, EC.0.23 ds.m). In the same area N35.750, E45.354 a research in epidemic greenhouse soil with nematode done that analyst for water quality and soil fertility and nematode infection before any application. four kind of soil improvements (biological like dry yeast Saccharomyces cerevisiae with two concentration, Biofertilizers, organic matter like humic acid, extract for plant and fungi residue called Nemakey) chemical fertilizer for more comparison and water as a witness or control were used. These seven treatment applied in R.C.B.D. design on Cucumber plant (BAHARA F1) with three replication each unit from these 21 unite (plot) contained 18 cucumber plant. By using XLSTAT program statistically analyst the results that show using dry yeast (10 gm/L.) have a significant differences on ($P \leq 0.05$) on the soil ph by decreased to 7, N contain , available p, K . Also the humic acid make a significant ($P \leq 0.05$) effect on EC, P, OM, Ca Mg. the biofertilizers also have a significant effect ($P \leq 0.05$). The yeast (10 gm/L) have a significant differences on ($P \leq 0.05$) on (yield 71.8 kg/5 m^2 comparing with control 48.73 kg/5 m^2, total leaf area 1.5 m^2 comparing with the witness 1.16 m^2 , TSS number of aborted flowers) Dry yeast, humic acid; biofertilizers make significant differences ($P \leq 0.05$) on the nematodes activity in all stages (larvae, egg mass, Gallas).

Keywords: GIS, Agroecosystem Management, Soil Survey, Soil fertility, Non Chemical Fertilizer, Root-Not Nematode, Cucumber

1. INTRODUCTION

During the past century, the challenge to people who live on watersheds in any ecosystem is that of mitigating the effects of all of the changes that adversely affect human Welfare and the functioning of natural ecosystems (Glassman 2007).

The use of modern agricultural technologies to raise yield has become an effective substitute for land expansion, global agro ecosystem are becoming more vulnerable to provide failures than when expansion to new land areas was an option. These issues have increased public awareness of soil ecology and the significance of maintaining soil health in agro ecosystem (Wang and McSorley 2005).

Ecosystem monitoring the soil ecosystem prior to the cropping season will help to determine whether the practices selected are compatible with the achievement of goals of soil ecosystem management. As an example to this, if natural enemies of major pests in a particular site are not present, biocontrol agents might be added to the soil. As the history of agricultural practices can affect soil ecosystem, knowing the history of an agricultural site can also be helpful in making decisions. An understanding of agro ecosystem is the key to determining effective farming systems.

Report for 21-year study of agronomic and ecological performance of biodynamic, bioorganic, and conventional farming systems in Central Europe that made by (Maeder, et al. 2002).

Agricultural practices to compatible with soil ecosystem management major characteristics of farming systems that are companionable with soil ecosystem management are the addition of organic amendments and avoiding the application of synthetic pesticides, similar to organic farming practices. One of the major concerns in agro ecosystem is the maintenance of sufficient soil fertility at key crop-growth periods.

being intensively cultivated with high yielding crops needs to be carried executed. Soil testing is usually followed by collecting composite soil samples in the fields without geographic reference. The results of such soil testing are not useful for site specific recommendations and subsequent monitoring soil obtainable nutrients status of an are using GPS will help in formulating site specific balanced fertilizer recommendation and to understand the status of soil fertility spatially and temporally (Patil et al. 2012).

The beneficial effects of using natural improve on soil fertility have been repeatedly shown, yet there are no procedures for their management. Organic materials are not magic; many of their functions with respect to soil fertility are known. Organic or biological compounds influence nutrient availability (i) by nutrients added, (ii) through mineralization-immobilization patterns, (iii) as an energy source for microbial activities, (iv) as precursors to soil organic matter (SOM), and (v) by reducing P sorption of the soil. The challenge is to merge organics of differing quality with inorganic fertilizers to optimize nutrient availability to plants (Palm et al. 1997).

Results of a research made on organic and synthetic fertility amendments influence soil microbial, physical and chemical properties the yields being higher on farms with sort of organic production, regardless of soil amendment type. Alternative fertility amendments enhanced beneficial soil microorganisms decreased pathogen populations, increased soil organic matter, total carbon, and cation exchange capacity (CEC), and lowered bulk density thus improving soil quality (Bulluck et al. 2002).

Root-knot disease is caused by different species of Meloidogyne. It has long been regarded as “the nematode” disease by farmers and other plant growers because of the severe yield reduction and obvious root-galling symptoms that are caused by these pests. There are a number of species of root-knot nematodes including M. hapla, M. incognita, M. are aria, M.

javanica, and M. naasi. Collectively, these species attack more than 2,000 different types of plants, including most vegetable, fruit, and field crops; many ornamentals (U.I.D.C.S.1993).

Cucumber is a popular cultivated plant in the gourd family Cucurbitaceous that managed to captivate our attention from the moment it came out in ancient India. Since that pivotal moment, over 4000 years ago, cucumber was spread beyond Indian borders, moved through Ancient Greece, Rome, Europe, New World, China, and eventually becoming fourth most widely cultivate vegetable in the globe. This journey was filed with golden periods when they were viewed as integral parts of many culture's cuisines, and sometimes they were dealt with as bringers of disease. In 2010 worldwide cucumber production was 57.5 million tons, with majority of the world's production and export being located in China (40.7 million tons).

Cucumber (Cucumissativus L.) is an important vegetable crop in our reign spatially in Sulaimaniyah city. The city has almost 3000 greenhouses and %50 of them are cultivating with cucumber. These greenhouses grown in different places in the city but mostly in Bazian area and they are suffered from infections of nematode. Cucumber is highly susceptible to Meloidogyne spp. and considerable plant damaged and yield loss occurs worldwide. For instance, root–knot nematode are the most economically important cucumber disease in north Iraq (Mehta et al. 2013) they use 15 cultivars to see the cucumber resistant to root-knot nematodes comparatively better crop yield than susceptible varieties and can be employed as a component of integrated nematode management but in the end all the these varieties infected by nematode.

Nematodes are wormlike invertebrate animals found in marine, freshwater, and terrestrial habitats depending on the species. Nematodes might feed on a variety of organisms, including plants, other nematodes and their eggs, fungi, protozoa, bacteria, tardigrades, and insect larvae (Freckman and Caswell 1985).

The influence of Meloidogyne Javanica on cucumber, the maximum multiplication rate and the equilibrium density of root-knot nematodes on cucumber and yield losses, and the relationships between relative leaf chlorophyll content and relative cucumber dry top weight biomass in relation to increasing nematode densities (Giné et al. 2014).

Bacterial fertilizer are preparation of living bacteria which are applied to improve soil and increasing yield, culture of nodule bacteria(Rhizobium spp.) have long been used extensively for this purpose and no controversy exists over their usefulness. The condition for maximum effectiveness of bacterial fertilizer have been studied extensively, greatest benefits gained on fertile soil (Brown et al. 1964).

So the theoretical idea of the recent study as a agronomic the present works depend on plant, water, soil and these are the natural resources that human use in his life positively or negatively so recent managements for these natural resources are integrated watershed management by using natural resources (soil organic and biological improve), to maintenance soil fertility from exhaustion and inhibited nematodes. The concept of present research depends on using the new technology of geographic information system with some application of agro ecosystem management to protected the triangle natural resources (soil, water and plant).

2. LITERATURE REVIEWS

2.1. GIS And Their Application

Over the last two decades significant developments have taken place in the application of GIS to environmental problems. GIS is characterized by its capability to integrate layers of spatially oriented information. The advantages of GIS in its application to general spatial problems include “the ease of data retrieval; ability to discover and display information gained by testing interactions between phenomena; ability to synthesize bulky amounts of data for spatial examination; ability to make scale and projection changes, remove distortions, and execute coordinate rotation and translation; and the capability to discover and display spatial relationships through the application of empirical and statistical models (Walsh 1988).

The principle benefit of coupling GIS to environmental models is to enable the models to treat large volumes of spatial data that geographically anchor many environmental processes. This is especially true of hydrologic procedures. GIS applications to hydrologic modeling have been used in the past most widely and effectively by surface hydrologists and to a lesser extent by groundwater hydrologists for NPS pollutant applications.

Only within the last decade have soil scientists started to use GIS as a tool in data organization and spatial visualization of NPS pollution model simulation (Corwin and Wagenet 1996).

Precision agriculture approaches were contrasted with routine current management for conducting soil fertility assessment in a recent study. Measurement of soil spatial variability in precision agriculture was accomplished using GPS equipment with exact fixing of soil sampling points, automatic soil sampler, and special software to map various soil fertility parameters, including soil nutrient content. Both spring wheat yield and net profit were the highest with variable rate fertilizer application in the on-farm research experiment (Tsirulev 2010).

In spite of the growing body of literature on ecosystem services, still many challenges remain to structurally integrate ecosystem services in landscape planning, management and design.

The ecosystem service approach and (Burrough 1996) identified three components or aspects to GIS-based environmental modeling: data, GIS and model. First and foremost, the solute transport model must be developed. Transport models of NPS pollutants range from the simplest of empirical functional models (e.g. leaching fraction equal to the electricalconductivity of the irrigation water divided by the electrical conductivity of the drainage water) to the most sophisticated 3-Dfinite-element numerical representations of complex partial differential equations. Secondly, the data for the model must be gained. This involves the measurement or estimation of the physical, chemical, and biological properties required as input into the model; and the spatial distribution of these transport parameters as defined by their spatial variability and spatial structure. Finally, the solute transport model has to be coupled to a GIS containing the spatial input data.

An area where economists have put a lot of effort, yet where they have systematically under-represented spatial factors, is in the understanding of options in farm practices, among which soil fertility management is an example. This despite the fact that processes such as the diffusion of information and agricultural technology are dynamic and frequently spatial (Bockstael 1996).

Several tools were combined to comprehend the interactions between human and natural systems, including a narrative conceptual model, an agent-based spatial computational model (ABM), a role-playing game, and a multi scale geographic information system (GIS). We synthesized into an ABM named SAMBA-GIS the knowledge generated from the above tools applied to a representative sample of research sites. The model takes explicitly into account the dynamic interactions among: (1) farmers' strategies, i.e.the individual decision-making process as a function of the farm's resource profile; (2) the institutions that define resource access and usage and (3) changes in the biophysical and socioeconomic environment. The following step consisted of coupling the ABM with the GIS to extrapolate the application of local management rules to a whole landscape. Simulations are initialized using the layers of the GIS, e.g. land use in 1990, accessibility, soil characteristics, etc., and statistics available at the village level, e.g., population, ethnic city, livestock, etc. At each annual time step, the agrarian landscape changes according to the decisions made by agent-farmers about how to allocate resources such as labor force, capital, and land to different productive activities, e.g., crops, livestock, gathering of forest products, off-farm activities. The participatory simulations based on samba-GIS helped identify villages with similar land-use change trajectories to which the same types of technical and/or institutional innovations could be applied. Scenarios of land-use changes were grown with local stakeholders to assess the potential impact of these changes on the natural resource base and on agricultural development. This adaptive approach was gradually refined through interactions between researchers and the local population (Castella et al. 2005).

The Conservation Reserve Program (CRP) is one of the largest programs of the U.S. Department of Agriculture (USDA) had the purpose of encouraging farmers and ranchers to address soil, water, and related natural resource issues on their lands in an environmentally sustainable manner. The study of (Raoetal 2007) outlines the design and development of a prototype web-GIS Decision Support System (DSS), CRP-DSS, for use in resource management and assessment of environmental quality. Exclusively, the DSS is targeted toward assisting USDA to better manage and plan CRP enrollments.

The DSS is based on the emerging industry-standard ArcIMS GIS platform and integrates a mapping component AFIRS (Automated Feature Information Retrieval System) and a modeling component SWAT (Soil and Water Assessment Tool). Novel integrated web-GIS DSS is implement educing web server and Java Served technology over an ArcIMS platform to back data access and processing in a distributed environment. AFIRS functions as a feature extraction protocol that makes use of multisource geospatial data sets and SWAT serves to simulate long-term trends of soil and water quality.

The prototype DSS was applied to simulate the sediment and nutrient dynamics of a small watershed in the Oklahoma Panhandle. We aim to develop the prototype CRP-DSS into a full-fledged tool geared to enable USDA better manage and plan future CRP enrollments (Rao et al. 2007).

(Lantet et al. 2005) has three purposes in their study, the first is to conceptualize agricultural watersheds as complex adaptive human ecosystem that co-produce agricultural goods and ecosystem services. The second is to demonstrate a generalizable framework for the spatial modeling of ecosystem service production in watersheds based on this conceptualization. The third is to examine the policy implications of the analysis conducted using this spatial decision support system (SDSS). Analyses using the SDSS express those restrictions on soil loss to the (T) cause average farm income to decline by only 4%, a reduction that is almost eliminated if the Conservation Reserve Program (CRP) is available to farmers as an income-generating alternative. The spatially variable response of farmers to soil loss restrictions and the CRP creates a complex pattern of winners and losers and a markedly different land use pattern and crop mix than occurs without these programs. The land use pattern connected with T restrictions and the CRP yields about 64% lower erosion rates and 43% lower sediment yields than the pattern without T restrictions or CRP.

These and other results from the SDSS analysis point out that ecosystem service based subsidies, such as CRP, improve the joint production of farm income, soil conservation and water quality in agricultural watersheds. These subsidies could possibly receive greater funding by shifting agricultural subsidies from income supports tied to yield and price as well as other crop-based programs. In this way public expenditures on agriculture would create valuable public benefit in the form of load reductions in a TMDL context, and an augmentation of ecosystem services now in decline in many agricultural watersheds. Additional methodological developments now underway using evolutionary algorithm scan find near-optimal solutions for farms over time and for landscape patterns over whole watersheds (Lant et al. 2005).In (Costanza’s 2001) expanded model of the ecological–economic system, natural capital, in association with human, social, and manufactured capital, is in charge of maintaining the productive base up on which future economic productivity, as well as individual and community well-being, are absolutely dependent. If this positive model of the manner in which society, nature, and the economy interact is adopted, with the normative objective of sustainability, the conclusion is that society should make greater investments in natural capital to make sure greater delivery of ecosystem services in the present and the future. This greater investment may come at the expense of agricultural commodities produced in the present; but, it is possible such investments would result in greater future delivery of agricultural commodities.

Unluckily, as (Zimmerman 1951; Ciriacy-Wantrup 1952; Firey 1960; Hardin 1968; Randall 1983; Lee 1992; Gottfried et al. 1996) and other social scientists have articulated over the past half century, there is only a narrow range of social circumstances under which resource managers such as farmers are willing to make substantial person al investments in the present to achieve even more substantial public benefits in the future.

One critical implication is that in private sector markets, ecosystem services and the natural capital generating them will be under-produced relative to agricultural commodities. This is a result of their non-excludable or public good nature and the resulting lack of markets for either the services or the natural capital Itself (Randall 1983).

Empirical studies of modern agricultural systems bear out the conclusions of these social scientists. For example, the flow of ecosystem services from agricultural landscapes in Sweden is declining (Bjorklund et al. 1999). Negative environmental externalities (i.e. damage to ecosystem services) in UK agriculture are large-over $300/ha/year (Pretty et al. 2000). CIS-derived measures of location and space have increasingly been used in models of land use and ecology. However, they have made few inroads into the literature on technology adoption in developing countries, which continue to rely largely on survey-derived information. Location, with all its dimensions of market access, demographics and agro-climate, nevertheless remains key to understanding potential for technology use. The measures of location typically used in the adoption literature, such as location al dummy variables that proxy a range of location al factors now appears relatively crude given the increased availability of more explicit GIs-derived measures. For better difference and understanding location effects. A set of GIS-derived measures of market access and agro-climate are included in a standard household model of technology uptake, applied to smallholder dairy farms in Kenya, using a sample of 3330 geo-referenced farm households. The three technologies examined are keeping of dairy cattle, planting of specialized fodder, and use of concentrate feed. Log it estimations are conducted that notably differentiate effects of individual household characteristics from those related to location. The predicted values of the location variables are then used to make spatial predictions of technology potential. Comparisons are made with evaluations based only on survey data, which demonstrate that while overall explanatory power may not improve with CIS-derived variables.

The latter yield more practical interpretations, which are further, demonstrated through predictions of technology uptake change with a shift in infrastructure policy. Even though requiring large geo-referenced data sets and high resolution GIS layers, the methodology demonstrates the potential to better unravel the multiple effects of location on farmer decisions on technology and land use (Staal et al. 2002).

In the U.S., agricultural conservation policy influences considerably the land use choices farmers make and therefore the ecosystem services produced on farms (Lant et al. 2001). Farm (Billssince 1985) have utilized (1) cross compliance in the form of Conservation Compliance, Sodbuster and Swamp 1buster and (2) economic incentives in the form of the Conservation Reserve Program (CRP), Wet land Reserve Program (WRP), Grassland Reserve Program(GRP), Wildlife Habitat Improvement Program(WHIP), and Environmental Quality Incentives Program (EQIP) as policy tools to influence land use behavior with considerable effect in decreasing soil erosion and wetland drainage (Esseks and Kraft 1993).

Beyond institutional factors, the second difficulty in increasing ecosystem service flows from agricultural landscapes is that spatial units of land management (farms) are not commonly at the spatial scale at which ecosystem services are generated, even thought is on farms that actions to maintain natural capital and improve ecosystem services must be taken if cumulative impacts on ecosystem services are to be avoided.

Water quality, for example, is produced at a watershed scale, biodiversity at a landscape scale, and carbon sequestration at a small scale, but with global additive effects.

Watersheds have increasingly come to the fore as spatial units for which natural capital and ecosystem services are analyzed (Montgomery et al.1995; Napier 1997) and managed (Duram and Brown 1999; Lant 1999). The U.S. EPA lists over 2000 watershed-based groups and some 20,000 water bodies and stream segments are in violation of water quality requirements. The Clean Water Act requires about 40,000 Total Maximum Daily Load (TMDL) plans to be written for these water bodies—mostly for sediment, N and P, common agricultural sources of polluted runoff. However, management practices that create clean water may also facilitate, for example, biodiversity, soil formation, and carbon sequestration; ecosystem services are often complementary.

Because of these difficulties, water resources and land-use planning in multiple-owner, largely private watersheds have been fragmented and subject to a variety of for cesoriginating both within and outside the watershed (Rogers 1993). The results of this style of watershed management have been particularly detrimental to the aquatic ecosystems of the U.S. in the 20th Century, despite large expenditures to build, operate and administer pollution control facilities.

Broad cross-sectional data refer to a general decline in reverie ecosystem health attributable to excessive water withdrawals, channel modifications, erosion and sedimentation, deterioration of substrate quality, chemical contaminants, over fishing, increases in impervious surface, and the introduction of exotic species (Adler et al. 1993).

The result of this conceptual analysis is presented visually as Fig 1 and verbally below. (Costanzia et al. 1997) the companion book (Daily 1997) ideas about cumulative impact assessment(Preston and Bedford 1988) and the human dimensions of global environmental change (Stern et al.1992). provide an excellent framework for conceptualizing the interaction between socio-economic and biophysical processes in watersheds. Globalization, property rights to resources, demographic trends, technological capacities, intellectual orientations and values are among the social driving forces reflecting macro-scale social structures. These forces are manifested and reproduced differentially in special watersheds as variable decision environments. Land and water managers, acting as agents, utilize their natural, financial, human and other resources to respond to these social structures in pursuit of their goals and objectives. The outcome of this process is land and water use decisions. These decisions bring into being important economic and ecological outputs while generating spatial and temporal patterns of land and water use activities within the watershed as an environmental system.

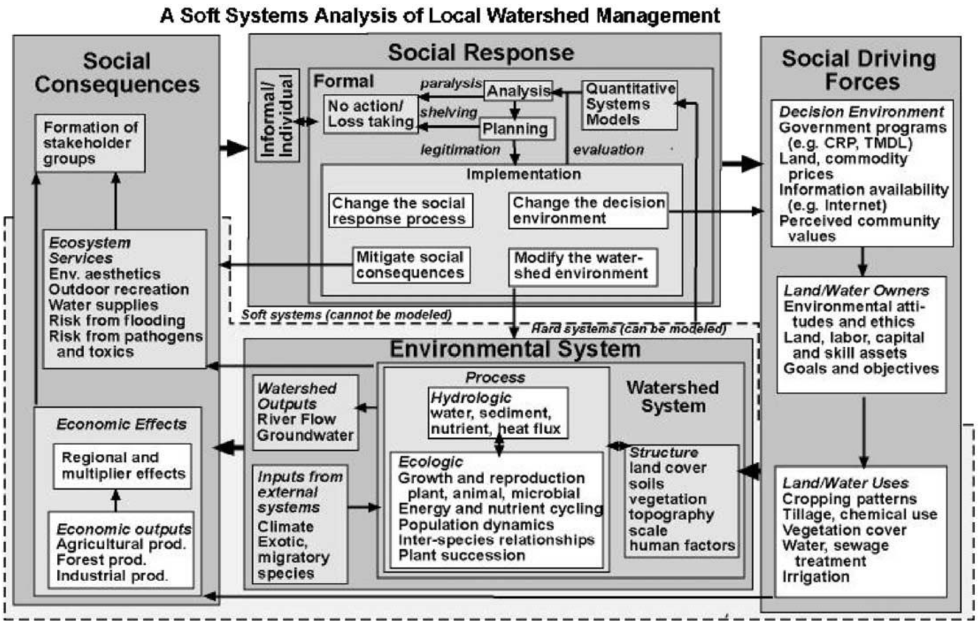


Figure 2.1. A soft systems analysis for locally led management of watersheds

This interaction between structure and process within the watershed produces a suite of ecosystem services that may or may not be vital to immediate stakeholders in the watershed groups that have an interest, economic or otherwise, in the economic and or ecosystem service outputs of the watershed. However, the services may have considerable importance to stakeholders removed from the watershed as well as residents in the watershed who are not directly involved in making land-use decisions.Perceived conflicts and trade-offs, as well as potential complementarities, among economic and ecosystem service products of the watershed set the stage for a social reply.

This social response is generally not confined to the watershed but is constrainedly the social structures within which other issues are addressed in the geographic region in which the watershed lays.

Changes in socioeconomic forces at the international scale, for instance, can cause changes in prices for agricultural or forestry products produced or potentially produced in the watershed. Changes in national policy can manipulate these prices (e.g. counter cyclical payments tied to prices initiated in the 2002 Farm Bill), pose restrictions on eligibility for federal subsidies or insurance programs (e.g. cross compliance), or create opportunities to generate income by producing ecosystem services rather than, or along with, marketable commodities (e.g. CRP,WRP or EQIP contracts, carbon farming).

At the local level, watershed planning becomes a viable response strategy, though one that is constrainedly socioeconomic forces operating at larger (state, federal, global market) and smaller (individual and ownerships, units of local government) geographic scales. One possible social response is to commission analyses, such as reported here, to improve understanding of system interactions and the consequences of alternative managerial options. A second is to change the decision environment (prices, taxes, regulations) to which land and water owners and managers respond. A third is to directly adjust the watershed as a physical system. A fourth is to mitigate the environmental consequences as symptoms.

Over historical time, response strategies are pursued, successes and failures are achieved, and human behaviors are altered. The biophysical system responds to these alterations, and a new set of ecosystem service flows is generated that may be different from the initial set in both the quantity and quality of service flows as well as the types of services produced. This new set may contain the same or different environmental problems as defined by a changing society. Following the adaptive management theme (Lee 1993), ecosystem service goals and the strategies to achieve them are continually reassessed and adjusted as environmental and social learning occurs through experience, captured as institutional memory (Wiebe and Crosson 1999). For the purpose of managing for ecosystem service production, watersheds are therefore usefully conceived as complex adaptive systems. Moving beyond a soft systems conceptualization to a hard systems model is not currently achievable for all components of the watershed system as presented in Figure 2.1, especially for the social response component that, in fact, uses such models. Below we develop an SDSS that is structured by the conceptual presentation above and includes many of the critical components shown within the hard systems portion of Figure 2.1.

2.2. Geoformation Technology

Geoformation technology includes Remote Sensing RS Geographic Information Systems GIS and Global Positioning System GPS and their integration form the basal and essential technical core of the system of geospace information science. The compilation of remotely sensed data facilitates the synoptic analyses of earth-system function, patterning, and change at local, regional, and global scales over time; such data also provide an essential link between intensive, localized ecological research and the regional, national, and international conservation and management of biological diversity Wilkie and Finn (1996).

2.3. Remote Sensing (RS)

Baumgardner (1980) defines remote sensing as a series of reactions between matter and radiation, and it is possible to acquire ground information throughout material reflection. Remote sensing is the science and the art of obtaining information about an object, area, or phenomenon through the analysis of data required by a device that is not in contact with the object, area or phenomenon under investigation (Lillesand and Kiefer 1994).

Remote sensing is the science of deriving information about the earth's land and water surfaces using images acquired from an overhead perspective, using electromagnetic radiation in one or more regions of the electromagnetic spectrum, reflected or emitted from the earth’s surface (Campbell 2002).

2.4. Geographical Information System (GIS)

Geographic Information Systems (GIS) are specialized computer programs designed to analyze spatially referenced data. A computer supplies storage, manipulation, and display large amounts of geospatial data that have been encoded in digital form. Generally stated, geospatial data portray attributes accurately associated with positions on the earth's surface, including every day examples such us highways maps, property records, census surveys, or remotely sensed images.

The theory and practice of designing and using GISs forms a body of knowledge known as Geographic Information Science, which is pertinent not only to GIS, but also to remote sensing, cartography, and spatial statistics (Campbell 2002).

GIS is a system for managing spatial data. In the strictest sense, it is a computer system which has the capacity to integrate, store, edit, analyze and display geographically-referenced information. In a more generic sense, GIS is a “smart map” tool that allows users to create interactive queries, analyze spatial information and edit data (Sobeih 2005).

Geographical Information System is a computerized system that simplifies the phases of data entry, data analysis and data presentation especially in cases when we are dealing with georeferenced data (de By et al. 2004).

2.5. Using of GIS In Plants Sector

The graphical representation of spatial soil properties in a digital environment is complicated because it requires a conversion of data collected in a discrete form onto a continuous surface. The objective of (Piedade et al. 2014) study was to apply three-dimension techniques of interpolation and visualization on soil texture and fertility properties and set up relationships with pedogenetic factors and processes in a slope area.The GRASS Geographic Information System was used to generate three dimensional models and Para View software to visualize soil volumes. Samples of the A, AB, BA, and B horizons were collected in a regular 122-point grid in an area of 13 ha, in Pinhais, in southern Brazil. Geoprocessing and graphic computing techniques were effective in identifying and delimiting soil volumes of distinct ranges of fertility properties confined within the soil matrix. Together three-dimensional interpolation and the visualization tool facilitated interpretation in a continuous space volumes of the cause-effect connections between soil texture and fertility properties and pedological factors and processes, such as higher clay contents following the drainage lines of the area.

The flattest division with more weathered soils Ox soils had the highest pH values and lower Al3+ concentrations. These techniques of data interpolation and visualization have vast potential for use in diverse areas of soil science, such as identification of soil volumes occurring side by- side but that exhibit different physical, chemical, and mineralogical conditions for plant root growth, and monitoring of plumes of organic and inorganic pollutants in soils and sediments, among other applications. The methodological details for interpolation and a three-dimensional view of soil data are presented here (Piedade et al. 2014).

The objective of the study of (Kühne et al. 2013) is elicitation study which provides insights into farmers' beliefs which influence their participation in knowledge exchange and innovation networks to enable the enhancement of network participation. A set of facilitating and impeding factors was obtained. Participants identified (a) 13 categories of behavioral beliefs (e.g. 'You learn something' and 'Low perceived return on investment), (b) 4 groups of normative beliefs (influence of colleagues, spouses, network coordinators and chain partners) and (c) 11 control beliefs (facilitators or barriers related to, for example, 'Network skills No time' and 'Perceived restraint by farmers in communicating openly and honestly').

Land-surface processes contain a broad class of models that operate at a landscape scale. Current modeling approaches tend to be specialized towards one type of process, yet it is the interaction of processes that is increasing seen as important to obtain a more integrated approach to land management. This paper presents a technique and a tool that may be applied generically to landscape processes.

The technique tracks moving interfaces across landscapes for processes such as water flow, biochemical diffusion, and plant dispersal. Its theoretical development applies a Lagrangian approach to motion over an Euler an grid space by tracking quantities across a landscape as an evolving front. An algorithm for this technique, know as level set method, is implemented in a geographical information system (GIS).

It fits with a field data model in GIS and is implemented as operators in map algebra. The paper describes an implementation of the level set methods in a map algebra programming language, called Map Script, and gives example program scripts for applications in ecology and hydrology (Pullar 2005).

Plant disease management may be improved by collecting, storing, manipulating, analyzing and displaying epidemiological information using a Geographic Information System (GIS), a useful tool to estimate plant disease problems in a spatial context. In the study of (Mazza et al.2008) GIS analysis was applied along with global positioning systems (GPS) to integrate field data-collected with the spatial distribution of the pathogen Inonotusrickii. This pathogen rouses a decay of sapwood/heartwood and cankers, determining a progressive crown dieback and structural weakness of the trees, therefore increasing risk of branch breaks and tree failures. In this survey, I rickiiwas recorded also on Robiniapseudoacacia, which is a new host. The study allowed obtaining thematic maps showing the spatial distribution of all infected trees, as well as the presence of anamorph and teleomorph structures of the fungus. Moreover, a map representing the incidence of the pathogen in dissimilar boulevards was obtained. The usefulness of GIS analysis in studies aimed to support and refine management strategies for disease control in urban trees is discussed (Mazza et al. 2008).

The Sino-German Project between the China Agricultural University and the University of Cologne, Germany, concentrates on regional agro-ecosystem modeling. One major focus of the cooperation activity is the establishment of joint rice field experiment research in Jiansanjiang, located in the Sanjiang Plain (Heilongjiang Province, north-eastern part of China),

to look into the different agricultural practices and their impact on yield and environment. An additional task is to set-up an Agricultural Environmental Information System (AEIS) for the Sanjiang Plain (SJP), which covers more than 100 000 km2. Research groups from Geography (e.g. GIS & Remote Sensing) and Plant Nutrition (e.g. Precision Agriculture) are involved in the project.

The major goal of the AEIS for the SJP is to supply information about (i) agriculture in the region, (ii) the impact of agricultural practices on the environment, and (iii) simulation scenarios for sustainable strategies. Consequently, the AEIS for the SJP supplies information for decision support and therefore could be regarded as a Spatial Decision Support System (SDSS), too. The investigation of agricultural and environmental issues has a spatial context, which requires the management, handling, and analysis of spatial data. The use of GIS enables the capture, storage, analysis and presentation of spatial data. Therefore, GIS is the major tool for the set-up of the AEIS for the SJP. This contribution reveals the results of linking agricultural statistics with GIS to provide information about agriculture in the SJP and discusses the benefits of this method as well as the integration of methods to produce new data (Zhao et al. 2012).

Leaf water has a particular significance for some applications, including plant organic materials that record spatial and temporal climate variability and that may be a source of food for migrating animals. It is also an important source of the variability in the isotopic composition of atmospheric gases. Though efforts to model global-scale leaf water isotope ratio spatial variation have been made (especially of d18O), significant uncertainty remains in models and their execution across spatial domains. A Geographic Information System (GIS) approach to the generation of global, spatially explicit isotope landscapes (isoscapes) of ‘‘climate normal leaf water isotope ratios. The results show global-scale spatial coherence in leaf water isotope ratios is like that observed for precipitation and validate the GIS approach to modeling leaf water isotopes. These results demonstrate that relatively simple models of leaf water enrichment combined with spatially continuous precipitation isotope ratio and climate data layers yield accurate global leaf water estimates applicable to important questions in ecology and atmospheric science (West et al. 2008).

Biodiversity sampling is a very serious task. When biodiversity is not representative of the biodiversity spatial pattern because of few data or uncorrected sampling point locations, successive analyses, models and simulations are inevitably biased. In this work, a new solution proposed to the dilemma of biodiversity sampling. The proposed approach is proficient for habitats, plant and animal species; in addition it is able to answer the two pivotal questions of biodiversity sampling:1, how many sampling points and 2) where are the sampling points (Ferrarini 2012). The capacity to detect disease outbreaks in their early stages is a key component of efficient disease control and prevention. With the increased availability of electronic health-care data and spatio-temporal analysis techniques, there is great potential to develop algorithms to enable more effective disease surveillance. However, to ensure that the algorithms are effective they need to be evaluated. The objective of (Watkins et al. 2007) research was to develop a transparent user-friendly method to simulate spatial-temporal disease outbreak data for outbreak detection algorithm evaluation. A state-transition model which simulates disease outbreaks in daily time steps using specified disease-specific parameters was developed to model the spread of infectious diseases transmitted by person-to-person contact. The software was evolves by using the Map Basic programming language for the MapInfo Professional geographic information system environment. The simulation model developed is a generalized and flexible model which utilizes the underlying distribution of the population and incorporates patterns of disease spread that can be customized to represent a range of infectious diseases and geographic locations. This model provides a means to explore the ability of outbreak detection algorithms to detect a variety of events across a large number of stochastic replications where the influence of uncertainty can be controlled. The software also gives the way to the historical data which is free from known outbreaks to be combined with simulated outbreak data to produce files for algorithm performance assessment (Watkins et al. 2007).

The paper of (AL et al. 2015) briefly describes the status of temperature and Chlorophyll-a trend in Kalpak am Coast, argues its ecological and temperature impacts recommending measures to achieve long term sustainability using advanced tools like Geographic Information System (GIS). The monthly spatial distribution of Temperature and Chlorophyll-a at Kalpak am. Transect based in-situ Temperature and Chlorophyll-a collected at 200m, 500m and 1km distance into the sea was interpolated using the Inverse Distance Weight age (IDW) method in ARC GIS. Data expressed the extent of spatial distribution of thermal effluent in Kalpak am. It might be found that temperature range of 26.2 to 31.9°C provided substantial Chlorophyll-a concentration between 0.8 to 2.9 mg/m3 for surface and bottom waters. Further, increase of Chlorophyll-levels did not lead to higher productivity.

Combined temperature and chlorophyll a showed little synergistic effects. It is concluded that the effect of thermal discharge from the power plant into the receiving water body is quite localized and productivity of the coastal waters are not affected. From the results obtained, the spatial data has been found to be useful in determining sites of safe use of seawater and to understand the extent of relationship between the relatable parameters.

The Navstar–gps (Navigation System with Time and Ranging – Global Positioning System) has been under development by the US military since 1973.

From 1993 the system has consisted of twenty-one active satellites and three spares. The satellites orbit the earth at an altitude of 20200km. Their orbits are arranged in such a manner that at least four of them are in direct line of sight at any point of the earth's surface, 24 hours a day, if the line of sight is not obstructed by buildings, vegetation or steep topography. The use of GPS has been developed for real-time navigation and for geodetic positioning (Konecny 2003). GPS, a process used to establish a position at any point on the globe.

The Following two values can be determined anywhere on earth:

1. One's exact location (longitude, latitude and altitude) accurate to within arrange of 20m to approx.1mm.

2. The precise time (Universal Time Coordinated, UTC) accurate 60ns to approx. 5ns. Speed and direction of travel (course) can to within a range of these be as well as the time.The coordinates and time values are derived from these coordinates as well as the time. The coordinates and time values are determined by 24 satellites orbiting the earth. During the development of the GPS system, particular emphasis was placed on the following three aspects:

1. It had to provide users with the ability of determining position, speed and time, if in motion or at rest.

2. It had to have a continuous, global, 3-dimensional positioning capability with a high degree of accurateness, Irrespective of the weather.

3. It had to offer potential for civilian use (Zogg 2002).

2.6. Landsat Satellites and Types of Sensors

Land sat satellite was proposed by scientists and administrators in the U.S. government who envisioned application of the principles of remote sensing to broad-scale, repetitive surveys of the earth's land areas. (Initially, Land sat was known as the "Earth Resources Technology Satellite," "ERTS" for short.) The first Land sat sensors recorded energy in the visible and near infrared spectrums. Although these regions of the spectrum had long been used for aircraft photography, it was by no means sure that they would also prove practical for observation of earth resources from satellite altitudes.

Scientists and engineers were not wholly confident that the sensors would work as planned, that they would prove to be reliable, that detail would be satisfactory, or that a sufficient proportion of scenes would be free of cloud cover. Although many of these problems were encountered, the feasibility of the basic thought was demonstrated, and Land sat became the model for similar systems now operated by other organizations (Campbell 2002).

The Landsat system consists of spacecraft-born sensors that monitor the earth and then transmit information by microwave signals to ground stations that receive and process data for dissemination to a community of data users. Early Landsat vehicles carried two sensors systems: the return beam Videocon (RBV) and the multispectral scanner subsystem (MSS) (Campbell 2002).

The RBV was a camera-like instrument designed to provide, relative to the MSS, high spatial resolution and geometric accuracy, but lower spectral and radiometric detail. That is, positions of features would be accurately represented, but without fine detail regarding their colors and brightness's.

(Campbell 2002) mentioned that the MSS is a scanning instrument utilizing a flat oscillating mirror to scan from west to east to produce a ground swath of 185 km. Perpendicular to the orbital track. The satellite motion along the orbital path equips the along-track dimension to the image. Solar radiation reflected from earth's surface is directed by the mirror to a telescope-like instrument that focuses the energy onto fiber-optic bundles located in the focal plane of the telescope.

The fiber-optic bundles then transmit energy to detectors sensitive to four spectral regions. The instrument field of view (IFOV) of a scanning instrument can be informally defined as the ground area viewed by the sensor at a given instant in time.

2.7. Applications of Remote Sensing for Soil

The spectral reflectance of soils is determined by physical factors quite different from those of vegetation. Soil reflectance commonly increases with increasing wavelength. The relative contributions of moisture content, iron-oxide content, organic matter content, particle-size distribution, mineralogy, and soil structure to reflectance of naturally occurring soils have been thoroughly reviewed (Irons et al. 1989). Accordingly, mapping and dating soil organic matter is vital to precise agriculture and soil evaluation. However, traditional remote sensing data seems not to be well adopted for mapping soil organic matter. Firstly, diagnostic characteristics of soil nitrogen are generally weak because of poor content. Secondly, mapping of soil organic matter is relative difficult because many other soil chemical and physical properties (e.g., moisture, surface roughness, nitrogen) also influence soil reflectance (Ben1999). Studies by Montgomery and (Baumgardner 1974) and Stoner and (Baumgardner 1981) expressed that reflectance of soil is cumulative property resulting from the heterogeneous contribution of organic matter, iron oxide, moisture, granulometry, and structure.

Remote Sensing and GIS techniques are being efficiently used in India for preparation of soil erosion inventories by integration of physiographic, soils, land use/ land cover, slope map layers and use of ancillary data of agro-met and soil physic-chemical properties (Saha 1996).

In the study of (Thine 2004) revealed that high-resolution soil spectral reflectance was shown to provide repeatable predictions and classification of soils in terms of their physical properties and conditions. Most of the spectral calibrations with physical properties showed coefficient of determinations 2 > 0.55 that are comparable to commonly published pedotransfer functions.

The vegetative degradation escorted with an increase in the sand dune accumulation area from 2.5 to 5.0% from the whole study area for some site in Iraq, increasing from the low degraded (IV) to medium degraded level (III). Rate of sand dunes expansion during the ten years of study was 10.2 km2Year-1. The decrease in the water bodies' area was 228.1 km2, while about 8.5% of total study area had a negative change in their soil/vegetation wetness, showing an expansion rate of 92.8 km2.year-1 during the period from 1990 to 2000 (Fadhil 2009).

2.8. Application of Remote Sensing for Water Resources

Water bodies have low reflectivity, especially in Near Infrared and Mid Infrared bands (bands 4, 5 and 7 of TM and ETM+). Several proceedings have been developed to identify flooded areas based on the low reflectivity of water in these spectral regions. Some indices have been proposed to automatically determine the inundation level in Land sat scenes. (Angel-Martinez 1994) suggested the CEDEX index to discriminate continental waters:

CEDEX = (Â4/Â3) − (Â4/Â5) -------- 6

Where B4 denotes TM or ETM+ band 4. According to (Castaño et al. 1999)

CEDEX values below 0.4 are inundated areas.

Pure water reflects some of the incident radiation in the visible bands of the electromagnetic spectrum and absorbs roughly all of it in the near- and middle-infrared bands. Therefore, in the infrared, water appears dark and is easily distinguishable from other land features. The spectral reply of water can vary with the presence of suspended sediments, which increase the amount of radiation reflected. Some of these sediments, such as suspended solids from soil erosion, can significantly impact the spectral reflectance and be identified easily in the visible bands. Phytoplankton cannot be easily distinguished from inorganic materials by common satellites (Landsat). Even other more specific sensors (Sea WiFS, MODIS) demand complex and sophisticated calibrations. Surface water is one of the best known applications of remote sensing to water resources is the inventorying of surface water bodies, particularly streams, lakes, marshes and bogs, within a given region.

The area covered by open water is readily delineated by various remote- sensing techniques due to the particular radiation characteristics of water. Decreased reflectivity of soils moisturized at the surface facilities the delineation of recently flooded areas, if these are barren.

The delineation of floods in vegetation-covered areas is more difficult, but is possible either by use of radar or via a combination of radiation and topographic data. Remotely sensed data gained by flood-plain characteristics can be combined with data obtained during floods for flood mapping and delineating flood hazard areas.Characteristics of river channel like width, depth, roughness, degree of tortuous and braiding can also be obtained from remote-sensing surveys (Koudmani 2004).Suspended sediments are the most common pollutant both in terms of weight and volume in surface waters of freshwater systems. Suspended sediments might serve as a surrogate contaminant in agricultural watersheds since phosphorus, insecticides, and metals adhere to fine sediment particles. Suspended sediments raise the radiance emergent from surface waters in the visible and near infrared proportion of the electromagnetic spectrum (Ritchie and Schiebe 2000).

The study of (Qader 2010) incorporated the Geoinformation technology (RS, GIS, and GPS) into monitoring, mapping, and assessment of the drought phenomenon that affected strongly Iraq including the Iraqi Kurdistan region during the recent years. It targeted at drought monitoring for six districts in Sulaimani governorate, the Iraqi Kurdistan region. Three Land sat images which were taken in different dates (1990, 2007 and 2008) were employed for this study.

2.9. GIS Studies in Agriculture in Iraq

The study area lies in the central part of Iraq, in Al-Anbar Governorate, it covers about (4400) km2.It includes Al-Habbinya Lake which represent touristic region and waterish reserves used for water balance management of Euphrates River. Remote sensing and GIS mechanisms were adopted as practical tools for long term monitoring of Al-Habbinya Lake (1990-2001) to study Environmental change detection in the study area using ERDAS 9.1 Imagine and Arc GIS 9.1 programs.

Supervised classifications were applied for the LANDSAT-5 and LANDSAT-7 images to class the data and determine the change which happened during the period (1990-2001).

The outcomes of these processes are two classification maps display eight classes of the land cover types for TM (1990) image in total classification accuracy reached 91.14% and a kappa coefficient 0.8989, eight classes of the land cover types for ETM (2001) image in total classification accuracy reached 93.06% and a kappa coefficient 0.9221. The obtained result reveals increase in area of vegetation, muddy soil, moist land and decrease in area of water, bare soil, bare soil with gravel, and sabkha during the period from 1990 to 2001(Ahmed et al. 2012).The research of (Abed 2008) has the goal to employ the ability of Remote Sensing & GIS (Geographical Information system) techniques to classify Darbandikhan soil basin in the northern of Iraq (Kurdistan region), The importance of this research is the ability of using the digital geotechnical map in the hydrological work such as find surface run-off ,The research done through many phases the first stage is a maps collection (topographic map, satellite image) for study area , second stage is a site visit for collect soil sample and using radiometer device in field to record the spectral reflectance to recognize different soil type by their reflectance.

The third stage is a laboratory test stage (liquid limit ,plastic limit, moisture content ,sieve analysis and hydrometer test) are used for unified soil classification , final stage is input data stage through ERDAS 8.4 program to obtain geotechnical map for the all basin, The map shows there are (five)main types of soil in Darbandikhan basin (Inorganic silts, clayey sands, salty, sands,silty soil, inorganic clay) and that each type is a heavily represented in the region.

The marshes of the southern part of Iraq are seen as the most outstanding feature in the area. They are developed within the Mesopotamian Plain forming natural balance between the Tigris and Euphrates Rivers and Shat Al-Arab that leads to the Arabian Gulf.

The marshes that are locally known as "Ahwar" have suffered from drying processes, since early eighties of the last century. During the late nineties, large parts were dried leaving barren salty (Sabkha) lands devoid of all types of life, especially those related to the large water bodies, beside human activities. Moreover, hydrological and climatic changes that obviously could be observed in the areas involved.

To notice the considerable changes, in land use and land cover, remote sensing techniques and GIS applications were used; among these are Landsat images in three different intervals: MSS in 1973, TM in 1990 and ETM in 2000. These were used in the changes detection method. Moreover, different digital image processing techniques that are available in ERDAS program were applied. Normalized Difference Vegetation Index (NDVI) was also used to distinguish the vegetation cover. The classified images were converted to vector shape in GIS media in each class; the area of each class is determined as percentage from the total coverage area of the marshes.

(Jabbar et al. 2010) revealed that large changes occurred between 1973 and 2000 in land cover and land use. The barren land is increased; while the water bodies are decreased drastically, consequently desertification is increased causing large environmental and hydrological changes that affected on the physical and chemical properties of the soil. The soil became unfertile and not appropriate for agricultural purposes. The marsh areas were also abandoned by the local people due to the mentioned changes.

Since 2004, great efforts are carried on in the marsh areas to rehabilitate and reactivate the marshes. Therefore, plentiful parts of the marshes have grown again; local people started to reconstruct their communities. Some types of birds, fishes and vegetation reappeared again. The coverage area of the marshes is about 50% of the original marsh areas, hitherto (Jabbar et al. 2010).

The process of matching of the most vital functions that are used in geographic information systems, which are based on the introduction of data on the phenomenon of study in the form of layers so as to include every layer of a specific topic it is entered in the form of files and a set of files for these classes base of geographic information, where they are conducting operations match of the factors affecting the phenomenon studied in the form of maps and when you agree to give out any agent with the distribution of the phenomenon studied indicates that the existence of a link and match the phenomenon being studied with the factors affecting them, and the subject of our research was to base on a set of maps of the wheat crop and the factors affecting it in the form of layers was treatment and conduct compliance Environmental wheat crop through the Arc view GIS using window Geoprocessing and conducting operations compliance group maps that represent the factors affecting the wheat crop has been reached to prepare a map of the corresponding environmental wheat crop in hand Alaiadip of the district of Tall Afar in Nineveh province(Al Azawe and Ibrahim 2012).

The project of (Hassan et al. 2012) examines the use of GIS and Remote Sensing in mapping vegetation Cover in Babil governorate between 1976 and 2010 so as to sense the changes that has taken place in this status between these periods. The remotely sensed data used in this study were NDVI images created from ETM+, TM, MSS sensors on board Land sat Satellites. The results produced from these NDVI images gave good indicators of vegetation degradation through the period 1986 – 1992 in the form of image maps. The final result was the image map grants an assessment for desertification, which gives good indication of areas decertified and those under risk of desertification. The remote sensing and geographic information system techniques were used to assessment and mapping of desertification over large areas of Babil governorate in the center of Iraq.

The study of (Khidir and Khalaf 2012) aims to value surface run off for Barat watershed located in northern west of Sinjar at the Iraqi-Syrian border in northern west of Iraq.

This watershed area is (267.9) km2. By using GIS a study was fulfilled on study area of Barat watershed which concluded that it was 5th rank and has longitudinal shape and topography percentage was (0.81), watershed textures (37.86) drain density (1.96) river branching, Annual expected runoff according to the morph hydro climatic elements was (0.585907233) meter milliard cubic.

Oil projects in the province of Basra are widely spread and remarkably increasing as they are considered to be of a noteworthy impact on the environment of this region in elements of air, water and soil. This is due to the presence of toxic elements in the air as a result of fuel, or waste thrown into the water. So, this research addresses to study the amount of the pollutants concentration that are discharged by Shuaiba refinery which is located in Basrah province and works for about 24 hours daily.

To assess the impact of the refinery on the river, 36 water samples were gathered for six months period (from December 2014 - May 2015) as well as field measurements and laboratory analyses for the purpose of getting appropriate solutions and proposals as much as possible. 180 field measurements have been achieved include electrical conductivity (EC) total dissolved solids (TDS), turbidity, water temperature, and hydrogen ion concentration (pH). In addition, 342 water samples have been prepared to measure several physical and chemical characteristics (NH3, NH4, NO2, NO3, SO4, Cl and Ca, oil and grease, and total hardness) inside and outside Shuaiba refinery in the study area. Measurements of these pollutant concentrations were performed on six sampling sites; one inside the wastewater collection tanks of the refinery and the remained five sites along the Shatt Al-Basrah River.

The locations of these sites were selected according to the land use map of Land sat 8 data 2015 and the coordinates of each sample location was measured precisely by GPS. The analysis, pollutants concentration maps and their locations on the satellite image were executed by using Arc GIS 10.3 and ERDAS 2013 software.

The field and laboratory test results of water samples indicated high pollutants concentrations during December, April and May months, while there were a decreased pollutants concentration particularly during the month of March. It is observed the high reflectivity values in areas that contain contaminants (turbidity) or oily spots with a purity of more sites. The calculations of water quality index (WQI) for all the study sites are within the range of 11.79 to 21.31. Accordingly, the overall WQI class of the study sites in Shatt Al- Basrah River can emphasized within "poor category" in the polluted range according to studied sorts of water pollution. The deterioration of the Shatt Al-Basrah water quality is observed toward south of Basrah city due to the pollutants flow into the river (Karim et al. 2016).

The research of (Mohammed 2011) represents part of the current attempts to employ remote sensing data in the scopes of the civil engineering and the geotechnical engineering applications. There is enormous need to know the kinds of soil and their geotechnical properties, to create recent maps which have the capability and high flexibility to deal with them in digitizing way. Therefore GIS techniques are employed in the soil of area of study.

By using Arc View software, a geographical database and information about soil chemical properties analysis have been registered and constructed digitally to represent the geotechnical soil characteristics maps. The work includes the digital image processing (digital classification techniques) by using ERDAS, ver., 8.4 package, and divide the soil of study area by using the superviser and unsupervised techniques.

The geotechnical maps by using GIS techniques depend on remote sensing data are the better to represent the ground truth concerning the characteristics of soil, in comparison with the traditional method, because they are easy way to produce, use, store and update, in addition they save in efforts, time and cost. The results of this study have shown that the soil of study area is gypsum where it ratio exceeded the allowable ratio (10.75 %) for all samples. In addition the total Soluble Salts ratio and SO4 ratio high compared to allowable ratio (10%, 5%). Respectively

2.10. Soil Fertility and GIS

The study of (Akhter et al. 2010) was conducted in district Hyderabad of Pakistan to map the soil fertility using GIS software under different agricultural practices. Cotton, wheat and sugarcane are the major crops cultivated in the region. Because of ariding climate, irrigated agriculture in the region depends mainly on water withdrawal from Indus River while some farmers use tube-wells. Key characteristics of the region are intensive cropping, imbalanced useof fertilizers, unreliable and poor quality of the irrigation water which resulted in less fertile soils. However, there is yet no detailed spatial information with respect to the status of the micro and macro nutrients in the soils. The soil samples were taken from 80spatially distributed locations from a depth of 0-60 cm. Soil samples were analyzed for texture, electrical conductivity, pH, total nitrogen, available phosphorus, potassium and micro nutrients (Zn, Cu, Fe, Mn and B). The data regarding fertilizer application, cropping pattern, crop rotation and irrigation practices were also collected from the farmers. The interpolated maps for the status of micro and macro nutrients show a clear deficiency of nutrients across the district. Nitrogen is deficient in 96 %, potassium and phosphorus are below the critical levels in 95 and 76% of the soils of the irrigated area, respectively. Organic matter is below recommended levels in 95% of the cropping area. More than 50% of the area has sandy loam to sandy clay loam soil texture.

The cotton-wheat rotation does not supply any time for soil recovery and there for intensive cropping followed by mismanaged heavy irrigation and insufficient and unbalanced fertilization caused nutrient deficiencies in the soils of this region.

The global challenge of meeting increased food demand and protecting environmental quality will be won or lost in cropping systems that produce maize, rice, and wheat. Fulfilling synchrony between N supply and crop demand without excess or deficiency is the key to optimizing trade- offs amongst yield, profit, and environmental protection in both large-scale systems in developed countries and small- scale systems in developing countries. Although advances in basic biology, ecology, and biogeo- chemistry can give answers, the magnitude of the scientific challenge should not be underestimated because it turns into increasingly difficult to control the fate of N in cropping systems that must sustain yield increases on the world's limited supply of productive farm land (Cassman et al. 2002).

Although soil fertility is recognized as a principal constraint to agricultural production in developing countries, use of fertilizer in Sub-Saharan Africa is declining. Smallholder farmers still rely heavily on livestock manure for soil fertility management. To explore the determinants of soil fertility management practices, including both the use of cattle manure and inorganic fertilizer, data are used from a sample of 3,330 geo-referenced farm households across Central and Western Kenya. A bivariate probit model is applied to jointly examine the use of the two technologies. Particular attention is given to measures of location related to market access and agro climate, which in the adoption literature have typically been addressed using crude proxies. To avoid such proxies, GIS-derived variables are integrated into the household decision model. Their use also permits the spatial prediction of uptake based on parameter estimates.

The results of (Staalet al. 2003) show plainly the derived-demand nature of soil fertility services, based on markets for farm outputs. They also clarify that supply of manure for soil fertility amendments is conditioned by demand for livestock products, especially milk. The integration of GIS-derived variables is shown to better estimate the effects of location than the usual measures employed, and offers scope to wider use in technology adoption research.

Soil fertility can be seen in an economic framework, in the context of derived demand emanating from farmer objectives for utility through farm product sales and consumption.

The demand for the services that farm land or farm soil offers is thus largely derived from the need for that land as an input to farm production, whether of crops directly or indirectly of livestock through pasture, planted forages or crop residues. Soil fertility management practices can be sighted as management of soil services, to increase the quality and durability of those services. Increased demand for soil services is likely to lead to increased use of soil fertility management practices.

In that conceptual context, the spatial location of a specific plot of land has several important aspects. If demand for soil services is derived from marketed outputs, then level of market access, and associated transfer and transactions costs will influence that order, as well relative prices of outputs, factors, and inputs. Every location will of course have particular market access characteristics that are associated with distances to demand and supply centers and quality of transport/road infrastructure (Omamo et al. 2002).

in another study of soil fertility management in Kenya, explain that level of fertilizer use is significantly related to market access costs. As well as on the output side, market access will also impact the real price of fertilizer or soil nutrients sourced from the market to be applied on farm. Within the farm, increased distance of a plot from the farm household may alter demand for soil services, either via lowering the effective prices of outputs or increasing input costs, and both through increased within-farm transport costs. Location of the farm land also has obvious supply side characteristics, particularly in the form of agroclimate; in the nonattendance of climate change, rainfall and temperature patterns will be fixed on average, and soil type and characteristics only partially amenable to change. These affect the quality of soil services, and their marginal productivity.

An area where economists have put a lot of effort, yet where they have systematically under-represented spatial factors, is in the understanding of choices in farm practices, among which soil fertility management is an instance.

This despite the fact that processes such as the diffusion of information and agricultural technology are dynamic and often spatial (Bockstael 1996).

Akhter et al. (2010) get ready detailed maps using GIS for the soil fertility of the region and to tie the status of fertility with agricultural practices. Soil samples were analyzed for texture, electrical conductivity, pH, total nitrogen, available phosphorus, potassium and micro nutrients (Zn, Cu, Fe, Mn and B).

Juan et al. (2008) shows that using application of organic fertilizer have a significant effect on carbon microbe and nitrogen microbe and changed from 96.49 to 500.12 mg / kg. and nitrogen microbe changed from 35.89 to 101.82 mg / kg Compared with other treatments that didn’t use organic fertilizer as well as increasing the soil total nitrogen and soil total phosphor ratios, some of soil microbial properties and soil enzyme activities were significant.

Soil organic matter plays a key role in soil biological and chemical processes, and changes in soil organic matter powerfully influence soil N turnover because of the importance of available C for microbial immobilization. Soils with higher organic matter contents may immobilize more N and reduce N loss to the environment. Otherwise, the depletion of available C will cause more rapid N turnover and losses. In addition, changes in N availability can also alter soil C turnover.

There is no doubt that higher crop production in reply to mineral N fertilizer application results in greater root exudates and more crop residues, thereby enhancing SOC sequestration in agricultural soils.

In addition increasing N fertilizer application can settle down organic matter and retard the mineralization of older soil organic matter. N fertilization plays a positive role in enhancing the SOC. However, the addition of N fertilizer has also been reported to have a negative or no effect on SOC accumulation Changes in the decomposability of fresh plant litter and soil organic matter fractions.

the stability of soil aggregates, and/or shifts in the microbial community can be used to eveal the decreases in SOC attributed to N fertilizer addition. Therefore, achieving a better understanding of the interaction between N fertilizer and SOC in agricultural soils is essential for maximizing SOC storage and minimizing potential N losses.

Intensive vegetable production systems in northern China differ from other ecosystems in which excessive nutrients and water are applied, which far exceed the resources needed for vegetable growth. As shown in previous studies, these practices have resulted in serious N losses to the environment. Thus, more work was done to understand how to reduce N fertilizer input with optimal N and irrigation strategies, along with catch crops in the intensive greenhouse vegetable cropping system.

In a conventional greenhouse vegetable planting system, most of the plant residues are removed at harvest out of fear of infecting the next crop with fungi and other pathogens. Vast amounts of organic manure with a low C/N ratio, such as poultry manure and pig manure, are the main soil carbon supplements in the greenhouse vegetable cropping system in northern China. Excessive N fertilizer application is also a significant feature of this cropping system. However, it is unclear how the continuous application of poultry manure and excessive mineral N affects the soil organic matter and total N. Whether lower optimized N fertilizer inputs will alter the accumulation of soil organic matter and total N in the greenhouse field. A greenhouse tomato experiment into which different N management strategies were introduced was conducted from 2004 to 2010 in Shouguang country, the largest greenhouse vegetable production region in northern China. In contrast to common farming practice, optimal N management could lower mineral N fertilizer input by 72% without decreasing the fruit yield.

In the experiment of (Ren et al. 2014) different types of organic manure, including conventional dry chicken manure and wheat straw, were applied.This environment provided an opportunity to obtain a better understanding of the influence of organic manure together with mineral N inputs on the SOC and total N pools, and determine if decreasing mineral N fertilizer input will alter SOC and TN accumulation. Moreover, it provided a chance to analyze the influence of changes in the SOC pool on N losses in the greenhouse vegetable cropping system. Evaluating this system will be of great assistance in improving management practices for maintaining soil fertility and productivity while minimizing potential N losses from the high input greenhouse vegetable cropping system.

Ren et al. (2014) reported The Effects of Manure and Nitrogen Fertilizer Applications on Soil Organic Carbon and Nitrogen in a High- Input Cropping System.

Phosphor fertilization usually increased shoot growth and significantly decreased the number of galls and the number of egg masses and eggs per g root, a research results mark that inoculation with Glomusintraradices and P fertilizer confer tolerance of cucumber plants to nematode M. by enhancing plant growth and by suppressing reproduction or galling of nematodes during the early stages of plant growth (Zhang et al. 2009). Field experiments of (Adesina et al. 2011) were conducted to study the effect of water hyacinth (Eichhorniacrassipes), and neem (Azadirachtaindica) based compost on the growth, fruit yield and quality of cucumber (Cucumissativus). The treatment consisted of six different fertilizer sorts, namely, 0 kg N/ha (control) 60 kg N/ha through mineral fertilizer (MF); 60 kg N/ha through N compost (NC); 30 kg N/ha through MF+30 kgN/ha through NC; 60 kg N/ha through water hyacinth compost (wc) and 30 kg N/ha through MF+30 kg N/ha through wc.

The treatments were laid out as randomized complete block design with three replicates. Parameter assessed were length of vine, vine girth, number of leaves, leaf area, and number of flowers, fruit yield and nutritional quality. Application of different fertilizer types had noteworthy effects on all the parameters taken. Combined application of 30 kg N/ha through MF and 30 kg N/ha through WC gave plants with the largest vine length, vine girth, leaf area, number of leaves, as well as fruit yield per plant. The values gained for these parameters using this treatment (30 kg MF + 30 kg WC) were significantly higher than what was obtained with non-fertilized plants (control). However, the use of 60 kg N/ha through WC and 60 kg N/ha through NC gave the best fruit nutritional composition. It was therefore inferred that application of 60 kg N/ha through WC and 60 kg N/ ha through NC or combine application of 30 kg N/ha through MF + 30 kg N/ha and WC should be optimal for good growth.

Organic soil amendments stimulate the activities of microorganisms that are antagonistic to plant-parasitic nematodes. The decomposition of organic matter results in accumulation in the soils of specific compounds that might be nematicidal. Adjustments are mainly bio-products and wastes from industrial, agricultural, biological and other activities. Control of plant-parasitic nematodes can be by improvements of soil structure and fertility, alteration of the level of plant-resistance, release of nemato-toxic compounds), parasites (fungi and bacteria) and other nematode antagonistic (biological control agents). The mode of action of organic amendments leading to plant disease control and stimulation of microorganisms is complex and dependent on the nature of the amendments (Akhtar and Malik 2000).

Organic inputs can impress nutrient availability (i) by the total nutrients added, (ii) by controlling the net mineralization-immobilization patterns, (iii) in complexion toxic cat ions and reducing the P sorption ability of the soil. In addition to these direct effects on nutrient availability, organic materials can affect root growth, pests, and soil physical properties that in turn influence nutrient acquisition and plant growth (Palm et al. 1997).

Although soil fertility is recognized as a principal constraint to agricultural production in developing countries, use of fertilizer in Sub-Saharan Africa is declining. Smallholder farmers still rely heavily on livestock manure for soil fertility management. To scout the determinants of soil fertility management practices, including both the use of cattle manure and inorganic fertilizer, data are used from a sample of 3,330 geo-referenced farm households across Central and Western Kenya. A bivariate probity model is applied to jointly examine the use of the two technologies. Particular attention is given to measures of location related to market access and agro climate, which in the adoption literature have typically been addressed using crude proxies. To avoid such proxies, GIS-derived variables are integrated into the household decision model. Their use also permits the spatial prediction of uptake based on parameter estimates. The results express clearly the derived-demand nature of soil fertility services, based on markets for farm outputs.

They also illustrate that supply of manure for soil fertility amendments is conditioned by demand for livestock products, especially milk. The integration of GIS-derived variables is shown to better estimate the effects of location than the usual measures employed, and offers scope to wider use in technology adoption research (Staal et al. 2003).

Wu et al. (2005) The application of Bioferitlizer containing three species of bacteria of N-fixer (Azotobacterchroococcum) P solubilizer (Bacillus megaterium) and (K) solubilizer (Bacillus mucilaginous) on soil properties, significantly enlarged the growth of Z. Mays.

The use of Bioferitlizer resulted in the highest biomass and seedling height. This greenhouse study also signalized that half the amount of Bioferitlizer Application had alike effects when compared with organic fertilizer or chemical fertilizer treatments.

Chahal et al. (1986) a specific investigations that were executed to study the effect of (Azotobacterchroococcum) on the hatching of egg masses and eggs of root not nematode (Meloidogyne incognita in vitro.) Eggs were more susceptible and required lesser time for antagonistic action of (Azotobacter) than egg masses. Experiments were conducted to assess the influence of (Pseudomonas fluorescens, Azotobacterchroococcum), was better at improving tomato growth and lessening galling and nematode multiplication than (A. chroococcum or A) brasilense (Zaki Al Siddiqui 2004).

Application of organic soil amendments is a traditional control way for plant–parasitic nematodes and it is counted as a part of nematode-management programs. A variety of organic amendments, such as animal and green manures, compost, nematicidal plants and portentous wastes, are used for this purpose, but nematode control efficacy is not always satisfactory. Elucidation of nematode-control mechanisms in amended soil may lead to improved efficacy or the development of more effective control techniques, though the effects of organic amendments on nematodes, microbial communities, plants and soil environments are very complex. Likely mechanisms involved in nematode suppression are: (1) release of pre-existing nematicidal compounds in soil amendments, (2) generation of nematicidal compounds, such as ammonia and fatty acids, during degradation (3) enhancement and/or introduction of antagonistic microorganisms, (4) increase in plant tolerance and resistance, and (5) changes in soil physiology that are unsuitable for nematode behavior. Combinations of these mechanisms, rather than a single one, appear to produce nematode suppression in amended soils.

An experiment of (Al-Rubaee 2012) was conducted in one of the plastic house growing. The resulted based on three kinds of foliar fertilizer (0, with terra. sorbs solution and with pro. sol. powder). The first spraying commenced at flowering stage and then after each 30 days interval. And the agricultural substrates (direct planting, trench culture with 3 soil: 3 cow manure and bags culture with 3 soil: 9cows manure). The experiment was laid out in RCBD with (1) replications. Data were gathered on Root length (cm), No of leaves, Root FW(g / plant), Root DW (g / plant), Root /Shoot Ratio, Chlorophyll content (mg / 300 g Leaves FW) and Total Plant yield (380 kg). The best results were obtained when use the combined application of pro.sol powder with bags culture methods.

The objective of the study of(Hamaza and Almasraf 2015) was to predict crop coefficient (Kc) values for cucumber inside the greenhouse during the growing season 2014, using watermarks gypsum blocks apparatus during the growing stages and to contrast the predicted values of the crop coefficient with different methods and approaches.

The study was conducted in the greenhouses field within Al-Mahawil Township, 70 km south of Baghdad, Iraq. The watermarks soil water sensors and atmometer apparatus were used to gauge crop evapotranspiration and reference evapotranspiration on daily basis, respectively. The comparison and the statistical analysis between the calculated Kc in this study and values acquired from greenhouse gave a good agreement. The root mean square difference (RMSD) and relative error (RE) gave an average value of: 0.065 mm/day and 9%, respectively. While, the comparison between the predicted Kc values and approaches developed by FAO (modified) and Ministry of Water Resources of Iraq granted less agreement. The values of RMSD and RE gave an average value of: 0.188 mm/day, 27%, and 0.17 mm/day and 26.8%, respectively. The method used by FAO and Ministry of Water Resources of Iraq was conducted on basis of using modified empirical equation suggested by FAO-56.Appropriate fertilizer application is an important management practice to promote soil fertility and quality in the red soil regions of China. In the study of (Dong et al. 2012), the effects of five fertilization treatments ,these were: no fertilizer (CK), rice straw return (SR), chemical fertilizer (NPK), organic manure (OM) and green manure (GM)] on soil pH, soil organic carbon (SOC), total nitrogen (TN), C/N ratio and available nutrients (AN, AP and AK) contents in the plowed layer (0–20 cm) of paddy soil from 1998 to 2009 in Jiangxi Province, southern China. Results displayed that the soil pH was the lowest with an average of 5.33 units in CK and was significantly higher in NPK (5.89 units) and OM (5.63 units) treatments (P,0.05). The application of fertilizers have remarkably improved SOC and TN values compared with the CK, Specifically, the OM treatment resulted in the highest SOC and TN concentrations (72.5% and 51.2% higher than CK) and NPK treatment increased the SOC and TN contents by 22.0% and 17.8% compared with CK. The rate amounts of C/N ratio ranged from 9.66 to 10.98 in different treatments, and reached the highest in OM treatment (P, 0.05). During the experimental period, the average AN and AP contents were the highest in OM treatment (about 1.6 and 29.6 times of that in the CK, respectively) and the second highest in NPK treatment (about 1.2 and 20.3 times of that in the CK). Unlike AN and AP, the highest value of AK content was monitored in NPK treatments with 38.10 mg/kg21. Thus, these indicated that organic manure should be recommended to improve soil fertility in this region and K fertilizer should be simultaneously applied considering the soil K contents. Regarding the long-term fertilizer efficiency, our results also suggest that annual straw returning application could improve soil fertility in this trial region (Dong et al. 2012).

The experiment of (Shabani et al. 2017) was conducted to study the influence of dissimilar fertilizing and farming systems in annual medic (Medicagoscutellata

Robinson) on soil organic matter and nutrients status. Fertilizing systems consisted of control (no fertilizer), chemical fertilizer, biological fertilizer and integrated fertilizers (different combinations of chemical and biological fertilizing systems).

The farming systems included irrigated and dry-farming systems. The experiment was conducted in two experimental positions with diverse climatic and soil conditions in Kermanshah province, Iran, during 2009 growing season.

The highest amount of soil organic matter of 1.28% was observed in integrated fertilizing system of nitrogen-fixing bacteria + phosphorus-solubilizing bacteria. Most of the nitrogen applied through chemical fertilizers was leached out of the plant access; however, application of integrated fertilizer resulted in raising the concentration of nitrogen in soil because of its slow release and efficient utilization by plants. According to the results of this study it was concluded that the integrated fertilizing system was more victorious in dry farming compared to other fertilizing systems.

Over the last century, in the biosphere occur expressed processes of soil degradation because of anthropogenic influence, which seriously change of top layer of soil. The agricultural landscape is allocated of noticeable accumulation of various wastes at expense of growing of food crops and grazing of farm animals, as well as due to mineral wastes generated in process production of constructing materials and fertilizers from natural raw. According to physical and chemical characteristics of wastes of plant origin and natural-raw wastes constitute a nontoxic highly dispersed connection with an admixture of different unrecompensed organic and mineral substances. Specificity of physical state is determined there of high dispersion, which is represented by system particles of colloidal substances distributed in various environments. Colloids of natural-raw wastes are described by a low rate of diffusion; do not penetrate finely porous membrane of cell structures, different very no equilibrium insolubility and specific chemical composition. As an example for this. Phosphor gypsum is characterized by high concentration of sulfur and calcium, Organic wastes are made by variety of chemical compounds and high concentration of carbohydrates, proteins, fats and other organic substances (Alekseevna et al. 2016).

The paper indicates to a random survey, conducted in 11 Counties, important in vegetables growing in Romania, and around Bucharest, regarding to the actual phosphorus insurances of plastic house soils cultivated with vegetables. The study was conducted during the period 2002-2012, and a total of 497 of soil samples on the depth of 0-30 cm, were analyzed. It was found a relatively raising trend of fertility until 2009, after which the concentrations of phosphorus in water-soluble forms have fallen. Concentration of water soluble phosphorus has a mean value (17 $mg \cdot kg^{-1}$).

On a mean textured soils. On the basis the plastic house soil contents P (water-soluble forms), average fertility status of soils in our plastic houses cultivated with vegetables, crop structure, chiefly, in 2 cycles (early spring tomatoes and autumn cucumbers) or in one extended cycle (sweet peppers and eggplants), a total taken up of phosphorus and the average coefficients of fertilizers use, it was calculated an approximate necessary of active ingredient (P_2O_5) for an spot of about 7,500 hectares of plastic houses (the year 2014) namely, P_2O_5 1,425 t. This means a consumption of P_2O_5 of 190 $kg \cdot ha^{-1} \cdot year^{-1}$ (Lăcătuş et al. 2016).

2.11. Biological Compound Yeast

One of the treatments is using biological compound yeast fungi Saccharomyces cerevisiae that classification:-

Table 2.1. Classification of Saccharomyces Cerevisiae.

Domain: Eukarya	Class: Saccharomycetes
Kingdom: Fungi	Order: Saccharomycetales
Subkingdom: Dikarya	Family: Saccharomycetaceae
Phylum: Ascomycota	Genus: Saccharomyces
Subphylum: Saccharomycotina	Species: cerevisiae Yeast

Organism contain (fungi) hold ratios of the important elements as explained in table (2.1.) also contains a growth regulators like oxiness and gabbiness (Wafa Ali 2011).

Table 2.2. Elements and contains of dry yeast.

Compound	**Mg/g**	**Compound**	**Mg/g**
Carbohydrate	82	Magnesium	2
Total Nitrogen	90	Phosphate	1-13
Nitrogen Humid acid	40	Potassium	30
Magnesium	2	Sodium	56
Cupper	0.05	Zinc	0.05
Calcium	0.1	Cobalt	0.005
Iron	0.05		

Studies for (Fialho et al. 2012) *Saccharomyces cerevisiae* brings about high mortality of plant parasitic nematodes in the second stage in for worm life (Jain ea al. 2000) found that yeast infects nematodes, causing disease and death for nematodes worm.

Meyer and Roberts (2002) plainly displayed that microbes in biocontrol preparations are potentially antagonistic to each other through parasitism and antibiosis. Compatibility of microbial agents merged in a biocontrol preparation is advocated by researchers. The accomplishment of such compatibility in nematode control was elucidated by (Khan et al. 2006) in their work (Nnennaya 2011).

Nagodawithana (1991) say that the yeast holds blindness Antihypertensive agents (thiamine, riboflavin, niacin, vitamin B12 as well as folic acid. well as folic acid.

Abraham et al. (2011) reported that, culture medium supplemented with yeast extract caused morphological abnormalities. This could be the result of stress response of the plantlets to the accumulation of secondary metabolites due to the yeast extract that acted as elicitor and The increment of total phenolics content of Curcuma mangga plantlets point out that yeast extract might trigger the production of endogenous jasmonic acid and or methyl jasmonate, which increased the production of phenolics content , addition of yeast extract into the culture medium increased the total phenolic content and also The higher amount of yeast extract did not act as elicitor for phenolics production. It was reported that yeast extract did not affect the biosynthesis pathway of plants. But, it triggered the production of endogenous jasmonic acid and methyl jasmonate, which impress the production of secondary metabolites (Sampedro et al. 2005).

2.12. Nemakey

Turkish compound called Nemakey holds nematode antagonistic compounds which are extracted from some special plants. These compounds are sesame extracts, marigold extracts, thyme extracts, etc. These extracts are able to oxidize the nematode detrimental. In addition to the oxidizing effect Nemakey also contains organic acid oils that are capable of covering the nematode eggs around the roots of the plant. By this way, the eggs of nematode detrimental can be destroyed before the development of larva, enabling to the farmer to be effective for a long time on the nematode detrimental.

Additionally, Nemakey™ contents free natural amino acid, it strongly favorites and aids to the development of the new roots which revives the plant and helps it to get out very quickly of the negative effects of nematode detrimental (merkezanadolu.com.tr/Nemakey 2009).

2.13. Humic Acid

Ralph et al. (.2005) in research reported that displays the phenomenological attractant experiments provided evidence that humid material sources like humid acid attract the nematode worm and exert distinct chemical cues. Freedom decreased significantly the nematode criteria and build up. Humic acid granules appeared to be more suppressive to nematode build up on superior and the higher dose on superior/freedom than liquid treatments. (Kesba and El-Beltagi 2012).

Saravanapriya and Subramanian (2005). Tested the effect of Humic acid on egg hatching and juvenile mortality of root knot nematode, Lowest number of juveniles hatched and highest number of dead juveniles were registered, Humic acid applied as soil application and root Humic acid when applied as root dipping significantly raised the plant growth parameters of tomato and also reduced the number of galls and egg masses/plant and final soil population of the nematode.

Fagbenro and Gboola (1993) results indicated that Humic Acid was helpful to the growth and nutrient uptake of teak seedlings. Plant monthly growth rates, and height and total dry matter yield compounded significantly (p = 0.05) over the controls in the two soils at the three Humic Acid application levels , The addition of HA to the two soils increased the uptake by seedlings of N, P, K, Mg, Ca, Zn, Fe, and Cu, while Mn was decreased.

2.14. Helminthes Diseases

Current knowledge of animal and zoometric helminthiases in which effects of climate change have been detected is reviewed. Climate variables are able to affect the prevalence, intensity and geographical distribution of helminths, instantly influencing free-living larval stages and indirectly influencing mainly invertebrate, but also vertebrate, hosts. The influence of climate change appears to be more pronounced in trematodes, and is mainly shown by increased cercarial production and emergence associated with global warming. Fascioliasis, schistosomiasis (S. japonicum) and cercarial dermatitis caused by avian schistosomes have been the concentration of study. Alveolar echinococcosis is currently the only cestode disease that climate change has been found to influence.

Nematodiases, including heterakiasis, different trichostrongyliases and protostrongyliases, ancylostomiases and dirofilariases, are the helminthes diseases most intensively analyses with regard to climate change.

It might be concluded that helminthes diseases should be listed among the infectious diseases with which special care should be taken because of climate change in the future, especially in temperate and colder northern latitudes and in positions of high altitude.Among infectious diseases, helminthiases are important because of their large effect on human and animal health and their capacity to regulate the abundance of wild animal populations and communities, and hence to affect the working of ecosystems. The different helminthes groups offer very different transmission patterns, ecological requirements and dispersal strategies.

Their dependence on biotic and biotic factors is related to their free-living stages, and their environment–host population interactions. Among the numerous environmental modifications that give rise to changes in helminthes infections, climate variables appear to have a substantial influence.

In general, and according to the life-cycle pattern of each helminthes species, climate variables are capable of affecting the prevalence, intensity and geographical distribution of helminthes by directly influencing free-living larval stages as well as indirectly influencing primarily the invertebrate, but also the vertebrate, hosts Trematodes follow a heteroxenous life cycle in which the first intermediate host is a specific mollusc. In trematodes that follow a two-host life cycle, the vertebrate definitive host turns out infected either via the skin, by the cercarial larva stage released from a snail (in schistosomatids), or by ingestion of the metacercarial larval stage attached to any carrying substratum, e.g. freshwater plants (in fasciolids).

In three-host life cycles, the vertebrate host becomes infected by ingesting the second intermediate host, usually an invertebrate (molluscs, insects, crustaceans) or an exothermic vertebrate (fish, frogs, reptiles). Climate conditions either directly influaffectence free larval stages (eggs facially shed by the vertebrate host, miracidium development inside the egg, snail-released cercariae, or non-parasitic metacercariae) or indirectly affect the parasitic stages (sporocysts, rediae, cercariae in the snail; metacercariae in invertebrates).

Trichurids (Trichuris) and ascarids (Ascaris, Toxocara) are monoxenous, with a definitive mammalian host and the egg being the only free-living stage rely on environmental factors (pseudogeohelminths). Ancylostomatids and Strong yloidesare also monoxenous but present active free-living larval stages that are extremely dependent on biotic factors (geohelminths). Other nematodes have a two-host life cycle; these include vectorborne parasites transmittedby biting dipteran insects (filarids). Diheteroxenousproto strong yield are transmitted by powerfully climate-dependent snails (Mas-Coma et al. 2008).

Southern root knot nematode, Meloidogyne incognita, is an important pathogen of vegetables, and was first noticed in South China. With the development of indoor agricultural facilities, it was found for the first time in Shaanxi in 2000, and now is broadly distributed through different ecological vegetable growing zones in Northern and Southern Shaanxi, and the Guanzhong area of M. incognita has become a devastating soil-borne disease, causing great economic losses in vegetable production. It survives at soil depths of 5 to 15 cm, and overwinters in the soil as eggs or second in star larvae. Soil temperature is an important factor affecting its overwintering, and this is counted on climate and plant conditions.

Air and soil temperature data for open fields can be obtained from meteorological stations, but soil temperature data for indoor agricultural facilities is not available, and thus mathematical models should be established to simulate soil temperatures under different cultivation conditions. Each winter (November to the following March) from 2009 to 2012, air and soil temperatures in four agricultural systems in four ecological regions (Yanan, Shangluo, Yangling, and Dali) in Shaanxi Province were automatically registered. Mathematical models relating air temperature to soil temperature were then developed, and air temperatures from 96 meteorological stations were converted to soil temperatures.

Based on the lowest survival temperature of M. incognita measured in the laboratory, a regional map of nematode overwintering was grown, and analyzed for different planting circumstances using the Rigging Interpolation of GIS. We found the following: (1) Overwintering of M.incognita was notably restricted below; If the temperature was less than -1over 32 days, the nematode was not able to overwinter (2) The connection between soil temperature and air temperature is linear. The production of vegetables in soil is an activity of diverse, inherent risk. Soil borne pathogens of vegetables include fungi, bacteria, water moulds, plasmodiophorids, nematodes, some viruses and other organisms. They are amongst the most difficult to reliably control by either synthetic chemicals or soft approaches.

Site and crop selection are enhanced by prior knowledge of pathogen presence, and an understanding of the growing environment and agronomic practices that might affect the pathogen population and host response to infection. Some soil borne pathogens may persist long periods in the absence of hosts. Such pathogens warrant on-going grower vigilance to ensure they are not introduced to clean spots, or spread from infested sites. Hygiene, sanitation, vehicle, soil and water movement are therefore important management considerations.

Also (Walters et al.1992) express their results about nematodes effect on cucumbers root system that make root tissue was ruined by root necrosis, and normal root-knot nematode reproduction would not occur, even though root galling was still observed.

However, in greenhouse conditions the nematode can overwinter throughout the whole province. Using GIS and geo statistics methods (Bo et al. 2014) analyzed the northern boundaries of M. incognita overwintering sites and supplied regional classification for open fields, mulched fields, plastic tunnel houses, and greenhouses.

Our work makes clear the response of the nematode to low temperature stress, so that rapid and effective watching as well as theoretical and technical support for prevention and control can be developed in Shaanxi Province (Bo et al. 2014).

These plant parasitic nematodes cause much damage to sugarcane crop.the chemical nematicidal such as carbofuran, aldicarb etc. are used to control the plant parasitic nematodes (Varaprasad and Mathur 1980).

The chemical nematicidal may be useful and efficient in the control of plant parasitic nematodes, but they harm do and cause environmental pollution. the chemical nematicidal are so expensive that small farmers cannot afford it (Mohan and Subhashini 2010). the organic amendments are also used to have power over such plant parasitic nematodes (Mohammad et al. 2000; Stirling et.al. 2005) reported the control of population of Pratylenchus and Tylenchorhynchus annulatus amended soil were lessened by 85% and 71% respectively in sugarcane fields. This study is undertaken to contrast the effectiveness of chemical with organic amendments.

Effect of inorganic and organic amendments on the activity and survival of nematodes have been examined by many workers (Kaushal and Seshadri 1989). Among the chemical nematicidal tested, carbofuran reduced the nematode population effectively followed by (phorate and aldicarb), while among organic amendments neem cake decreased the population of nematodes to the maximum per cent followed by press mud, groundnut oil cake, neem and cotton seed oil cakes (Mehta et al. 1994).

It has been monitored that the chemical nematicidal gave more efficient control of nematode population density than the organic amendments for an instant control. The chemical nematicidies applied to readily fumigate the soil and reduced the population density.

The instant and high reaction of chemical nematicides was already studied by (Kaushal and Seshadri 1989). The nematicidal properties are also affected by environmental factors of soil such as soil porosity, water content, organic matter content and temperature (Jenkins and Taylor 1967).

The nematode population build-up relies on the initial population of nematodes in the soil whereas the final population Pf is always correlated with (Mehta et al. 1992).

Hence, in fields where Pi is higher, application of chemical nematicides would lessen the population level at period of germination and initial growth. So, further population development could be prevented beyond the economic threshold level. When the initial population of nematode is less then control will be very effective and will not need more application of chemical nematicides.

Application of organic amendments resulted in lower control in the nematode population when compared with chemical nematicides. This may be due to the fact that soil nematode population is decreased when the organic amendments undergo decomposition.

The decomposition process in soil is in general slow. During the decomposition of organic materials, volatile fatty acids ammonia and hydrogen sulphide gas are released.

Such gases are toxic to plant parasitic nematodes and lessen the population (Singh and Sittaramiah 1970).

The beneficial effect of organic amendments for the control of plant parasitic nematodes differs. Their decomposition by micro-organisms has been reported by a research of (Singh and Sitaramaiah 1970).

Further, they noted that reduction of nematode population, the organic amendments are also directly beneficial to the field crop by equipping additional nutrients to the same. The chemicals are effectual for immediate short duration control and organic amendments for long duration.

Organic amendments not only help in the reduction of soil nematode population but also prohibit pollution created by the chemical nematicides.

The toxicity of chemical nematicides such as soil fumigants or non-fumigants has been reported by (Bell et al. 2011). Hence, the regular use of organic amendments have to be recommended as far as possible in controlling the soil nematodes in sugarcane fields relying on the nematode population level (Mohan 2011).

There is a direct linkage between the amount of "protein" N in organic amendments and their effectiveness as nematode population suppressants. Most Nematicidal amendments are oil cakes, or animal excrements containing 2-7% (w: w) N; these materials are effective at rates of 4-10 t/ha. Organic soil amendments containing monopoly saccharine are also effectual nematode suppressants (Rodriguez Kabana1986).

Bacterial-feeding nematodes affect organic-matter decomposition in several methods. They include: feeding on microbes and regulating the rate at which organic compounds are degraded into inorganic ions.

dispersing microbes throughout the soil and water; feeding on saprophytic and plant pathogenic bacteria and influencing the composition of the microbial community, The effectiveness of bacterial-feeding nematodes in nutrient cycling and their use as ecological indicators is discussed (Freckman 1988).

2.15. Cucumber Nematodes

Plant growth and yield are often reliant on nitrogen (N) supply. Therefore, applications of N fertilizers (organic and inorganic N) have been widely used to improve crop yields of most agroecosystem in developing and developed countries (Liang et al. 2009; Roosta et al. 2009). Since soil nematodes are involved in significant ecosystem functions, such as decomposition and nutrient mineralization by bacterivorous and fungivorous nematodes (Djigal et al. 2010), as well as the control of plant-feeding nematodes by predacious and omnivorous nematodes (Yeates and Wardle 1996).

a large number of studies have been recently devoted to the comparative impacts between organic and inorganic N fertilizers on soil nematodes for organic agroecosystem (Wang et al. 2006; Liang et al. 2009; Hu and Qi 2010) and toxic effects of added mineral nitrogen on precise species of root-knot nematodes (RKN) (Meloidogyne spp.) for biological control of plant parasitic nematodes (Barker et al. 1971; Oka et al. 2003; Khan and Kim, 2007; Gong et al. 2009). However, there is very limited information concerning soil nematode assemblage affected by inorganic N fertilizers including different rates and forms, though its application is increasing globally (Gong et al. 2009).

Nitrate (NO3- -N) and ammonium (NH4+ -N) are the two main forms of N available for plant uptake. They are often used as vital forms of inorganic N fertilizers in conventional agricultural practices. Ammonium fertilizer entering into the soils may be submissive to different pathways of N transformations, including assimilation into microbial biomass, uptake by plant roots and nitrification. Nitrate fertilizer entering into soil is normally assimilated by soil microbes, or denitrified, ammoniated and taken up by plant roots, or hastily leached to environment (Pan et al. 2008).

In such case, easily accessible nitrogen, derived from either direct inorganic N fertilizer input or root exudates stimulated by fertilizer, might activate microbe, and then provoke opportunistic bacteria and colonizer nematodes (r-selected, with low cpvalues), decrease the proportion of K-strategist bacteria and persisted nematodes (K selected taxa, with high values) (Bongers et al. 1997). In such case, the soil nematode food web might be modified by the fertilizers.

Therefore, it will be important to investigate how the forms and rates of inorganic N fertilizers influence soil nematode food webs, thereby using inorganic N to effectively manage nematodes. Fertilizers that contain or release ammonia cal nitrogen, for instance ammonium and urea are liable to control Meloidogyne spp. (a group of herbivorous nematodes) for its toxicity at higher dosages (Kabana 1986; Akhtar and Malik 2000). The addition of suitable nitrogen fertilizers both ammonia cal nitrogen and nitrate nitrogen can improve health and defense of plants that let them to directly reduce the herbivorous nematodes.

Additionally, nitrate nitrogen fertilizer into soil can be transformed into ammonia cal nitrogen that has direct toxicity for some of herbivorous nematodes. The findings from nitrogen fertilizers in general point to those containing ammonia cal nitrogen are more harmful to nematodes than nitrate nitrogen (Kabana 1986). Although abundance of herbivorous nematodes was sometime negatively correlated with the concentration(s) of soil ammonium (Liang et al. 2009; Wei et al. 2012) and nitrate (Liang et al. 2009), whether chemical nitrate fertilizers that only have nitrate nitrogen can effectively diminish herbivores and RKN are not well understood (Barker et al. 1971; Collange et al. 2011).

Cucumber (Cucumissativus) belongs to the Cucurbitaceous family, and is cultivated universally. It is the fourth most important vegetable after tomato, cabbage and onion in Asia, and the second after tomato in Western Europe (Eifediyi and Remison 2010). Cucumber monoculture often causes a decline in growth, yield and quality in continuous cropping system due to phototoxic effects of allele chemicals (mainly phenol acids) exuded by the plant (Zhang et al. 2010). However, RKN increasing with year of continuous cropping may play much more important roles in lessening cucumber production and quality when compared to its auto toxic effects in the systems. Cultural practices such as crop rotation and mixture with antagonistic plants are effective methods against nematode attack (Hooks et al. 2010; Kayani et al. 2012). However, continuous cropping of cucumber monoculture has especially attracted attention in some countries with large population and limited farmland because it can produce higher profits than other cash or cover crops. Interestingly, larger amount of inorganic N fertilizers (cheaper nitrate or ammonium) are normally supplied into soils prior to planting and believed to be effective for reducing herbivorous nematode infection and benefit for cucumber monoculture continuous cropping system in Leshan district Sichuan province Southwestern China.

One possible hypothesis given here was that the application of higher proportion of mineral nitrogen fertilizer prior to planting might not raise soil mineral concentration (ammonium and nitrate) in the later stages of growth due to the swift losses of mineral nitrogen, thus had no higher inhibition for herbivores and stimulation for bacterivores than that of lower rate of mineral nitrogen fertilizer. Previous limited reports suggested that fertilizers having nitrate-N could better improve root growth (Heuer 1991) shoot growth (Schenk and Wehrmann 1979) and arbuscular mycorrhizal (AM) colonization of cucumber plants than those containing ammonium-N. This suggested, in contrast with ammonium fertilizer, nitrate fertilizer might increase cucumber plant vigor, stimulate root exudates, boosting bacteria and bacterivorous as well as improving the capacity of cucumber plants to fight herbivorous nematodes. Therefore, the other possible hypothesis given here was that nitrate fertilizer might have stronger inhibition for herbivores and stimulation for bacterivorous than ammonium fertilizer in the ecosystem.

Nitrate (NO_3^--N) and ammonium (NH_4^+-N) fertilizers are the main forms of chemical inorganic nitrogen fertilizers that are broadly used in agro-ecosystem for high yield. However, the responses of soil nematode food web to different forms and averages of inorganic nitrogen fertilizers are not well understood.

The results signalized that the numbers of nematodes were significantly higher in soils with the addition of 67.5 kg N than the control at the seedling and blooming stages. Nematode number strongly rose at the seedling stage and decreased at the blooming and fruiting stages in nitrate-treated soils compared to the ammonium-treated.

Nitrate significantly lessened the values of channel index at the blooming stage and maturity index at the seedling stage in comparison with ammonium, respectively. Enrichment index and structural index powerfully increased at the seedling stage, and decreased at the blooming and fruiting stages under the treatment of nitrate relative to ammonium. The findings suggested responses of nematode food web dependent on the proportions and forms of inorganic nitrogen fertilizers and stages of cucumber growth (Pan et al. 2015).

Sixty days after inoculated, each plant was evaluated, when root fresh weight, total number of nematodes in the soil and in the roots (final population), nematodes number per gram of root and the reproduction factor of both Meloidogyne species were determined.

All rootstocks and cucumber hybrids permitted the M. Javanica and M. incognita race 2 multiplications, but, generally, reproduction factor values were greater in cucumbers than in rootstocks (Wilcken et al. 2010).

The goal of this study was to determine the effect of rootstocks on the growth and yield of cucumber, plants in soils infested with root-knot nematodes (Meloidogyne spp.).

The experiments were conducted in commercial greenhouse, with cucumber grafted onto three rootstocks in the first season and onto six rootstocks in the second spring-summer season.

The number of leaves was considerably influenced by the rootstock in both seasons, and was the highest for the plants grafted onto inter specific rootstocks (28.0 in the first and 44.9 in the second season). The plants grafted on to ‘Strong Tosa’ had higher total number of fruits (19.9) and yield (5.38 kg) contrasted to other rootstocks or non-grafted plants in first season, and the same result was found for two inter specific rootstocks in the second season (6.96 kg and more than 28.9 fruits per plant).

The total soluble solids, pH and electrical conductivity of the fruit were not affected by rootstock, while titratable acidity changed with the rootstock kind. The grafting of cucumber plants onto different rootstocks was assure as an acceptable non-chemical method to vied with the limitations of soils infected with root-knot nematodes, but the effect was highly dependent on the choice of the rootstock (Ban et al 2014).

Root-knot nematodes (RKN), Meloidogyne spp., are obligate end parasites and are among the most common biotic stressors that can bring about serious problems in soil grown cucurbits (Di Vito et al. 1983; Ploeg and Phillips 2001).

Root-knot nematodes infect roots and cause the production of root galls also called giant cells (as a result of hypertrophy and frequent cell multiplication).

Plants experience a reduced flow of water and nutrients, and thereafter, reduced vegetative growth and yield. Root-knot nematodes jeopardize the soil-grown greenhouse crops in Croatia (Raspudić et al. 2006) and can cause annual cucumber yield losses of approximately 12% (Main and Gurtz 1989).

Crop rotation with non-nematode hosts and soil disinfestations/fumigation are broadly used methods for the prevention and suppression of RKN. But, grafting of tolerant rootstocks, as an alternative to pesticide use, might be a more sustainable approach particularly for organic production. The usage of the RKN-resistant rootstocks has been successful in tomato, but is dependent on the RKN species present, the local RKN population within the species, and on the genetic background of tomato with regard to the (Lopez-Perez et al. 2006 ; Cortada et al. 2008 ;Lucas et al. 2009 ; Rivard et al. 2010).

Several species were tested as a potential source of RKN resistance in cucurbits, and varying degrees of resistance were found (Lee and Oda 2003 ; Siguenza et al. 2005 ;Thies and Levi 2007).However, RKN resistance has not been certain in commercial cucurbits (Cohen et al. 2007). Root-knot nematodes (RKN) are polyphagous plant-parasitic roundworms that create large crop losses, representing a relevant agricultural pest worldwide. After infection, they encourage swollen root structures called galls containing giant cells indispensable for nematode development.

Among efficient control methods are biotechnology-based strategies that need a deep knowledge of underlying molecular processes during the plant-nematode interaction. Methods of fulfilling this knowledge include the application of molecular biology techniques such as transcriptomics (as massive sequencing or microarray hybridization), proteomics or metabolomics.

These have need of aseptic experimental conditions, as undetected contamination with other microorganisms could compromise the interpretation of the results.

We present a simple, efficient and long-term method for nematode amplification on cucumber roots grown in vitro.

Amplification of juveniles from the starting inoculums is around 40- fold. The method was validated for three Meloidogyne species (Meloidogyne Javanica, M. incognita, and M. arenaria), producing viable and robust freshly hatched J2s. These J2s can be used for further in vitro infection of different plant species such as Arabidopsis, tobacco and tomato, as well as to maintain and amplify the population.

The method permitted maintenance of around 90 Meloidogyne sp. generations (one every 2 months) from a single initial female over 15 years (Manzanoet al. 2016).

Root-knot nematodes (RKNs; Meloidogyne sp.) constitute major pests in agriculture universally, causing annual economic losses estimated at $118 billion, (McCarter 2008). They are obligate parasites that penetrate plant roots to establish their feeding sites, called giant cells (GCs).

Causing thickenings or knots in the roots referred to as galls (Escobar et al. 2015).Meloidogyne Javanica, M. incognita, and M. arenaria are the most common species of RKNs in the warm climate of southern Europe but also in glasshouses of the more temperate climate of northern Europe (Wesemael et al. 2011).

The polyphagous behavior of RKNs as well as the ban on the most effectual agrochemical nematicidal constitutes a challenge for the successful management of this pest (Haydock et al. 2013).

Knowledge of the nematode’s biology is crucial for the development of new biotechnology-based control methods (edin et al. 2015).

Efficient nematode amplification and maintenance in the laboratory under aseptic experimental conditions are significant and rather valuable for molecular biology techniques, such as transcriptomics (as massive sequencing or microarray hybridization), proteomics, metabolomics, etc., being free of biological contamination. So far, the usual practice is to surface-sterilize either eggs or nematode juveniles from greenhouse- grown host plant specimens. Normally, integration of different disinfection methods (mercuric chloride, chlorhexidine, streptomycin sulfate, bleach, antibiotics, physical filters, etc (Huettel 1990).

however, excessive doses of disinfectants may be toxic, leading to poor nematode survival, where as insufficient dosage will not ensure efficient sterilization. In vitro culture presents the additional interests of a reduced growth chamber space and non-daily maintenance. Therefore, several protocols for monogenic nematode cultures have been developed: for instance, in tomato excised roots or seedlings (Sudirman and Webster 1995; Hutang uraetal.1998) in Abelmoschus esculentus (Tandaetal 1980). In onion root cultures (Mitkowski and Abawi 2002) in Agrobacteriumrhizogenes-transformed roots of potato, tomato, bind weed, tropical tomato, lima bean, and carrot (Verdejo et al. 1988; Mitkowski and Abawi 2002). Hydroponic or semi- hydroponic cultures have also been described (Atamianetal. 2012) but nematodes and plants were not totally aseptic. Here, we portray a simple monogenic culture method using cucumber roots (Cucumissativus) to amplify different Meloidogyne spp. populations. This efficient technique provides a viable and prolonged culture system for these obligate plant parasitic nematodes.

The main proof of the notion is that a population of M. Javanica has been established from a single female and has been maintain edit our laboratory for more than 15 years.

The amplification has been succeeded fulata ratio around 40 (final population/ initial population) from the initial inoculums for each re-inoculation obtained. Moreover, J2s from these cultures can be used straight after a simple hatching step in aseptic conditions to infect plants for experiments with different in vitro grown plant species. Successful experiments have been performed with this procedure on different genotypes of Arabidopsis, tobacco, and tomato (Barcala et al. 2010; Escobar et al. 2010; Portillo et al. 2013; Cabrera et al. 2014).

The fluctuation of Meloidogyne population density and the percentage of fungal egg parasitism were set from July 2011 to July 2013 in two commercial organic vegetable products on sites (M10.23 and M10.55) in plastic green houses, located in north eastern Spain, in order to know the level of soil suppress sevens. Fungal parasites were recognized by molecular methods. In parallel, pot tests characterized the level of soil suppress sevens and the fungal species growing from the eggs. In addition, the egg parasitic capacity of 10 fungal isolates per site was also assessed. The genetic profiles of fungal and bacterial populations from M10.23 and M10.55 soils were gained by Denaturing Gradient Gel Electrophoresis (DGGE), and compared with an on-suppressive soil (M10.33). In M10.23, Meloidogyne population in soil reduced progressively during the rotation zucchini, tomato, and radish or spinach. The percentage of egg parasitism was 54.7% in zucchini crop, the only one in which eggs were detected. Pochonia chlamydosporia was the only fungal species isolated. In M10.55, nematode densities peaked at the end of the spring-summer crops (tomato, zucchini, and cucumber); however, diseases verity was lower than expected (0.2–6.3). The percentage of fungal egg parasitism ranged from 3 to 84.5% in these crops. The findings in pot tests confirmed the suppers sevens of the M10.23 and M10.55 soils against Meloidogyne. The number of eggs per plant and the reproduction factor of the population were reduced ($P<0.05$) in both non- sterilized soils compared to the sterilized ones after one nematode generation.

P. chlamydosporia was the only fungus isolated from Meloidogyne eggs. In visitor tests, P. chlamydosporia isolates were capable of parasitizing Meloidogyne eggs from 50 to 97% irrespective of the site. DGGE finger prints revealed a high diversity in the microbial populations analyzed. Furthermore, both bacterial and fungal genetic patterns differentiated suppressive from non- suppressive soils, but the former showed a higher degree of resemblance between both suppressive soils than the later (Giné et al. 2016).

Cucumber (Cucumissativus) is threatened by substantial yield losses because of the south root- knot nematode (Meloidogyne incognita). However, understanding of the molecular mechanisms underlying the process of nematode infection is still limited. In this study, we found that M. incognita infection influenced the structure of cells in cucumber roots and treatment of the cytoskeleton inhibitor (cytochalasin D) reduced root- knot nematode (RKN) parasitism. It is known that Acting- Depolymerizing Factor (ADF) affects cell structure, as well as the organization of the cytoskeleton. To address the hypothesis that nematode- induced abnormal cell structures and cytoskeletal.

Rearrangements may be mediated by the ADF genes; we distinguished and characterized eight cucumber ADF (CsADF) genes (Liu et al. 2016).

The root-knot nematode (RKN) is one of the most damaging agricultural pests. Effective biological control is need for controlling this destructive pathogen in organic farming system. During October 2010 to 2011.

the nematicidal effects of the Syncephalastrum racemosum fungus and the nematicides, avermectin, alone or combined were tested against the RKN (Meloidogyne incognita) on cucumber under pot and field condition in China. Under pot conditions, the application of S. racemosum alone or combined with avermectin significantly rose the plant vigor index by 31.4% and 10.9%, respectively compared to the M. incognita-inoculated control. However, treatment with avermectin alone did not notably affect the plant vigor index. All treatments reduced the number of root galls and juvenile nematodes compared to the untreated control.

Under greenhouse conditions, all treatments decreased the disease severity and enhanced fruit yield contrasted with the untreated control. Fewer nematodes infecting plant roots were monitored after treatment with avermectin alone, S. racemosum alone or their combination compared to the M. incognita-inoculated control. Among all the treatments, application of avermectin or S. racemosum combined with avermectin was more effectual than the S. racemosum treatment.

The results of (Huang et al. 2014) showed that application of S. racemosum combined with avermectin not only reduced the nematode number and plant disease severity but also reinforced plant vigor and yield. The findings referred to the combination of S. racemosum with avermectin could be an effective biological component in integrated management of RKN on cucumber.

In north of Iraq spatially in Sulaimaniyah it is the number one for sowing in green houses almost half of 4000green houses in Sulaimaniyah they are using cucumber as a main vegetables for cultivation.

Grafting is an alternative technique often recommended for the cucumber crop in root-knot nematodes infested areas.

This study had a goal to determine the reproduction factor of Meloidogyne Javanica and M. incognita race 2 on six rootstocks for cucumber and four cucumbers (Cucumissativus) Japanese type hybrids two experiments were executed in greenhouse, each one with nematode specie. Each plot consisted of one plant per pot containing 2 liters of autoclaved soil. Nine days after the seedlings transplantation, each plant was inoculated with 5,000 eggs and second-stage juveniles (initial population-Pi) of M. Javanica or M. incognita race 2. ‘Rutgers’ tomatoes were used as a standard for inoculums viability in both experiments. The experimental design was totally randomized with five replicates per treatment.

Table 2.3. Nutrition Facts, Amount per 100gm cucumber.

Total Fat	0.1 g
Saturate	0 g
Polyunsaturated	0 g
Monounsaturated	0 mg
Cholesterol	0 mg
Sodium	2 mg
Potassium	147 mg
Total Carbohydrate	3.6 g
Dietary fiber	0.5 g
Sugar	1.7 g
Protein	0.7 g
Vitamin A	% 2
Vitamin C	% 4
Calcium	% 1
Iron	% 1
Magnesium	% 3

2.16. Biological Control of Nematode

In recent years, continuing environmental problems associated with the use of nematicides have resulted in a sense of urgency concerning the search for alternative methods of nematode control. Biological control of plant-parasitic nematodes with natural products from plants and animals, and soil organisms are alternative control tactics that are receiving increased interest among nematologists. Natural products contain a number of plant parts, by-products, and residues when incorporating into soil, The useful influences of natural products have been in general considered to be due to direct or indirect stimulation of predators and parasites of nematodes. Very often, when there was suppression in the nematode population, there was a consequent rise in crop production (Mohammad 2001).

Management of the antagonistic potential in agricultural ecosystem is a try to use integrated crop production mechanisms to increase the activity of a specific antagonist or a group of antagonists in soil ether naturally occurring or introduced for biological control of plant parasitic nematodes or disease.

2.17. Agroecosystem Management and Integrated Watershed Management

Ecosystem management, a focus of natural resource management in the 1990s, is based on maintaining the integrity of ecosystems while sustaining benefits to human populations**.**

Global agroecosystem are becoming more vulnerable to supply failures than when expansion to new land areas was an option. These issues have increased public awareness of soil ecology and the importance of maintaining soil health in agroecosystem.

A healthy soil should be able to support life processes such as plant anchorage and nutrient supply, retain optimal water and soil properties, support soil food webs, recycle nutrients, maintain microbial diversity, remediate pollutants, and sequester heavy metals. Plant pathologists assert that disease suppression also should be a function of soil health.

In this article, we adopt all these definitions of soil health and synthesize a perspective relating to nematode management. While conventional nematode management focuses on suppressing plant-parasitic nematodes, we propose to also manage the more abundant and beneficial free-living nematodes in the soil ecosystem. This is feasible because of comprehensive nematode faunal analysis studies that have been conducted over the last few decades (Bongers 1990; Ferris et al. 2001; Ferris and Matute 2003; Ferris et al. 1996; Ingham et al. 1985).

Our approach is to develop soil ecosystem management strategies to protect against damage caused by plant-parasitic nematodes ultimately leading to improvements in plant health. The characteristics of soil health emphasized include: high biological diversity, high community stability that can provide resilience to disturbance (short-term) or stress (long-term), ability to maintain the integrity of nutrient cycling and energy flow, suppression of multiple pests and pathogens, and improved plant health.

3. MATERIAL AND METHODS

3.1. Descript the Study Area

A- Bazian located in Kurdistan region Northeast of Iraq, 20 km. southwest of Sulaimaniyah governorate, 35N latitude and 45 E longitude, big and important agriculture area that contain at least 4000 greenhouses , sea surface level reach it (837m – 847m) also located in BASARA Basin (Figure 3.1) that located in high folded zone, it has a wide plain with slightly slope topography called Bazian Plain. It's contain (6) Watersheds and (14) micro- catchments (Barzinji 2013).

B- Stream flow: Basara Basin has many springs, kariezes. Basara Basin has perennial main stream, which consist of the combination of two great streams which are Tilie stream and Chami Tainal stream (Barzinji 2013).

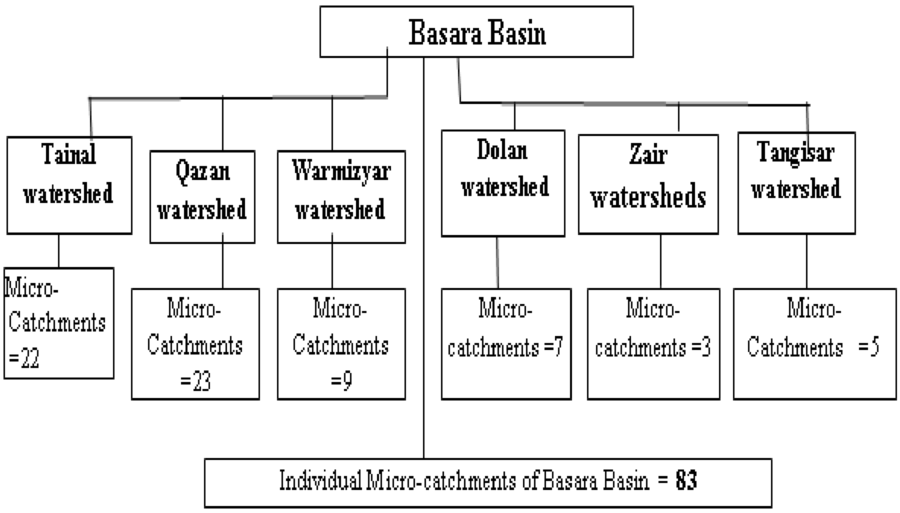


Figure 3.1. BASRAR basin

3.2. Climate

Bazian climate in winter cold and rainfall getting to freeze point in end of January and February, in middle and end of December snowfall be the higher and rainfall quantities reach it 800 mm – 1000 mm /year. In summer climate be hot and dry getting to 45^{o}c, in September wind be faster compared to other months also in June wind be fast but not like in September.

Table 3.1. Average Climate Data for Bazian city / 2016

Months	**Temperature ^{o}C**			**Precipitation (rain) mm.**	**Wind speed (M / hr.)**	**Humidity (%)**	**Sun hours (hr)**	**Pressure (Mb)**
	Max.	**Min.**	**Avg.**					
Jan--2016	9	1	6	176.2	6.0	69	74	1021.3
Feb-2016	15	4	11	69.5	6.5	59	73	1021.1
Mar-2016	17	6	15	175.4	10.5	47	106.3	1015.1
April-2016	24	10	20	73.9	9.4	38	136	1013.1
May-2106	30	17	25	19.9	11.4	23	146	1010.5
June -2016	37	21	31	3.8	12.3	16	149.8	1007.4
July-2016	42.1	25	34.5	0	11.6	13	155	1002.8
Aug-2016	42	24	36	0	10.1	22	154.8	1006
Sep-2016	35.4	19.3	29	0.2	12.8	27	138	1009.8
Oct-2016	29	13	23	7.7	9.6	31	97.8	1014.9
Nov-2016	19	5	14	4.5	8.1	63	86.5	1021.4
Dec-2016	10.2	1.2	6.4	158.5	6.3	59	68.5	1022
Average	25.8	12.29	20.9	689.6	9.55	38.9	115.47	1013.78

3.3. Soil

Soil and water, humane life without these two precious have no live so protect them should be every one duty not just agronomics we make our research and studies in two different places but in the same area in Bazian city (Tainal watershed).

We do the research in normal green houses in Bazian city that located in N35°36.528’, E45°7.897', and all service practices we do it in organic way without using any chemical or pollute sources starting from plowing we sterilize the plow by ethanol absolute (C_2H_5OH,35%) and all the material we use we sterilize it.

Table 3.2. Making soil analysis for soil samples before and after the research

Analysis element	**Soil texture**	**E.C. / ds.m.**	**PH**	**N%**	**Available P (ppm)**	**Soluble K^+ (meq/l)**	**Soluble Na^+ (meq/l)**	**Soluble Ca^+ (meq/l)**	**Soluble Mg^+ (meq/l)**	**Cl meq/l**	**o.m %**	**$CaCo_3$ %**	**HCO_3 meq/l**	**CO^{-3}**
Before	Clay loam	0.28	7.76	0.14	15.18	0.10	0.17	1.9	3.6	0.4	2.06	27	1.7	0.3

3.4. Field Design for the Research and Treatments Contains

- X.L.STAT program use for statistical analysis.
- Type of the research design (R.C.B.D.).
- Numbers of treatments = 7
- Numbers of replications = 3
- Distance of treatments (sow line) = 5 m
- Width of terraces or plot (unite experiments) = 1 m
- High of the terraces 30cm.
- Area of plot = 5 m^2

- Distance between each plots = in the same line = 1 m
- Numbers of sow lines in each treatments 2 line in zigzag way.
- Distance between each two plant = 40 cm
- Numbers of guard line = 2
- Numbers of plant in each plot = 18 cucumbers plant
- Numbers of plants selected for parameters and data's = 10
- Distance between each feed line 40 cm.
- Cucumber variety (ABAHA F1).

3.5. Locations for Research

Table 3.3. GPS coordinates for each treatment

NO.	Treatments	X	Y
1	T5	N35.750	E45.354
2	T6	N35.749	E45.355
3	T1	N35.748	E45.362
4	T7	N35.748	E45.357
5	T2	N35.748	E45.358
6	T4	N35.747	E45.360
7	T3	N35.747	E45.360
8	T4	N35.748	E45.359
9	T1	N35.749	E45.358
10	T7	N35.749	E45.358
11	T6	N35.750	E45.358
12	T3	N35.749	E45.357
13	T2	N35.749	E45.357
14	T5	N35.751	E45.355
15	T7	N35.750	E45.355
16	T6	N35.750	E45.356
17	T5	N35.751	E45.356
18	T4	N35.750	E45.358
19	T3	N35.748	E45.360
20	T2	N35.748	E45.360
21	T1	N35.748	E45.361

Figure 3.2. R.C.B.D. design in greenhouse

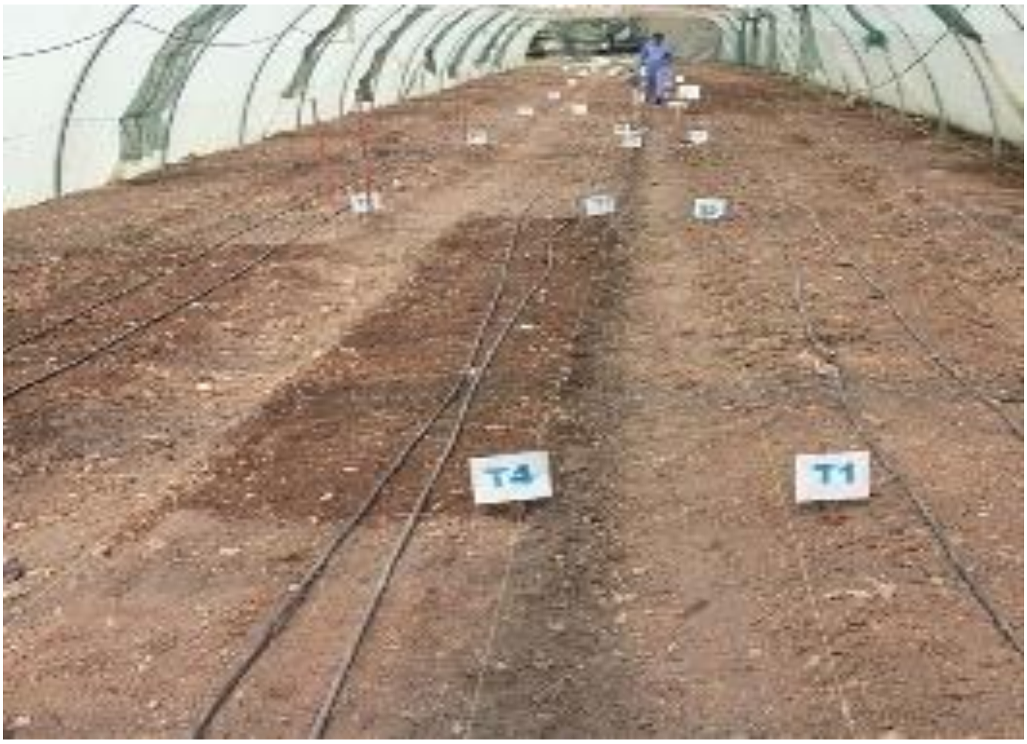


Figure 3.3. Preparing the 16mm pipe line and the treatment

3.6. Research R.C.B.D. Design

T1	T3	T5	East
T2	T1	T6	
T3	T7	T1	
T4	T6	T7	
T5	T3	T2	
T6	T2	T4	
T7	T5	T3	west

Figure 3.4. Treatments Field distributions

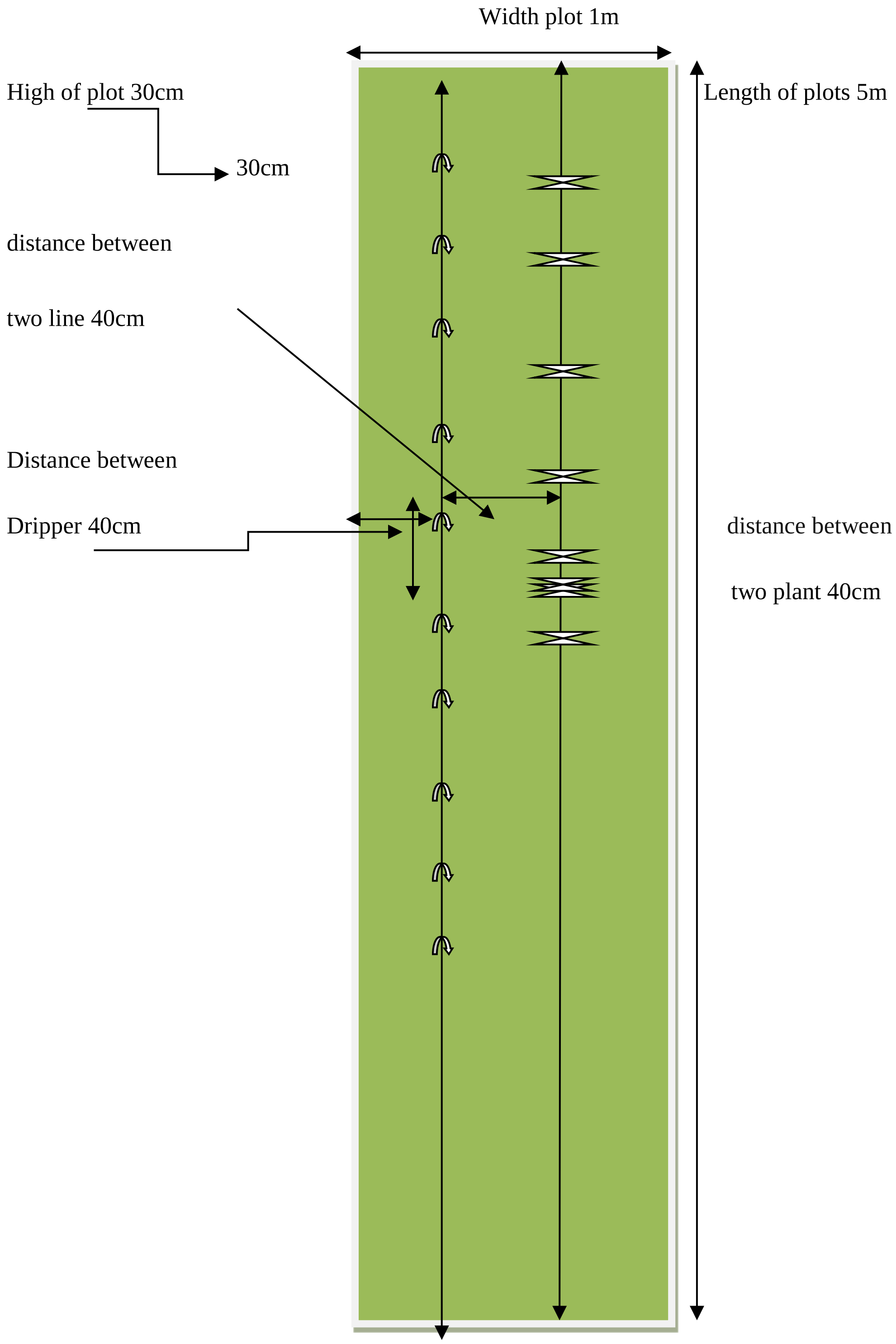
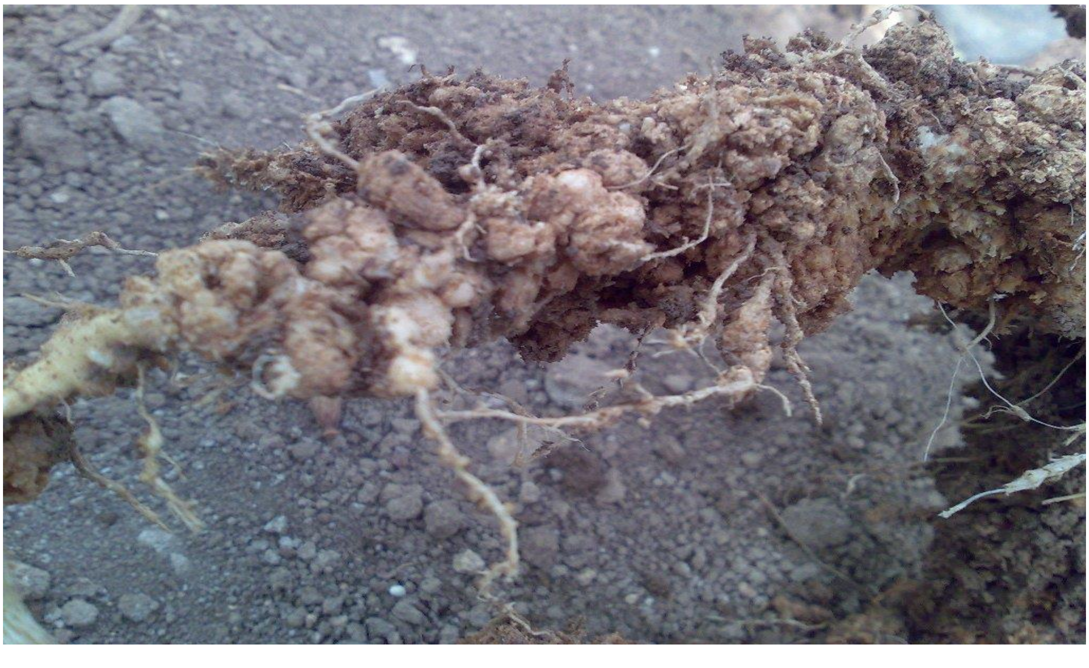


Figure 3.5. Shape for the treatments

Figure 3.6. Teeing up the cucumber plants

Figure 3.7. Cucumber plants in flowering stage

Figurer 3.8. Root cucumber badly affected with root not nematodes



Figurer 3.9. Root not nematodes

3.6. Methods

How to use Materials for treatment.

1. Witness (Control) which uses only water (T1).

2. Use of compost component of Humic acid (charge) (T2).
   - Added to soil before planting b (7-10 days) the amount of 1 mm/Plant.
   - Added to the soil by (fertigation) the soil the amount of 1 mm per plant.
   - Added to soil after planting b (15 days) the amount of 1 mm/ Plant.
   - Added to the soil during the flowering amount of 1 mm per plant.
   - Added to the soil at the first fruits of the amount of 1 mm per plant.
   - Added to the soil after a month of output by 1 mm per plant.
   - Added after two months of production quantity of 1 mm per Plant.
   - Added to the soil after (3) months from the production quantity of 1 mm/plant.

3. Biological fertilizer Austrian origin (infoxgen - Austria fertilizer Act.) (T3):- Add to the soil in three stages.

   1. With Agriculture when watering concentration (25 g \ liter of water).
   2. After the Agriculture (20 days) in the same concentration.
   3. After the First harvest directly concentration (30 g \ liter of water).
   4. A month after the first harvest concentration (30 g \ liter of water).
   5. Two months after first harvest concentration (30 g \ liter of water).

4. Fungus (Saccharomyces cerevisiae) of yeast bread (Commercial dry yeast).

5. Add it to the soil with two concentrations:

(5 g \ liter of water) (T4).

(10 g \ liter of water) (T5).

And that in the first three stages before planting by (7-10) days, and the second in the middle of the season and the third stage before the end of the season in one month.

6. N.P.K. adding chemical fertilizer (20: 20: 20) after transplanting with one week we start with 1g / plant each week until harvesting after that we make it 1.5gm/plant (T6).

7. Nemakey extract (T7) a vegetable extract is used to support and strengthen against many diseases in addition to fit on organic materials and organic potassium Nitrogen and it also helps the plant to absorb nutrients for the plant.
   - Is used at a rate of (1mm\m^2) one week before planting.
   - When the first fruits of the same rate.
   - In the middle of the season the same rate**.**

Table 3.4. Parameters that studies in this research

Parameters	**Parameters**	**Parameters**
Abortive flowers	Numbers of galls	Yields
Setting flowers	Numbers of egg mass	Width of fruit
Total flowers	Numbers of larves	Thickness of skin
Chlorophyll meter	Total Leaf area	Length of fruit
Mild weight of shoot system	Numbers of leaf /plant	Outside color
Mild weight of shoot system	Total plant area	Flavor
BRIX	Numbers day to harvesting	Smell

Table3.5. Temperature and humidity inside the greenhouse during the research

Months	**Temperature (^oC)**		**Humidity (%)**		**Not's**
	at 5 am	at 5 pm	at 5 am	at 5 pm	
March	19	7	67	41	Taking these data's by thermo-hygrometer Instrument.
April	27	9	52	30	
May	33	16	33	17	
June	41	22	25	10	
July	47	26	18	9	
August	49	25	28	13	

Monthly average of temperature and humidity, every day in two times we take these data's manually.

3.7. Water Supply and Controlling Amounts of Irrigations

One of the most precious natural resource components and agro ecosystem elements is water, there for keep it from any losses it is our main duty as an agronomic**.**

In our research we use a well that's good for irrigation depending on these analyses.

Table 3.6. Analysis for water used in irrigation

E.C. / ds.m.	PH	Soluble K+ (meq/l)	Soluble Na+ (meq/l)	Soluble Ca+ (meq/l)	Soluble Mg+ (meq/l)	HCO_3 meq/l	CO^{-3}
0.4	7.2	0.012	0.12	3	1.2	4.5	0.7

The analysis show that the ability to electrical conductivity (total concentration of salts dissolved in irrigation water) suitable for irrigation, the value of the percentage of sodium (SSP) it was (2.77%) which is less than the critical value specified by the US salinity Research Laboratory.

And for the value of the sodium adsorption ratio (SAR) and the values of the (ca, mg, Na) be The (SAR) of irrigation water (0.0272) is very suitable as the US salinity Research Laboratory.

- Extended to the (RSC) or residual sodium carbonate were (1 meq. / L) And is within the allowable limits.

Either magnesium ratio was (28.57%) it is very suitable because it is less than the 50% allowed, calcium in the value of irrigation water was (3 meq./L) And is within the permissible (less than 10 meq. /L). To control the amounts of water that use to irrigate the plants we use tensiometers (irrometer), Using a 16mm dripper pip for the sub lateral lines that feed the plants with 6 L/hr. water, distance between each dripper is 40 cm.

3.8. Study Area

In this study our main target is to use GIS applications like GIS maps to show the distributions of epidemic soils with Nematode worm and non epidemic Soils and Effect of that on soil fertility, this area also located in Bazian plain in Tainal watershed contains many villages, we took the samples from 24 villages that contains at least 2000 greenhouse in 10km^2 area , Soil Samples we taken from deep 20 – 30cm for fertility analysis and for nematodes analysis.

Table 3.7. These locations' as below

Locations no.	**Village name**	**Latitude**	**Longitude**
L1	Bagajani	N 35.573129	E 45.179865
L2	Mewk	N 35.574642	E 45.170733
L3	Bagajani	N 35.562523	E 45.153836
L4	Koyik	N 35.563983	E 45.170733
L5	Kani big	N 35.563227	E 45.175807
L6	Shuwankara	N 35.564188	E 45.192795
L7	Tui awlia	N 35.559212	E 45.19.636
L8	Qushqaya	N 35.557166	E 45.193336
L9	Ali bzaw	N 35.555679	E 45.180524
L10	Ali bzaw	N 35.554676	E 45.176405
L11	Kani penjsharma	N 35.540696	E 45.191150
L12	Kani shaya	N 35.538872	E 45.217801
L13	Kani shaya	N 35.529785	E 45.204436
L14	Halay sarchawa	N 35.525898	E 45.208935
L15	Halay sarchawa	N 35.531651	E 45.198905
L16	Mahmudia	N 35.524027	E 45.221645
L17	Ziyeka	N 35.524583	E 45.222030
L18	Ziyeka	N 35.524583	E 45.237502
L19	Warmizyar	N 35.518852	E 45.235790
L20	Warmizyar	N 35.517955	E 45.254908
L21	Gawani	N 35.500416	E 45.254239
L22	Gawani	N 35.501443	E 45.254239
L23	Gawani	N 35.508113	E 45.231547
L24	Latif awa	N 35.492244	E 45.231547

3.9. Soil and Plant Sampling

Soil sample taking for soil fertility analysis.

1. From each greenhouse take two samples by auger in middle of first half and the middle of last half then put these samples in plastic bags and put labels that write on the samples information's.

2. After being in lab make an air drying for these samples fewer than 27 – 30^{o}C after that we clean it from stone and plant residue.

3. Grinding soils and pass it throws a 2 mm sieve.

4. Take 500g. from each sample.

5. These samples are ready to make a soil analysis.

Figure 3.10. Tainal watershed, Bazian city, Qushqaya, Ali bzaw village

Each parameters taking by three replications and make physical and chemical analysis.

Table 3.8. Procedures for soil analysis

Analysis kind	**Procedure**	**Source**
Soil Texture	Bouyoucos,1962;Day 1965;FAW 1974 USDA textural triangle	Soil and plant analysis (Laboratory index) by John Ryan George Stephen nternational Center for agriculture research in the dry areas. And Abdul Rashid National Center for Agriculture research Islamabad , Pakistan
E.C.	Richards, 1954	
PH	McKegne, 1978:McLean 1982	
N%	Kjeldahl	
Available P	Olsen and Sommers, 1982	
Soluble k	Richards, 1954	
Soluble Na	Richards, 1954	
Soluble Ca	Richards, 1954	
Soluble Mg	Richards, 1954	
CL	Richards, 19544	
O.M. %	Walkley, 1974; FAW, 1974	
$CaCo_3$ %	FAW, 1974	
HCO_3	Richards, 1954	
CO3	Richards, 1954	

Figure 3.11. Tainal watershed, Bazian city, Bagajani village

Figure 3.12. Tainal watershed, Bazian city, gawani village

3.10. Plant Sample Taking for Analysis

1. From each greenhouse we take some plant sample for analysis.

2. Clean samples from dust and other residues before packing.

3. Put the plants in bags to be ready for analysis.

Table 3.9. Procedures for plant analysis

Analytical elements	Procedure	Source
N	Kjeldahl	Chapman & Pratt 1961
P	Spectrophotometer (410mm)	
K	Spectrophotometer (410mm)	
Ca	Spectrophotometer (410mm)	
Mg	Spectrophotometer (410mm)	
Fat %	Soxhlet instrument (Egan, 1988).	
Ash%	Muffle furnace 540^{o}c	
Moisture %	Oven dry	
Protein %	Kjeldahl	
Carbohydrate %	Alasowad 2000	
B.R.X. %	Refractometer instrument	
Chlorophyll	Chlorophyll meter	

3.11. Soil Sample Taking for Nematodes Analysis

1. Take samples in end of august after the summer season that is best time for nematodes samples from 20 – 25cm.

2. Each time clean and sterilize the shovel by.

3. Put the samples in bags for analysis.

3.12. Root-Plant Sample Taking for Analysis

1. Taking root samples from effected plants in green houses.

2. Cut the effected roots from plants.

3. Take the wet weight for these samples.

Table 3.10. Procedure of nematodes analysis

No.	Materials	Procedure and Source
1	20-mesh sieve (833 -µm aperture)	Howard Ferris Departments of Entomology And Nematology University of California
2	200-mesh sieve (74 -µm aperture)	
3	325-mesh sieve (43- -µm aperture)	
4	Coarse sieve (1cm aperture)	
5	Two stainless steel bowls or plastic buckets	
6	250 ml beaker	
7	600 ml beaker	
8	Coarse spray wash bottle or tube attached to faucet	

4. RESULTS AND DISCUSSION

Agroecosystem practices we use in this research shows a lot of results and clarifications, specially using some kinds of improvement like the fungi *Saccharomyces cerevisiae in yeast* make a significant difference on the yield comparing with the other treatments because of inhibited the negative activity for nematode and maintain the soils fertility during plant growth (Asmaa Abdelhamid 2014) certainly there is a lot of chemical nematicides to control nematodes but are not effective beside are not environmental friend (Abd-Elgawad 2008), so we need to look for some alternatives in natural to manage *Meloidogyne* population spicily in green houses, the biological control are nematophgous fungi and yeast (Kiewnick and Sikora 2005).

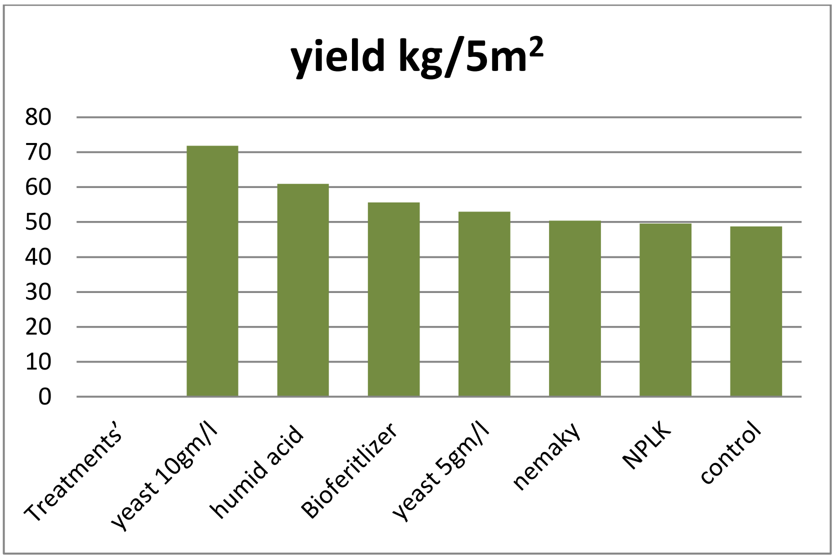


Figure 4.1. Effect of fertilizers on yields

From figure 4.1. The highest significant cucumber yield was about 4.14kg/plot for yeast-treated plants yeast treatment gave the highest significant fresh weight (Muwaffaq 2013).

Taha (2011) research shows that dry bread yeast caused significant increase in all yield traits as compared with untreated treatment (Hussain and Khalaf 2007), found that using yeast have a significant differences on the yield.

Azza el din and Hendawy (2012) they report that using dry yeast with concentration (4g/L) increased growth parameters of borage plants compared with control treatment and showed significant differences in the mean values of fresh weight of aerial parts.

Humic acid caused an increase in all shoot characters as compared to the control. While the results showed as well that spraying plants with bread yeast concentration of 5 and 10 mL/L caused positive significant differences in plant height and total chlorophyll as compared with control (Sarhan et al. 2011).

Soil application of yeast significantly increased the averages of root fresh weight/plant, root length and diameter as well as root and sugar yields, total soluble solids (TSS%).

The obtained increases in the previous mentioned characters may be due to the facts that Increasing carbon dioxide in the soil air led to decrease the soil pH as a result to its reaction with the soil water giving carbonic acid according to the following equation.

$$CO_2 + H_2O \longrightarrow H_2CO_3$$

Carbonic acid lead to solve some of soil phosphate compounds and so it increases the phosphorus compounds in soil solution. Moreover, decreasing the soil ph lead to increase the availability of nutritive elements to absorption by plants Yeast contents of proteins, growth substances and vitamins (Abdou 2015).

The results obtained by (Youssef and Soliman 1997: Noweer and Hasabo 2005) show the activity of *S. cerevisiae* to convert carbohydrate to ethyl alcohol and CO_2 toxic to nematode.

Gül et al. (2007) Results showed that organic matter decrease the total yield by 22.4% in comparison to inorganic nutrient solution.

Each one (Widmer et al. 2002) Organic matter addition effect on the biological activates of soil the incorporation of organic materials provides soil organisms with a new energy source that results in the increased diversity and activates of soil microbes.

The affect of organic matter on soil microorganisms depend on soil type and source of organic matter and decomposition status but the population of most soil organisms increase (Gallardo-lara and Nogales 1987; Kuter et al. 1983; Dayegeamiye and Isfan 1991; Pera et al. 1983).

From figure 4.1. Treatment of organic matter (T2) effect on the chemical properties of soil in different ways one important change resulting from the addition of organic matter is a potential increase in available nutrients, including an increase in organic carbon Guidi et al. (1983). So using O.M. gives a significant difference on the yield.

Also O.M. change the level of available nitrogen in the soil, Nitrogen availability depends on the C/N ratio of the organic source. various sources of organic materials have different effects on the general biological activities in soil (Widmer et al. 2002).

Table 4.1. Effect of fertilizers on some parameters

Trea.	**Yields Kg/5m^2**	**Day to Harvesting**	**Leaf area meter**	**Weight of shoot system**	**Weight of shoot system**	**TSS**
Trea. 1	48.73 c	62 b	1.16 c	3.45 b	1.35 b	3 b
Trea. 2	60.9 b	56 a	1.14 b	4.55 a	2 a b	7 b
Trea. 3	55.6 b	59 b	1.1 b	3.88 a	1.82 ab	6 b
Trea. 4	53 c	61.3 b	1.21 c	3.75 a	1.74 a b	7 b
Trea. 5	71.8 a	50 a	1.5 a	4.6 a	2.39 a	8.3 a
Trea. 6	49.6 c	61 b	1.1 c	3.35 b	1.5 b	6 b
Trea. 7	50.4 c	62 b	1.2 c	3.4 b	1.55 b	6 b

Means with different letters are significantly different according to Duncan's multiple ranges test at $P \leq 0.05$.

From Table 4.1. It is clear superiority of using dry yeast as improvement or fertilizer with concentration (10 g / l) comparing with the other treatments (Virtanen and Synnqve 1983) said that yield was increased remarkably when yeast was added.

Chlorophyll and TSS was increased when they use yeast and inhabited the pathogens (El Sayed et al. 2008).

In our research we discover that yeast Saccharomyces cerevisiae have a role as Bioferitlizer. Yeast as fertilized increased the nitrogen and phosphorus content of roots and shoots of cucumber. Yeast addition to soil also increased the root-to-shoot ratio and induced species-specific morphological changes that included increased tillering in sugarcane and greater shoot biomass in tomato plants.

These findings support the notion that brewers' yeast is a cost-effective Bioferitlizer that improves not only plant nutrition but also plant vigor during the early growth phase Lonhienne et al. (2014)

Table 4.2. Effect of fertilizer on some parameters

Trea.	**Chlorophyll ratio**	**N. aborted flowers**	**N. of setting flowers**	**N. of total flowers**
Trea. 1	38 b	7 b	17 c	24 a
Trea. 2	40.33 a	4 b	15 d	23 a
Trea. 3	41 a	6 b c	29 a	27 a
Trea. 4	38.6 b	4 b c	23 b	27 a
Trea. 5	41.3 a	1 a	21 b c	22 a
Trea. 6	37.6 b	7 b c	21 b c	28 a
Trea. 7	38.3 b	8 c	20 b c	26 a

Means with different letters are significantly different according to Duncan's multiple ranges test at $P \leq 0.05$.

Table 4.3. Effect of fertilizer on nematodes

Trea.	N. larvae in soil	N. egg mass	N. galls
Trea. 1	430 d	12 b	18 d
Trea. 2	48 a	3 a	3 a
Trea. 3	94 ab	4 a	4 ab
Trea. 4	105 ab	6 a	6 ab
Trea. 5	70 a	3 a	3 a
Trea. 6	278 c	6 a	11 b
Trea. 7	156 b	7 b	8 c

Means with different letters are significantly different according to Duncan's multiple ranges test at $P \leq 0.05$.

From Table 4.3. Saccharomyces cerevisiae T5 caused significant differences in numbers of larva. Different yeast strains are promising biocontrol agents for different crops root knot nematodes infection, which reduced nematode reproduction and increased plant growth parameters (Muwaffaq 2013).

According to (Gowen et al. 2000; McSorley 2011) an extensive range of organic materials have shown efficiency in reducing nematode population In a number of pathosystems.

Soil organic amendments have been proved to substantially increase the soil health (Neher 2001), the environmental wellness (Adegbite and Adesiyan, 2005) and sustainable crop production.

Hassan et al. (2001) say in his report that owing to environmental pollution and costliness of synthetic pesticides, chemical control will no longer holds future in sustainable agricultural production, thus, justifying attempts by previous workers to develop non-chemical alternative control technologies using organic substances (Hassan et al. 2001; Adegbite and Adesiyan 2005; Renco et al. 2007; Atungwu and Kehinde 2008). Organic materials like agro industrial and animal wastes and other organic source may act as nutrient sources and improve water holding capacity of the soil increasing plant growth (Ana Carolinre et al. 2016).

Addition and maintenance of organic matter spatially the active fraction will improve the physical, chemical and biological properties of soil against specific pathogens and their resultant disease, total soil nematode and plant parasitic nematodes are spatially affected by organic matter (Widmerea al. 2008).

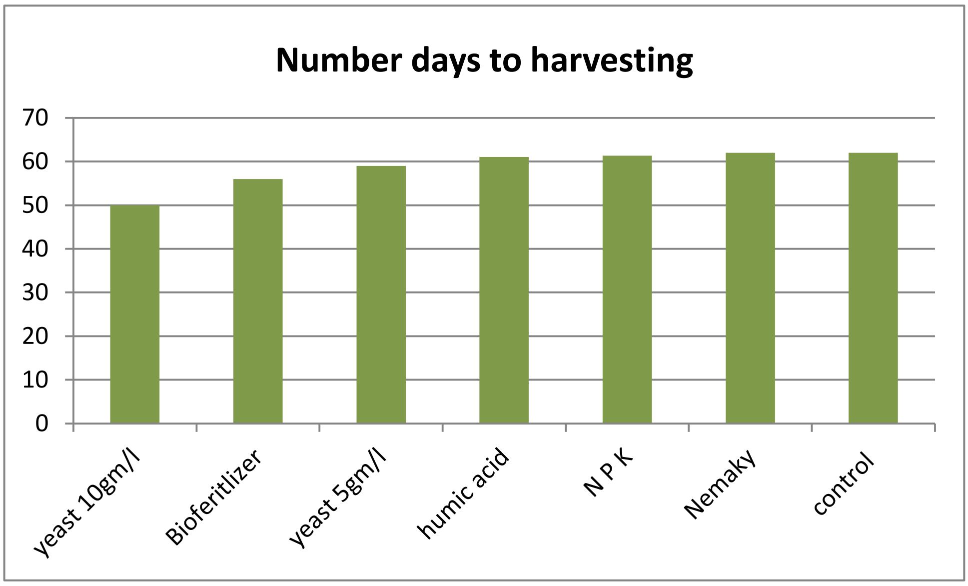


Figure 4.2. Effect of treatments' on total number day need to harvesting

Our research shows that using extract (yeast 10 g / l) gives a significant difference with Bioferitlizer treatments comparison with the other treatments. also using yeast with 5 g / l concentration and organic matter treatment has a good effect on the numbers day to harvesting. results (Zala 2013) showed the application treatments of dry yeast (5 g / L) and liquorices root (5 g / L) extractions, either alone or combined with each other in vegetative growth characteristics (plant height, number of leaves, shoot dry matter percentage).

Mandana et al. (2015)reported that Root length and dry weight were both positively affected by integrated bio-fertilizer application that increased root length and root dry weight, respectively This might be due to the fact that bacteria inoculation increased root growth, root development, caused better nodulation. More nutrient availability could result in vigorous plant growth and dry matter production leading to a better flowering and pod information (Mehtal et al. 2012).

The higher bacteria population due to seed inoculation by biofertilizers leads to a better symbiosis activities in rhizospheric which result in increased amount of N fixed (Mehtal et al. 2012).Our results are also in conformity with those reported by (Purbey 2004; Shaheen 2014).

The application of organic manures increased plant nutrients of N, P and K in soil and number days to harvesting These results are in line with those Bioferitlizer have some microorganisms which convert elements to available nutrient for plant’s Roots (Seydeh et al. 2012).

Sarhan et al. (2011) shows that humic acid caused an increase in all shoot characters as compared to the control while the results showed as well that treated plants with bread yeast at concentration of 5 and 10 mL/L caused positive significant differences in plant height as compared with control treatment.

A Significant differences when increase the minerals content (nitrogen, phosphorus, potassium) in leaves as a result of humic acid and bread yeast treatments at concentration of (5 g / L and 10 g / L) bread yeast.

These improvements in shoot characters might be due to the effect of humic acid which provides nutrient minerals that share in biological activities and finally increase the growth (Abdel-Mawgoud et al. 2007).

humic acid cause increase in soil porosity so it shared in its ventilation and root respiration and easily penetration in soil and increase root system and reflect an increase in vegetative growth (Garcia et al. 2008) also Humic acid effect as a chelating and considered as induce for nutrient element act to increase capable capacity and increase availability of nutrient elements and then easier absorbed by plants and increase its concentration in plant tissue and building root system with highly efficiency for absorption of macro and micro nutrient elements which help to increase the quality of synthesized substances in leave to build plant tissues (AL- Niemi 1999).

And might be due to that bread yeast induces nutrient minerals absorption through improvement of soil pH to acidity (Pawte et al. 1985).

or as mentioned by (Bown and Rovira 1991; Sarhan 2008; Glick 1995) about the yeast ability to increase the production of stimulants for plant growth, especially Gibberellins, Auxins and Cytokinins which act to improve the plant cell division and its growth results showed when they increase of yeast extract up to 10 g / l. improved the vegetative growth characters of potato plants as expressed as plant length, stems and leaves number/plant, leaf area/plant, fresh and dry weights of whole plant. (Ahmed et al. 2013).the applying of bread yeast near the plants roots, with concentration of 4 and 8 g. Lead to a significant increase in the leaf area compared with the control (Abdel- Monnem 2015).

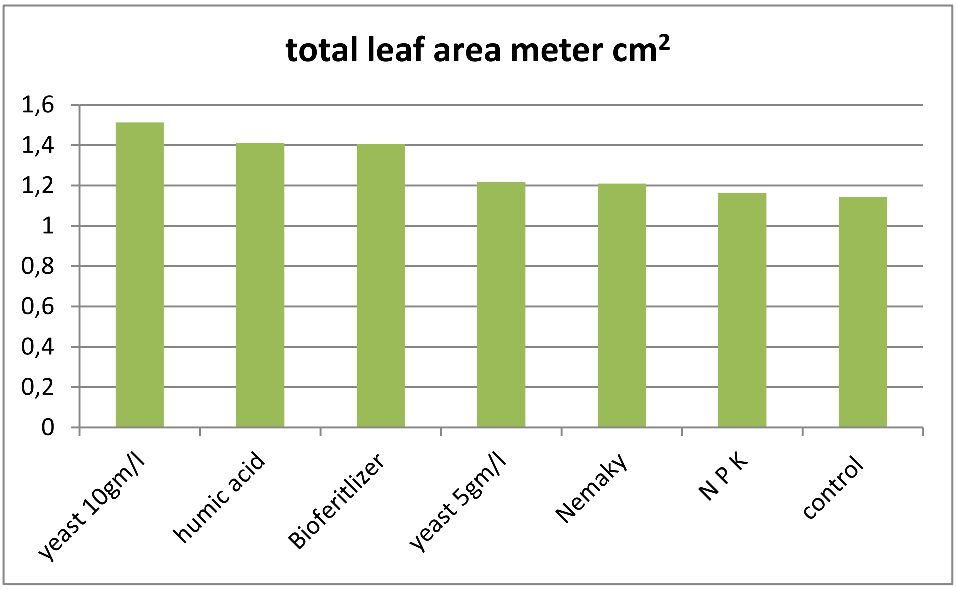


Figure 4.3. Effect of fertilizers on total leaf area

The combined application of liquorice root extract 10 g/L plus bread yeast suspend 10 g / L gave the highest significant leaf area 3.14 and 2.85cm^2 (Thanaa et al. 2016).

Effect of inoculation of sweet pepper plants with biofertilizers on chlorophylls, N, P and K percentages in sweet pepper leaves the highest significant values of the mentioned parameters were obtained by inoculation with biofertilizers in two seasons compared to the uninoculated plants (Abd El - Nabi and Swelam 2012).

The significant effect of biofertilizers may be due to the fact that biofertilizers have a positive effect on chemical composition in leaves by providing doses of nutrient to the plants and in some cases to provide plants with some promoting growth regulators. In addition, biofertilizers increase microorganisms living in the soil and these microorganisms working on the organic matter in the soil to convert organic N to mineral N (Lampkin, 1990).

Biofertilizers play a fundamental role in converting P and K fixed form to be ready soluble for plant nutrition and making the uptake of nutrients by plants more easy. These results are in conformity with the findings of (Supangani et al. 2006).

(Kaya et al. 2009; Khan et al. 2012) who showed that application of biofertilizers (N-fixing bacteria, P-dissolving microorganisms and K-solubilizing bacteria) increased chemical constituents of sweet pepper leaves.

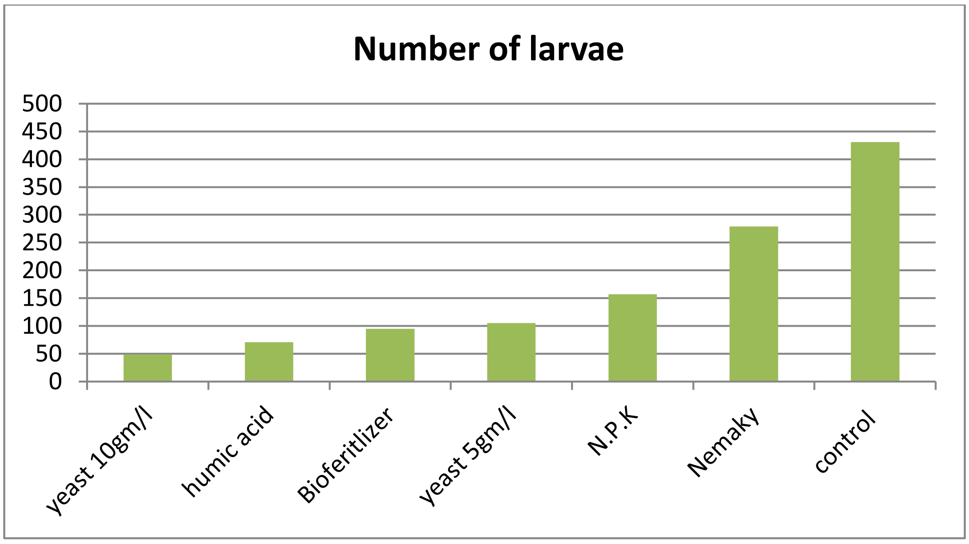


Figure 4.4. Effect of fertilizers on activity of nematodes

The mechanism of yeast bio-control activity may involve competition for nutrients site exclusion parasitism and induced resistance and/or make physical and chemical soil properties change it clearly (Ahmed et al. 1972; Alam et al. 1977; Sitaramaiah and Singh 1978; Noweer and Hasabo 2005). Significant reduction in nematode populations in our study could be linked to (Johnson 1957) view that decomposition of organic substances by bacteria is capable of producing compounds that are toxic to plant-parasitic nematodes.

Fakunle (1972) findings that neem leaves are rich in tannins which may be nematostatic It was evident from (Miller et al. 1973) that biologically active ingredients inherent in neem leaves extract had nematicidal potentials, that are easily released by heat or bacterial degradation in soil.

Evident that effect of Bioferitlizer and organic matter in inhabitation nematode population in plant is enhanced by blending the two organic substances. Since the use of synthetic nematicides by subsistent farmers is plagued with several limitations, such as prohibitive cost and lack of technical expertise in their application, among others, blending of organic substances of different origin will forestall large-readily available supply of these materials that limit practical use of soil amendment practices for the control of pests.

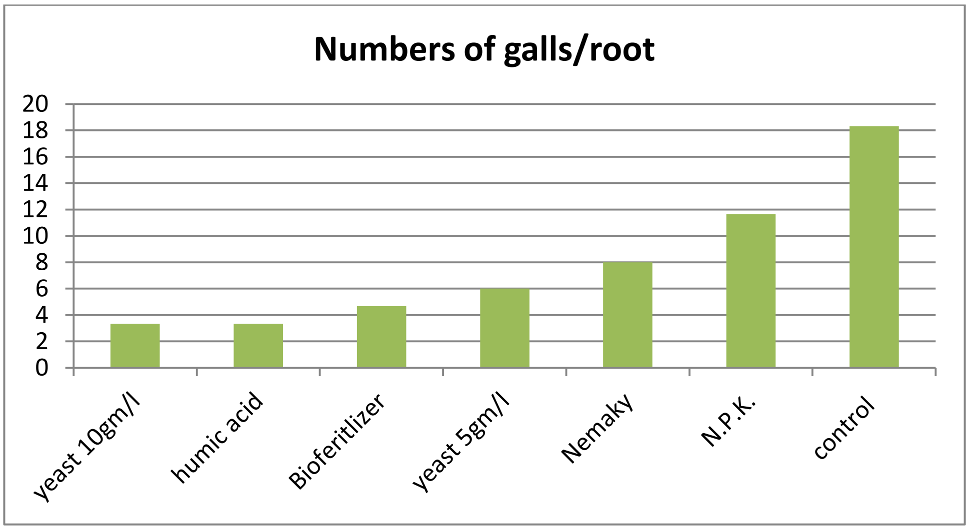


Figure 4.5. Effect of fertilizers on nematodes activity

Using the dry yeast (*S. cerevisiae*) as well as the nematicides Ethoprophos when applied as a rhizospheric soil drench treatment led to an obvious reduction of root galling caused by the nematode *M. Javanica* and resulted in reducing the nematode reproduction ability on cucumber (Muwaffaq 2013).

Noweer and Hasabo (2005) find that the effect of yeast on *M. incognita* might be due to the activity of *S. cerevisiae* to convert carbohydrates to ethyl alcohol and CO^2 toxic to nematodes. This is in agreement with the results obtained by (Youssef and Soliman 1997). The increase in number and weight of fruits in all treatments is partially due to the effect of the tested materials on the nematode; besides its role in plant nutrition as suggested by (Akhtar and Alam 1990).

Biofertilizers are known to increase plant growth and subsequently induce resistance against nematodes (Durrant and Dong 2004).

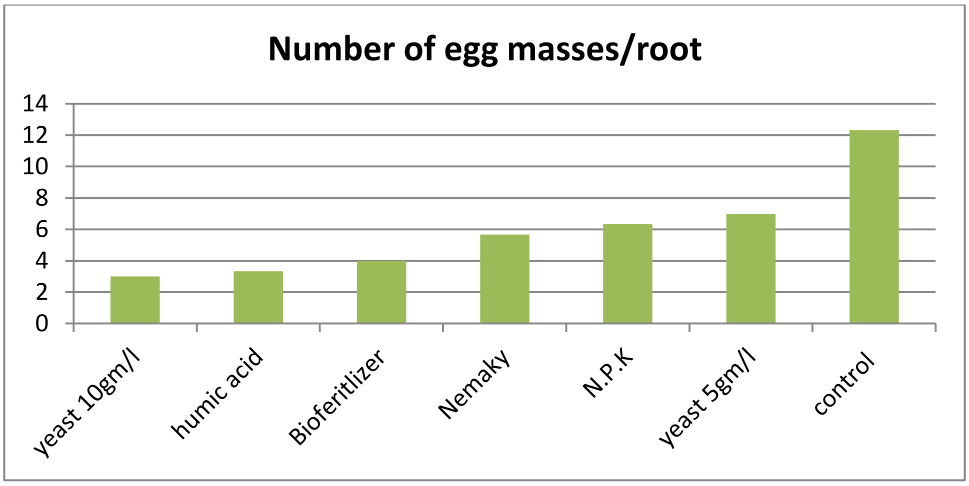


Figure 4.6. Effect of fertilizer on nematodes activity.

High content of total phenolics in cucumber roots treated with *S. cerevisiae* gives the ability to resistance (Desikan et al. 2001).soil application of the yeast enhanced cucumber plant and root fresh and dry weight and fruit yield. Yeasts were able to enhance growth and increase tissue nutrient contents of marigold (Azzam et al. 2012).

Muller and Leopold (1966) reported that the growth-enhancing effect of yeast application might be due to yeast that produced cytokinins responsible for increasing the production and accumulation of soluble metabolites.

The pronounced increase in cucumber growth and fruit yield of *S. cerevisiae* treated plants may be due to the indirect effect of the yeast on the nematode infection; besides the yeast direct role in promoting plant growth and development (Akhtar and Alam

1990).In conclusion, the application of the yeast *S. cerevisiae* could suppress population of *M.* Javanica and root gall formation on cucumber through its effects on nematode infection and reproduction and through inducing plant resistance and enhancing fruit production of cucumber (Ramadan 2013).

Organically amended soil may change the physical properties of soil, which in turn may adversely affect the nematode behavior, such as hatching, movement, and survival. The biofertilizers further improve the soil fertility through nitrogen fixation, thus supplement additional nitrogen, which might be detrimental to the population of nematodes. Phosphate is known to reduce soil pH, which has an adverse effect on nematode multiplication (Pant et al. 1983). Potash also showed an inhibitory effect on nematodes as reported by (Gupta and Mukhopadhyaya 1971).

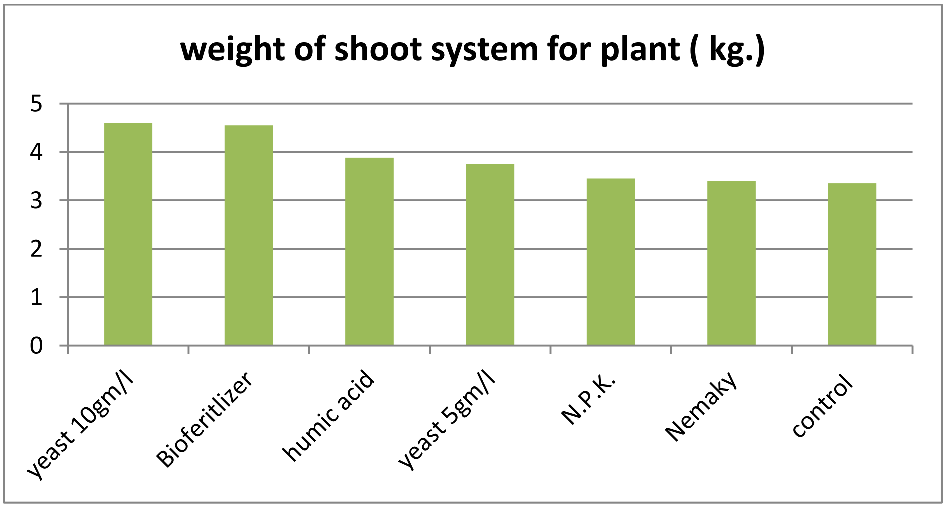


Figure 4.7. Effect of fertilizer on weight of shoot system

From Figure 4.7. Bread yeast caused significant increase in shoot characteristics plant height as compared with control. This enhancement in the characteristics of the vegetative shoot growth may attribute to the ability of yeast to increase the production of stimulants for plant growth (Sarhan et al. 2011) the applying of bread yeast near the plants roots, with concentration of 4 and 8 g lead to a significant increase in the stems number per plant, fresh and dry weight of the plant as compared with the control (Abdel 2015).

Wafa (2008) discovered that results of dry yeast spray showed a significant effect on improved vegetative growth characteristics. A significant increase in the length of the plant by 20.13% when spraying with 8 g / plant compared to the measurement scale (water only), There was a significant increase in the number of branches / plants with an increase of 53.69% compared to the comparison coefficient.

The yeast-carrying substrates (4, 8, 6 g/L) to an increase in the dry matter of the total vegetative and by 28.72%, 23.07% and 21.63% respectively (Wafaa 2007) Whereas the highest shoot fresh weight (62.14 and 61.38 g) and shoot dry weight (55.14 and 55.08 g) were recorded from the interaction between 10 g / L liquorice root extract plus 10 g / L bread yeast suspend during the two seasons respectively. On the other hand, the control gave the lowest values of these parameters in both seasons of this study Wafaa (2007).

Shafeek et al. (2015) find that the concentration of 2% yeast extracts was the most favorable for increasing plant growth, expressed as plant length (cm) number of leaves as well as fresh and dry weight (g) of leaves, plant in both two seasons as compared with the medium level 1% and control treatments the combined application of liquorice root extract 10 g / L plus bread yeast suspend 10 g / L gave the highest significant stem length 130 and 124 cm, stem diameter 2.55 and 2.61 cm, number of branches (27 and 30/ seedling), number of leaves (398 and 396, seedling) (Thanaa et al. 2016).

The effect of biofertilizers on sweet pepper growth performance, plants in the presence of biofertilizers achieved the good records of plant height, number of leaves and branches, fresh and dry weights and leaf area in two successive seasons as compared with the others Abd El-Nabi and Swelam (2011).

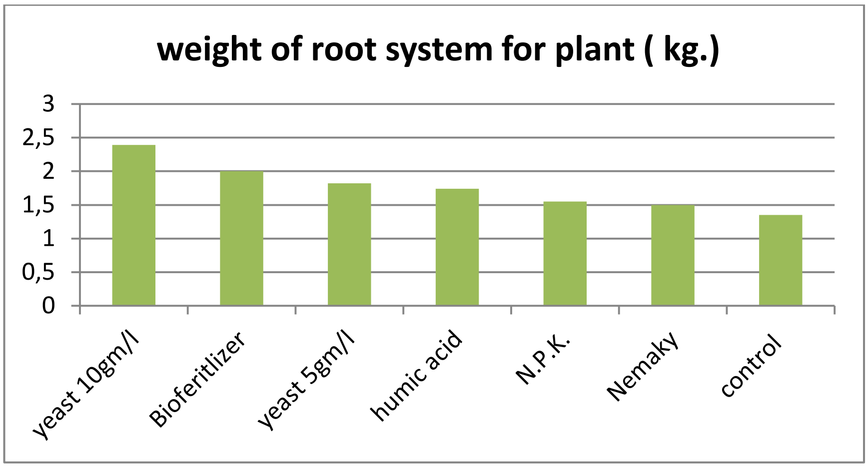


Figure 4.8. Effect of fertilizers on weight of root system

Lobna et al. (2016) found that Maximum stimulatory effect on plant height (cm), stem fresh and dry weight (g) and root fresh and dry weights (g) was observed in plants treated with 15% yeast extract which produced (134.67 cm, 72.12cm, 21.78cm, 42.80cm and 9.16cm respectively) as compared with control plant which gave (97 cm, 38.76, 15.42, 17.7 and 5.96 respectively).

These findings are in agreement with the results by (Kamal and Ghanem 2012 ; Tarek et. al. 2014) and (Marzauk et al. 2014) who found that the increase level of yeast extract significantly increased plant growth characters on vegeTable crops who found that the application of yeast extract increased plant growth characters.

Shadia et al. (2014) mentioned that the different concentrations of active dry yeast significantly increased fresh and dry weights/ plant of basil plant compared with control, and when the concentrations of yeast treatments increased the fresh and dry weights were significantly increased, and the highest values were obtained from the treatment of highest concentration of yeast (8g / l).

The dry yeast is able to create growth promoting substances like hormones and amino acids that may enhance plant growth (Armanious 1987) that may enhance plant growth.

However, the fermentation process that occurred in the presence of dry yeast produces CO^2 in high quantity, a factor that may increase photosynthesis and consequently plant growth, the high content of dry yeast from vit.B5 and minerals might play a considerable role in orientation and translocation of metabolites from leaves into the productive organs Mohamed et al. (1999).

These results were in agreement with those obtained by (Ahmed et al. 1998) on rossel plants and (Seleim 2005) on mint sage plants.

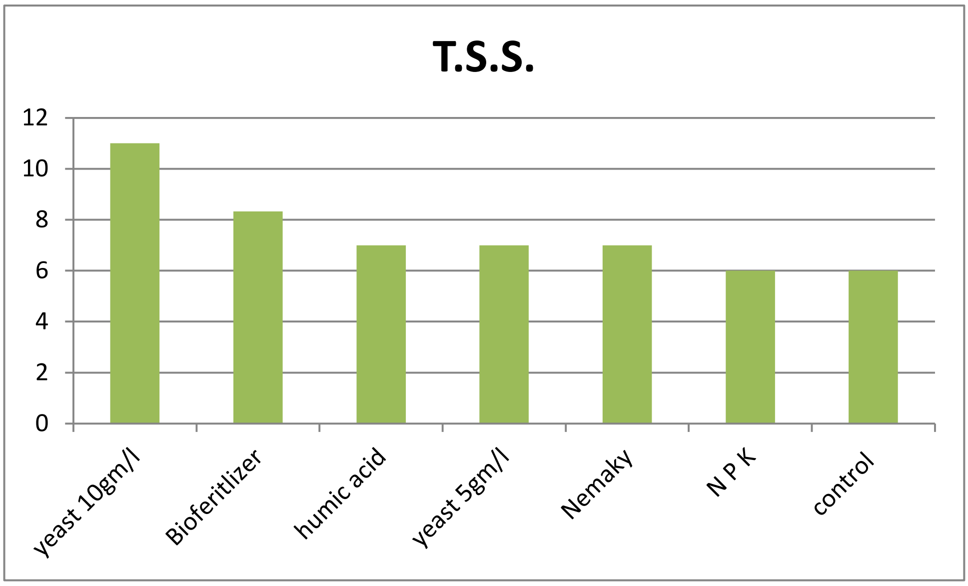


Figure 4.9. Effect of fertilizer on total soluble sugars

Hussain and Khalaf (2007) found that spraying yeast solution treatments significantly increased plant height, dry matter of vegetative growth, yield/plant, yield/plant and TSS.

The dry yeast solution treatment 6 g / L increased T.S.S. at the rate 28.35% compared with the control treatment (Wafa 2008).

Lobna et al. (2016) reported that most of dry yeast extracts treatments caused significant increase in total soluble sugars. Ttotal soluble sugars (T.S.S.) number of leaves, number of branches, plant fresh weight and plant dry weight, compared to the uninoculated control in both seasons. Additionally, the mixed Bioferitlizer was found superior and associated with the highest mean values of the vegetative growth characters comparing with the other single biofertilizers.

These enhancing effects of the different biofertilizers could be due to the efficiency of the different bacterial strains on the N_2-fixation. Dissolving immobilized Phosphoresce and producing appropriate amounts of phytohormones necessary for activating plant growth parameters.

(Jagnow et al. 1991; Noel et al. 1996) demonstrated that the non-symbiotic N_2-fixing bacteria of the genera Azotobacter and Azospirillum produced adequate amounts of IAA and cytokinins which increase the surface area per unit of root length and enhanced root branching with an eventual increase in the uptake of nutrients from the soil and finally accelerated plant growth. The current results generally.

Agree med with those results reported by many investigators such as (Abd EL-Fattah; Arisha 2000; Shiboob 2000) on common bean (Abd ELNaby 1998; Adam 2002) on broad bean (EL-Mansi et al.2000; Ishaq 2002) on pea (Ismail 2002) reported that the inoculation of pea seeds with Rhizobium was responsible for significant increments on plant height, number of leaves and branches, fresh and dry weight plant-1 and dry matter percent compared to the uninoculated plants.

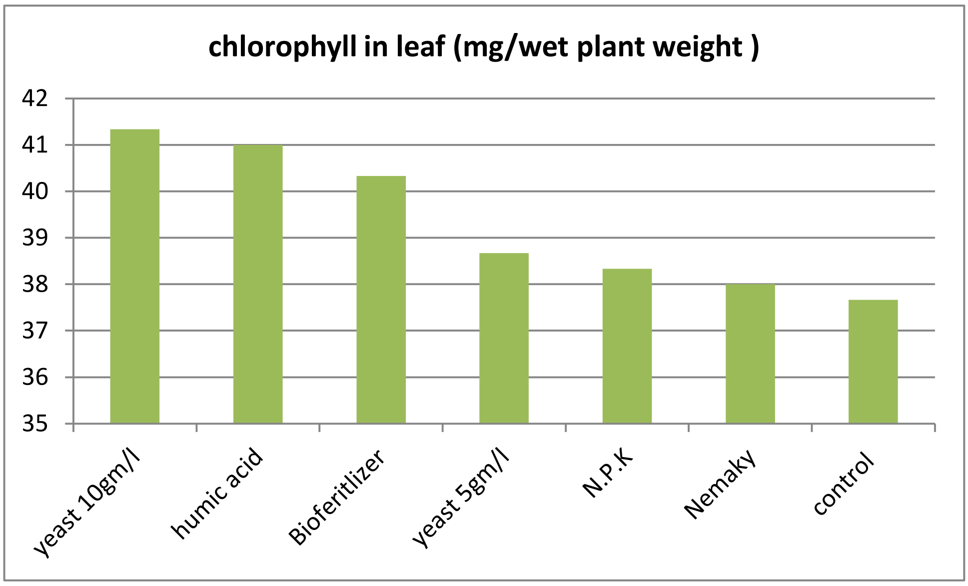


Figure 4.10. Effect of fertilizers on chlorophyll in leaf

From Figure (4.10) we have a significant differences with using yeast (10 g/ l) concentration on chlorophyll ratio in leaf.

Stimulating vegetative growth by using dry yeast may be due to its influence on the nutritional signal transduction producing growth regulators and suppressing pathogen (Tohamy 2007). It is also a natural source of cytokinins that stimulates cell proliferation and differentiation, controlling shoot and root morphogenesis and chloroplast maturation (Amer 2004).

(El tohamy and El-Greadly 2007; Gomaa and Mohamed 2007) revealed that dry yeast treatments (5 and 10 g /L) result in improving pods quality of snap beans plants (Phaseouls vulgaris) in terms of chlorophyll, protein, carbohydrates and decreased fiber content. (Shafeek et al. 2015) find that the concentration of 2% yeast extracts was the most favorable for increasing plant growth, expressed as plant length, and total chlorophyll content (Seydeh and Shahram 2012), found the biofertilizers have a significant effect chlorophyll content.also (Sarhan et al. 2011) found that using yeast extract and humic acid gave a significant result on amounts of chlorophyll in eggplant.

Increase the total chlorophyll amounts in the plant, This will positively reflects on the activity of photosynthesis and the synthesized materials which will positively reflects on the shoots characteristics (Thomas 1996).

Results of (Al naggar 2010) on total chlorophylls content of leaves due to applying Bioferitlizer treatment gave significant effect also using organic matter have the say effect. The plant leaves analyses for their N, P and K The treatment of biofertilizers gave significant increased N, P and K contents % for two seasons. The N,P and K uptake were significantly increased with incremental increasing of organic compost application rates, as well as biofertilizers application.

The increased availability of N might lead to better root development as well as uptake and transportation of water and mineral nutrients (Rizvil et al. 2013). The increased plant vegetative and generative growth due to nutrients like N may be attributed to its role in enhancing chlorophyll content as nitrogen is one of the main components of chlorophyll, which increases synthesis of food material and their distribution towards the pods (Jain et al. 2003). The Rhizobium inoculation increased the N and P content in grain and straw and total uptake N and P. This was probably due to more nitrogen fixation by the bacteria resulting in better utilization of all other nutrients by crop. These findings support those of (Dubey et al. 2012).

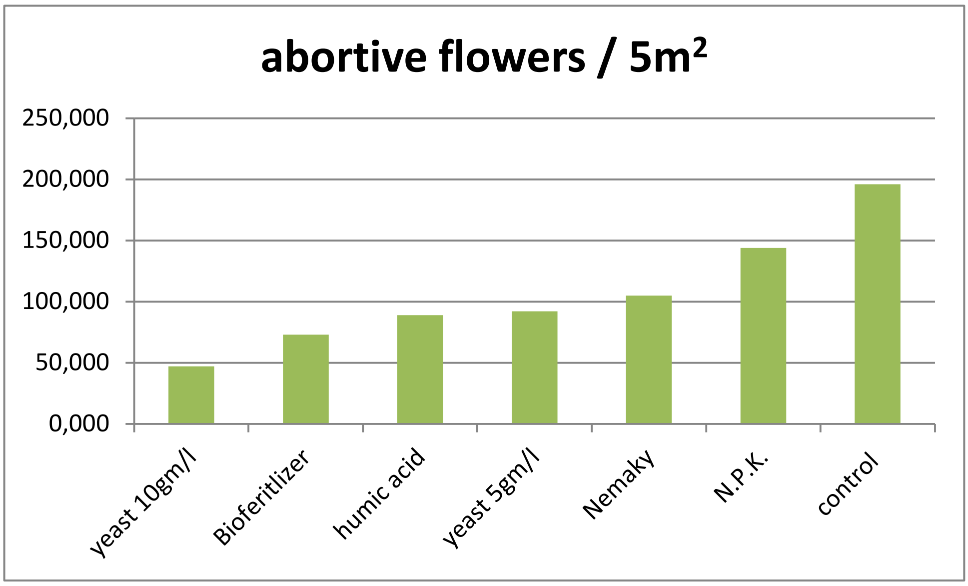


Figure 4.11. Effect of fertilizers on abortive flowers.

Seydeh et al. (2012) found the biofertilizers have a significant effect on flowering comparing with control.

(Mady 2009) discover threw his escapement on faba bean that using dry yeast as a biological fertilizer have a significant differences on the total flower.

Ali (2013) found that the yeast have a positive effect on Geranium plant in Characteristics of flowering growth (numbers, widths) this is due to dry yeast extracts contain substances that promote growth like B2 and riboflavin B1 and thiamine Which have an important role in metabolizing carbohydrates Build amino acids (Jassim 2009).

Conclusion and recommendation Application of nutrients like neem cake, different nitrogen levels, and biofertilizers has a significant and effect on yield and quality attributes of chili. The supply of various plant nutrients at an optimum level sustains the desired crop productivity by optimizing the benefits from all sources in an integrated manner. The inference drawn from the present investigation clearly stated that organics are effective alternatives as a source of macro and micronutrients and have a potential to improve yield, and thus avoid costly chemical fertilizers. The biofertilizers produce growth promoting substances, increase soil fertility in terms of nitrogen, phosphorus, and potassium, and suppress the population of pathogenic nematodes.

This type of experiment will definitely increase the interest amongst the related people to formulate ideas to develop organic agriculture, which sustains the crop production without harming our natural bioresources (Zehra 2012).

Table 4.4. Effects of Different Fertilizer Treatments on Soil fertility

Treatment	Soil Texture	E.C. (ds/m.)	PH	N (%)	available P ppm	soluble K^+ (meq/l)	soluble ca^{+2} (meq/l)	(%) o.m
before sowing	Clay loam	0.7	7.55	0.25	11.317	0.036	1.6	1.86
Control	Clay loam	0.54 a	7.2 c	0.18 e	0.8 e	0.03 b	0.75 a	0.74 f
Humic acid	Clay loam	3.4 a	7.65 d	0.52 b	38.4 a	0.06 b	1.3 a	2.9 a
Bioferitlizer	Clay loam	1.2 a	7.3 b	0.3c	22.7 c	0.05 b	1.1 a	2.1 b
Yeast 5g/L	Clay loam	1.1 a	7.45 b	0.34 d	14.3 d	0.035 b	0.9 a	0.95 d
Yeast 10 g/L	Clay loam	5.6 a	7e	0.48 a	40.5 a	0.075 a	1.4 a	2.85 a
N.P.K.	Clay loam	0.91 a	7.9 a	0.37 c d	30.4 b	0.09 a	0.8 a	1.1 c
Nemakey	Clay loam	0.62 a	7.6 b	0.32 d	2.1 d	0.028 b	1 a	0.86 e

Means with different letters are significantly different according to Duncan's multiple ranges test at $P \leq 0.05$.

Table 4.4. Shows that the chemical properties of the selected fertilizers used in this research differed depending on the type of fertilizer (Bernal et al. 1998; Kato et al. 2005; Zmora-Nahum et al. 2005). From (Table 4.4) the electrical conductivity (EC) of extract Yeast 10g / l. were significantly higher than the other fertilizers and this can be attributed to the fact that the dry yeast rapidly during composting,

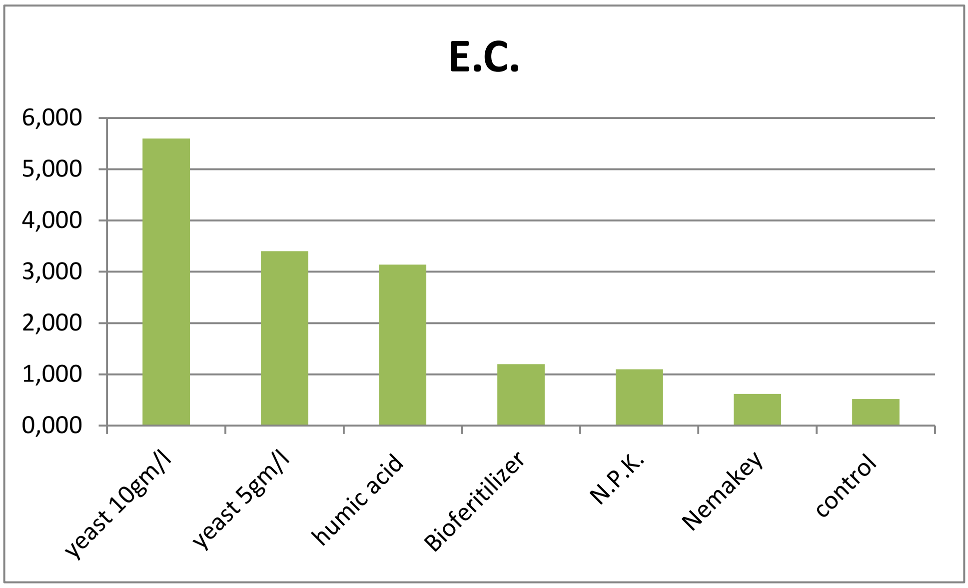


Figure 4.12. Effect of fertilizers on soils electronic conductivity.

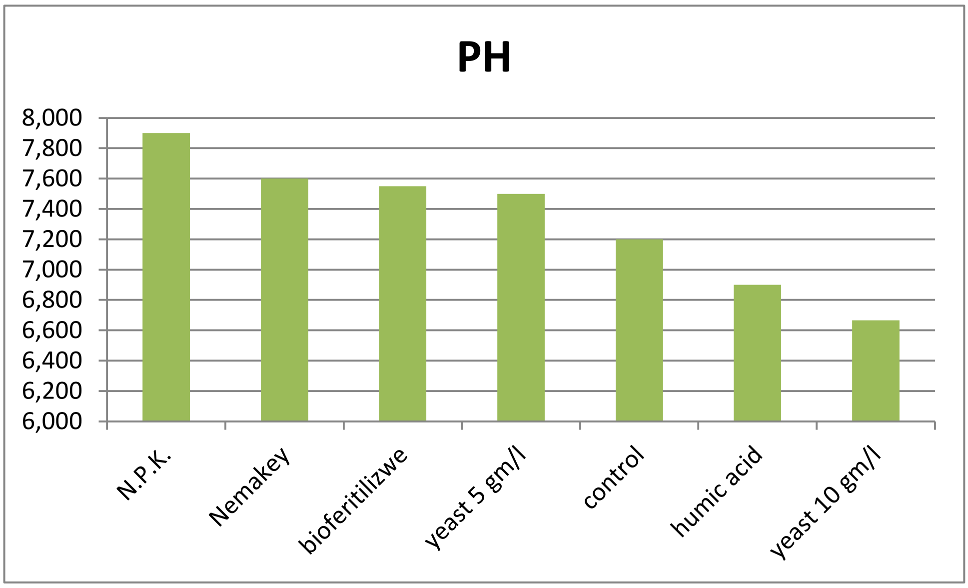


Figure 4.13. Effect of fertilizer on soils PH

Our research shows that pH of the soil after harvest decreased in all the treatments but increased with the application of NPK fertilizer. The increase in soil pH can be adduced to addition of high inorganic fertilizer and also consistent with findings of (Chuwku et al.2012). Who reported that application of NPK fertilizer could lead to increase in soil pH (Figure 4.13) the decrease in the pH of plots with low application of inorganic fertilizer could be attributed to complete decomposition of organic matter as a result of enhanced activities of micro organisms and low level of inorganic fertilizer application (Agbede 2009).

Table 4.4. shows significant change in soil pH was observed by applying humic acid and yeast 10 g/l for the plants and when compared with the initial soil pH (6.7). This result could be attributed to the high amount fungi and plant residues. Similar results have been obtained in other studies (Hue 1992; Materrechera and Mkhabela 2002; Whalen et al. 2000).

Zaller and Koepke (2004) showed that the soil pH, available P and available K contents were all significantly increased by yeast 10 gm/l. application. Table 1 show that no significant change in soil pH was observed by applying NPK and Nemakey when compared with the initial soil pH (7.55). This result could be attributed to the high amount of bases also applied with the composts. Similar results have been obtained in other studies (Hue 1999 ; Materrechera and Mkhabela 2002 ; Whalen et al. 2000).

The activities of soil acid and alkaline phosphates were affected by different fertilizer treatments (Dick 1992).Reported that soil acid phosphates activities increased with the addition of organic materials. However, our results show that the treatments of Yeast 5gm/l and Nemakey lowered the phosphates activity compared with that of the yeast 10gm/l. plots; there was no significant difference in acid phosphates activity between the control and Nemakey treatments. In general, Yeast 10g/ l. treatment and humic acid treatment soils had the highest acid phosphates activity.

The properties of soil humus depend on, and simultaneously are characteristic for, different soil types. Humic acids, which are the main component of soil humus, specify the properties, and consequently, the role of humus in a natural environment. It is commonly known that the content of humic acids that are included in humus, as well as their properties is modified by the kind of fertilization that is applied by (Orlov 1986; Gonet 1989; Dębska 2004; Ventorino et al. 2011).

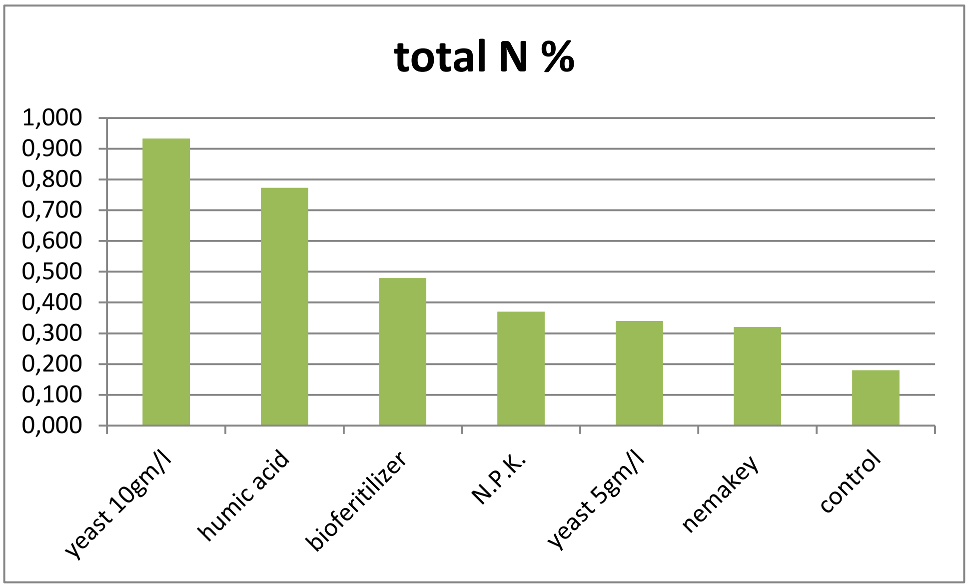


Figure 4.14. Effect of fertilizer on soils total N

The pre-planting soil analysis (Table 4.4) indicates a poor soil fertility status that requires fertilizer application to replenish nutrients taken out from the soil through crop harvest and to supplement nutrients to boost yields (Olatunji and Ayuba 2012). The total N before planting before planting (0.25 %) falls below the optimum value of 0.48 % Agboola (1975) Similarly, the values of SOM (1.56 and 1.64 %) for the two cropping seasons were below the average range of 2.5 to 2.6 % considered for good crop growth (Prasad and Singh 2000) in the study area. The results of the pre-planting soil analysis thus indicated that soil amendment was required in line with earlier observation by (Agboola 1975).

The total nitrogen status of the soil increased with using Yeast 10gm/l. and humic acid application of fertilizer. The increase in N content of the soil observed with addition different fertilizers can be adduced to release applied of N which further enhanced microbial activities as a result of increased concentration of nutrients (Adeniyan and Ojeniyi 2003).

The depletion in total N observed in the control plots may be attributed to nutrient up take by component crops and absence of fertilizer application

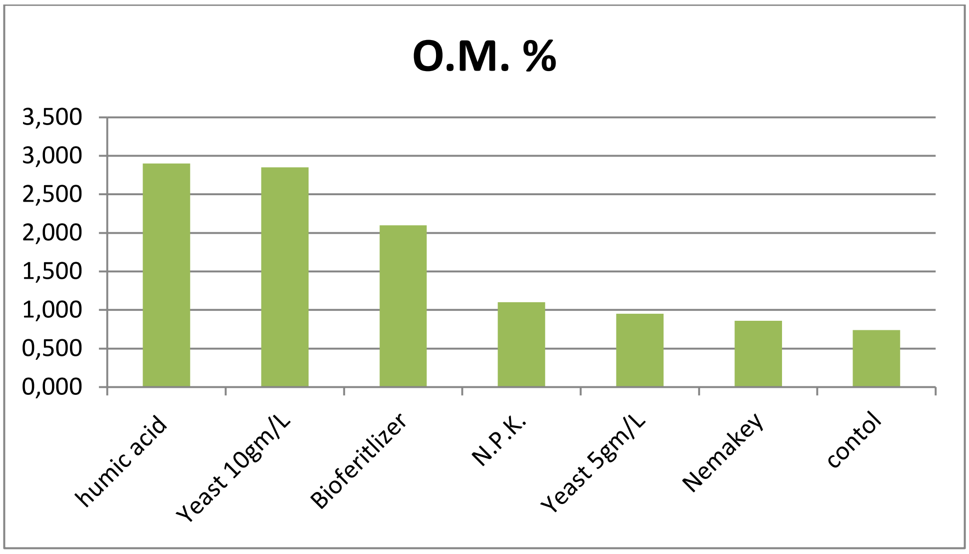


Figure 4.15. Effect of fertilizer on soil organic matter.

The use of dry yeast 10 g / l. in our research and organic fertilizer increased Soil organic Matter that consistently low in plots with no application of fertilizer. This can be attributed to the absence of fertilizer which would have enhanced the decomposition of organic matter in the soil. According to (Plaster 1992), organic matter content of the soil can be maintained through incorporation of crop residues, mulching, and addition of organic and inorganic fertilizers to the soil It has been reported that organic matter is responsible for up to 90% of the cation exchange capacity of the surface layers of mineral soils (Stevenson 1992).

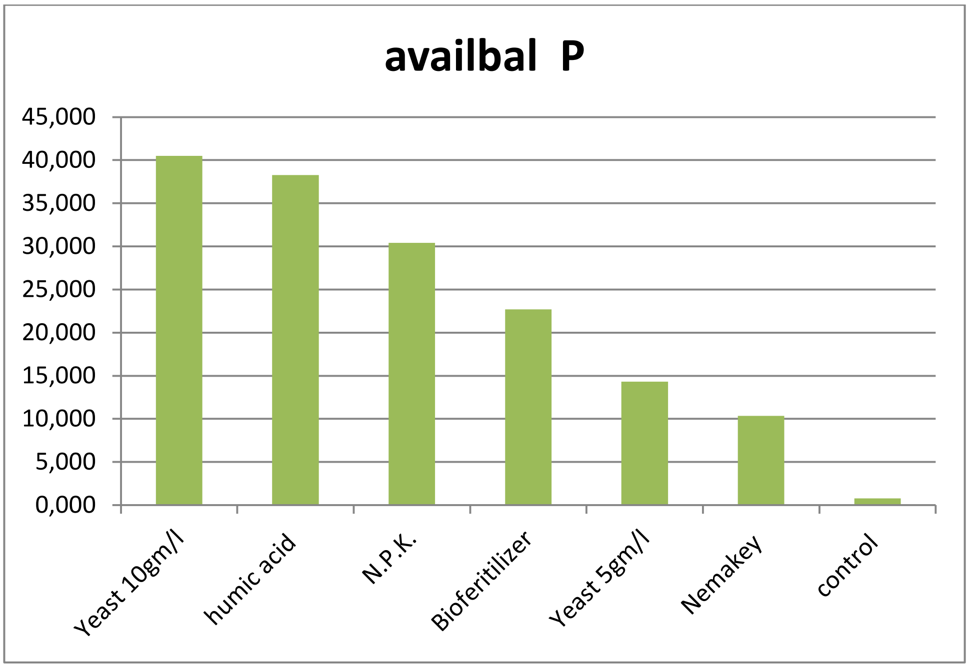


Figure 4.16. Effect of soil improvement on soil phosphoresce availability

Similarly, the available P was depleted in the control plots which may be attributed to uptake of the nutrients by component crops and probably due to fixation of the element that usually occur at low soil pH (Brady and Weil 2007). A higher build up of available P was observed with the application of yeast 10 g/l fertilizer. Similar trend was observed with the exchangeable bases. The release of nutrients to the soil by organic Matter fertilizer application most probably explains the increase in viable Phosphoresce.

Returning to any plant parameters like crop yields we see the obtained at the extract dry yeast 10g /l. and humic acid fertilizer used in the study. the increases observed in the values of soil pH, organic matter, total nitrogen is an indication that soil fertility can be improved by good practical agro ecosystem management applications for sustainable agricultural production.

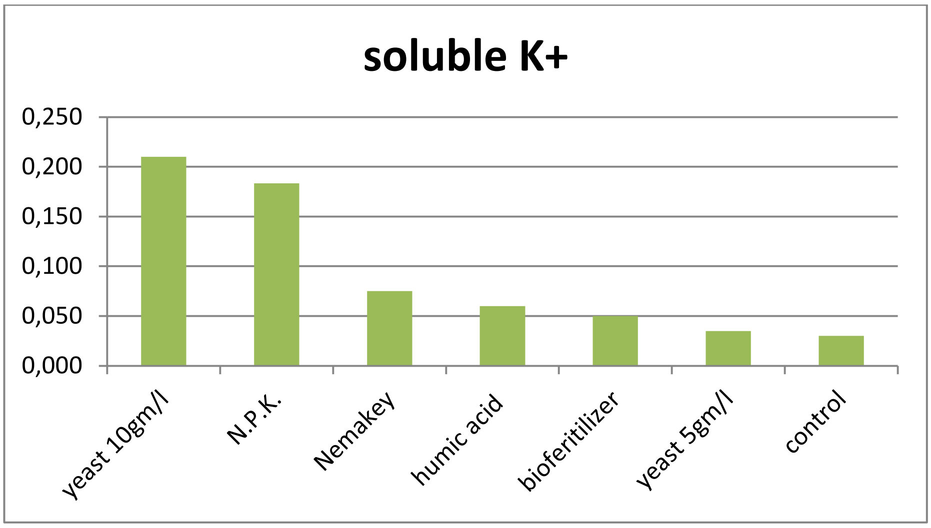


Figure 4.17. Effect of soil improvements on soil soluble K

The increases in K upon application of fertilizer have been reported by (Adeniyan and Ojeniyi 2003). The CEC of the soil was affected by addition of inorganic fertilizer; this is an indication that soils with high organic matter content will have high CEC as reported by (Plaster 1992; Agbede 2009). This observation is consistent with (Brady and Weil 2007) who reported that organic fertilizer application significantly ($p<0.05$) increased CEC of soils.

The cucumber yield components increased with increase in yeast extract application from 5g / l. to 10g / l. similar positive responses of cucumber to humic acid fertilizer application have been observed by some researchers (Osunde et al. 2004; Mbah et al. 2007). In addition, Kang (1975) reported a significant linear increase in yield of cucumber to nitroge. (okpara et al. 2002) in their study with straight nitrogen and potassium fertilizers in the humid rainforest zone reported high response of cucumber to fertilizer application and concluded that nitrogen alone was very effective in increasing cucumber yield wit application.

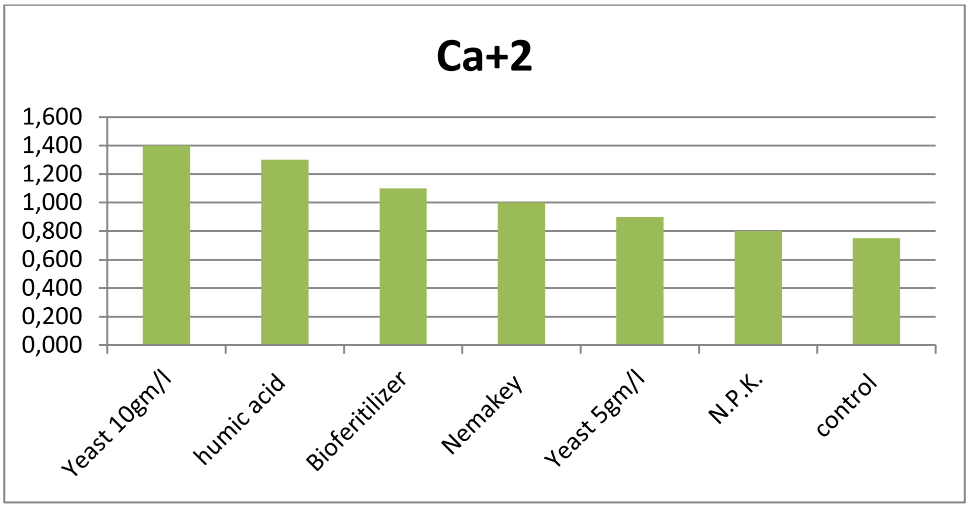


Figure 4.18. Effect of soil improvements on soils calcium contain

From Table our research also showed that soil available nutrient contents were significantly affected by different fertilization treatments except Exchangeable Ca^{+2} that have no effected statically and have no significant effect.

These results indicated that the amount of nutrients applied by the fertilizers was higher than those removed by the vegeTables. similar results were reported by (Carpenter et al.1998; Aulakh and Pasricha 1999; Van Den Bossche et al. 2005). Tthe fact that little leaching occurs under greenhouse conditions is another reason for the rapid accumulation of nutrients in the soil (Chen et al. 2002; Ayoola 2006) reported that exchangeable Ca increased by about 21% in plots treated with organic fertilizer after cropping but it reduced in all other plots.

The yeast extract and humic acid and Bioferitlizer application gives a mounts of Ca that higher than all of the other treatments. This could be attributed to the formation of high solubility Ca–P compound (Zaller and Koepke 2004), showed that the soil pH, C/N ratio, available P and available K contents were all significantly increased by applying humic acid to the treatments application. Purpose of this study is to document (1) the farmer-perceived value of soil fertility for crop yields, (2) the use of soil sampling for nutrient diagnosis, and (3) who actually makes fertilizer recommendations on cropland.

The chemical, physic, and biological benefits of this study also to maintaining soil organic matter concentrations in this agroecosystem by learn these famers how do this maintain (Wood and Edwards 1992).

Maximum use should be made of soil survey information in planning the location of future soil fertility trials and in interpreting 'the results obtained. knowledge of the distribution of differing soil units should be used; when available, to ensure extensive kinds of soils , in interpreting the results of fertility trials knowledge of soil distribution pro-tides is for generalizing fertilizer recommendations on an area basis.

this area return to Tainal watershed that's in one of the Basara Basin bounded at the east by Daragha and Baranan mountains and in the south by Dewana Basin and at the west by Hanjira mountains. It lies between latitudes 350 20' and 350 39' and between longitudes 450 00' and 450 25'.

Topographically the area located in high folded zone, it has a wide plain with slightly slope topography called Bazian Plain.

Stream flow of Basara Basin has many springs, kariezes. Basara Basin has perennial main stream, which consist of the combination of two great streams which are Tilie stream and Chami Tainal stream. The soils used in this study were collected from 24 sites representing 12 km^2 areas that lies between latitude 35.573129 and longitudes 45.179865 in Bagajani village and end it with Latif awa in latitude 35.492244 and longitudes 45.231547.

Table 4.5. GPS coordinate for the villages' that effected or not with nematode in Tainal watershed

Loc.	village name	latitude	longitude	crops	Description
L 1	Bagajani	35.573129	45.179865	cucumber	non effected with nematode
L 2	Mewk	35.574642	45.170733	cucumber	non effected with nematode
L 3	Bagajani	35.562523	45.153836	cucumber	effected with nematode
L 4	Koyik	35.563983	45.170733	pepper	non effected with nematode
L 5	Kani big	35.563227	45.175807	cucumber	effected with nematode
L 6	Shuwankara	35.564188	45.192795	cucumber	non effected with nematode
L 7	Tui awlia	35.559212	45.190636	tomato	non effected with nematode
L 8	Qushqaya	35.557166	45.193336	tomato	effected with nematode
L 9	Ali Bzaw	35.555679	45.180524	pepper	non effected with nematode
L 10	Ali Bzaw	35.554676	45.176405	cucumber	effected with nematode
L 11	Penjsharnma	35.540696	45.191150	tomato	effected with nematode
L 12	Kani Shaya	35.538872	45.217801	cucumber	effected with nematode
L 13	Kani Shaya	35.529785	45.204436	cucumber	effected with nematode
L 14	Halay Sarchawa	35.525898	45.208930	pepper	non effected with nematode
L 15	Halay Sarchawa	35.531651	45.195435	cucumber	non effected with nematode
L 16	Mahmudia	35.524027	45.198905	tomato	effected with nematode
L 17	Ziyeka	35.524583	45.221645	cucumber	non effected with nematode
L 18	Ziyeka	35.518852	45.222030	cucumber	non effected with nematode
L 19	Warmizyar	35.515835	45.237502	cucumber	effected with nematode
L 20	Warmizyar	35.517955	45.235790	tomato	effected with nematode
L 21	Gawani	35.500416	45.254908	cucumber	non effected with nematode
L 22	Gawani	35.501443	45.254239	cucumber	non effected with nematode
L 23	Gawani	35.508113	45.254239	cucumber	non effected with nematode
L 24	Latif awa	35.492244	45.231547	cucumber	effected with nematode

Table 4.6. Survey for soil feritilty in tainal watrershed, E.C. , PH , OM

Village name	latitude	longitude	E.C. ds.m	PH	% OM
Bagajani	35.573129	45.179865	0.59	7.57	2.80
Mewk	35.574642	45.170733	0.70	7.65	1.93
Bagajani	35.562523	45.153836	0.235	7.64	1.24
Koyik	35.563983	45.170733	0.23	7.50	2.85
Kani big	35.563227	45.175807	0.235	8.45	0.95
Shuwankara	35.564188	45.192795	0.41	7.40	2.47
Tui awlia	35.559212	45.190636	0.38	7.30	2.00
Qushqaya	35.557166	45.193336	0.29	8.20	1.35
Ali Bzaw	35.555679	45.180524	0.45	7.45	0.60
Ali Bzaw	35.554676	45.176405	0.29	7.70	1.40
Penjsharnma	35.540696	45.191150	0.42	8.45	1.70
Kani Shaya	35.538872	45.217801	0.34	7.85	0.725
Kani Shaya	35.529785	45.204436	0.43	8.15	1.10
Halay Sarchawa	35.525898	45.208930	0.36	7.15	2.15
Halay Sarchawa	35.531651	45.195435	0.45	7.40	2.30
Mahmudia	35.524027	45.198905	0.37	8.6	0.79
Ziyeka	35.524583	45.221645	0.36	7.05	2.35
Ziyeka	35.518852	45.222030	0.30	7.42	1.85
Warmizyar	35.515835	45.237502	0.44	8.15	1.85
Warmizyar	35.517955	45.235790	0.049	7.95	1.30
Gawani	35.500416	45.254908	0.35	7.70	2.20
Gawani	35.501443	45.254239	0.255	6.80	2.30
Gawani	35.508113	45.254239	0.445	7.75	1.05
Latif awa	35.492244	45.231547	0.47	8.05	2.15

Table 4.7. Survey for soil fertility in Tainal watershed, P, K , Na, Ca, Ma, Cl,$CaCO_3$, HCO_3

Village name	N (%)	Available P (ppm)	Soluble K^+ (meq/l)	Soluble Na^+ (meq/l)	Soluble ca^{+2} (meq/l)	Soluble Mg^{+2} (meq/l)	Cl^- meq/l	(%) $CaCO_3$	HCO_3 (meq/l)
Bagajani	0.21	12.75	0.38	0.13	2.35	2.75	0.41	14.2	3.7
Mewk	0.09	7.7	0.065	0.11	0.97	1.35	0.265	10	1.64
Bagajani	0.22	92.64	0.038	0.77	5	6.6	1.55	9	1.8
Koyik	0.095	6.86	0.011	0.075	1.15	1.65	0.37	7.3	1.7
Kani big	0.22	12.6	0.011	0.22	3	1.95	0.55	6.9	1.8
Shuwankara	0.38	10.8	0.015	0.23	3.2	1.35	0.38	7.5	3.2
Tui awlia	0.18	15.15	0.022	0.2	2.8	1.45	0.35	4.9	0.8
Qushqaya	0.085	7.96	0.018	0.053	1.4	0.9	0.18	7.5	1.8
Ali Bzaw	0.115	9	0.027	0.145	1.45	0.85	0.375	8.1	2.95
Ali Bzaw	0.15	4.15	0.055	0.19	1.1	1.35	0.25	7.4	1.35
Kani Penjsharnma	0.2	25.95	0.042	0.12	1.25	0.6	0.55	6..3	1.7
Kani Shaya	0.29	7.95	0.032	0.079	3.35	1.7	0.315	5.8	1.25
Kani Shaya	0.095	7.85	0.032	0.07	1.4	1	0.25	4.8	0.9
Halay Sarchawa	0.22	11.23	0.038	0.13	1.5	1.7	0.35	5.4	0.7
Halay Sarchawa	0.11	6.1	0.0175	0.775	1.8	1.25	0.15	6.3	0.5
Mahmudia	0.115	7.8	0.019	0.16	1.7	1.65	0.29	4.8	0.8
Ziyeka	0.12	12.4	0.038	0.11	2.7	1.85	0.19	8.1	2.45
Ziyeka	0.325	14.7	0.032	0.18	2.55	2.1	0.35	5.4	0.6
Warmizyar	0.22	11.7	0.04	0.086	2.85	3.4	0.45	6.7	2.6
Warmizyar	0.25	12.75	0.04	0.14	3.15	3.8	0.42	7.2	1.4
Gawani	0.07	7.9	0.0125	0.115	0.745	1.2	0.325	8.0	1.5
Gawani	0.325	21	0.018	0.28	4.1	2.6	0.51	6.7	0.94
Gawani	0.14	14.25	0.016	0.088	2.65	1.45	0.44	7.05	1.2
Latif awa	0.31	11.85	0.027	0.11	3.2	2.1	0.32	4.4	0.6

.

Table 4.8. Survey for soil fertility in Tainal watershed, plant analysis

village name	BRIX (%)	Total chlorophyll (mg/g)	N (mg)	P (mg)	K (mg)	Ca (mg)	Mg (mg)	Protein
Bagajani								
Mewk	8	28	56.8	19.7	61.3	47.7	10.5	0.47
Bagajani	12.6	29.2	22.45	7.85	29.35	23.55	4.7	0.38
Koyik								
Kani big	7.6	25.35	33.6	22.6	71.6	16.1	8.25	0.45
Shuwankara	11	41	51.45	25.5	141	15	13.15	0.62
Tui awlia								
Qushqaya								
Ali Bzaw	11.5	41	59.7	19.65	59.9	40.5	9.4	0.57
Ali Bzaw	6.1	19.4	20.05	18.4	69.7	9.55	7.2	0.365
Kani Penjsharnma								
Kani Shaya								
Kani Shaya	8.35	21.44	31.35	25.35	78.6	14.45	7.95	0.65
Halay Sarchawa								
Halay Sarchawa	14	41	57.6	16.95	58.1	44	11.15	0.61
Mahmudia								
Ziyeka								
Ziyeka	9.5	38	68.2	23.1	69.8	54.5	11.5	0.66
Warmizyar								
Warmizyar	7.8	22.3	37.05	21.6	91.8	17.15	7.8	0.58
Gawani								
Gawani								
Gawani	10	38.5	60.4	21.6	66.7	48.4	10.75	0.52
Latif awa	6.9	19.1	30.5	18.9	73.2	14.3	63	0.51

Table 4.9. Survey for soil fertility in Tainal watershed, plant and nematodes analysis

village name	**Fat g.**	**Ash g.**	**Moisture**	**Carbohyd rates g.**	**larves**	**Egg mass**	**Gallas**
Bagajani							
Mewk	0.11	0.46	77.2	2.05			
Bagajani	0.095	0.033	91.9	2.15	458	16	20
Koyik							
Kani big	0.1	0.35	64.5	1.55	515	23	16
Shuwankara	0.12	0.51	89	3.4			
Tui awlia							
Qushqaya					615	24	38
Ali Bzaw	0.12	0.51	73.3	2.2			
Ali Bzaw	0.09	0.225	82.5	2.3	588	20	30
Kani Penjsharnma					695	31	36
Kani Shaya					622	27	36
Kani Shaya	0.08	0.32	77.5	2.05	568	30	38
Halay Sarchawa							
Halay Sarchawa	0.13	0.63	92.6	3.95			
Mahmudia					706	39	45
Ziyeka							
Ziyeka	0.16	0.51	81.3	2.8			
Warmizyar					487	19	26
Warmizyar	0.085	0..385	77.4	2.3	290	13	19
Gawani							
Gawani							
Gawani	0.10	0.58	86.5	3.7			
Latif awa	0.075	0.35	65.5	1.35	425	17	21

Meloidogyne spp. is common in vegetable world where they parasitize vascular root tissues and induce their familiar root galls. Root knot nematode (Anwar and Mckenry 2010; Abawi and Widmer 2000; Davis et al. 2003) Meloidogyne Javanica is the common nematode in this reign.

Nematode root galling cause to arrested root systems and its presence is often been associated with increased incidence and severity of Fusarium wilts of several field crops (Anwar and Khan 1973; Martin et al.1994).

The result is reduced yield of vegetable to nematode feeding and this can range up than more 40% (Anwar and Mckenry 2012), that depend on texture of soil firstly and prevailing weather conditions secondly as (Starr 1993) said.

Association of root not nematodes with vegetables is reported to limit yields of world like each one of reported (McSorley et al. 1987; Sehgal and Gaur 1999; Anwar and McKenry 2012).

In this survey, only Meloidogyne Javanica is currently considered to be economically damaging to Cucumber and tomato. Meloidogyne Javanica is the commonly species pest on cucumber in Tainal watershed it is likely that the root-knot second-stage juveniles recovered were M. Javanica based on the continuous cucumber production.

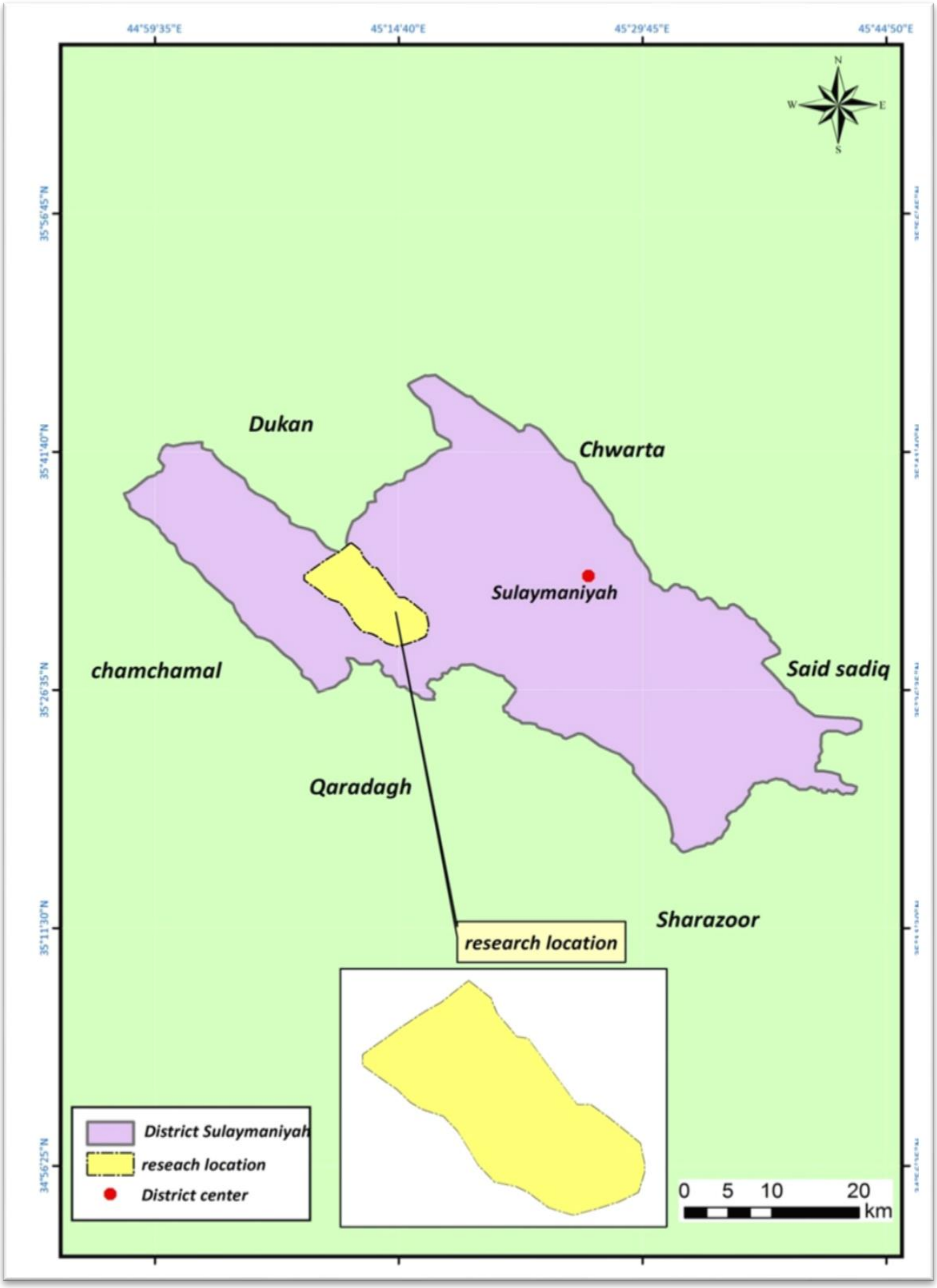


Figure 4.19. Location of the survey depending on table 4.5. and ArcGIS 10.1 program

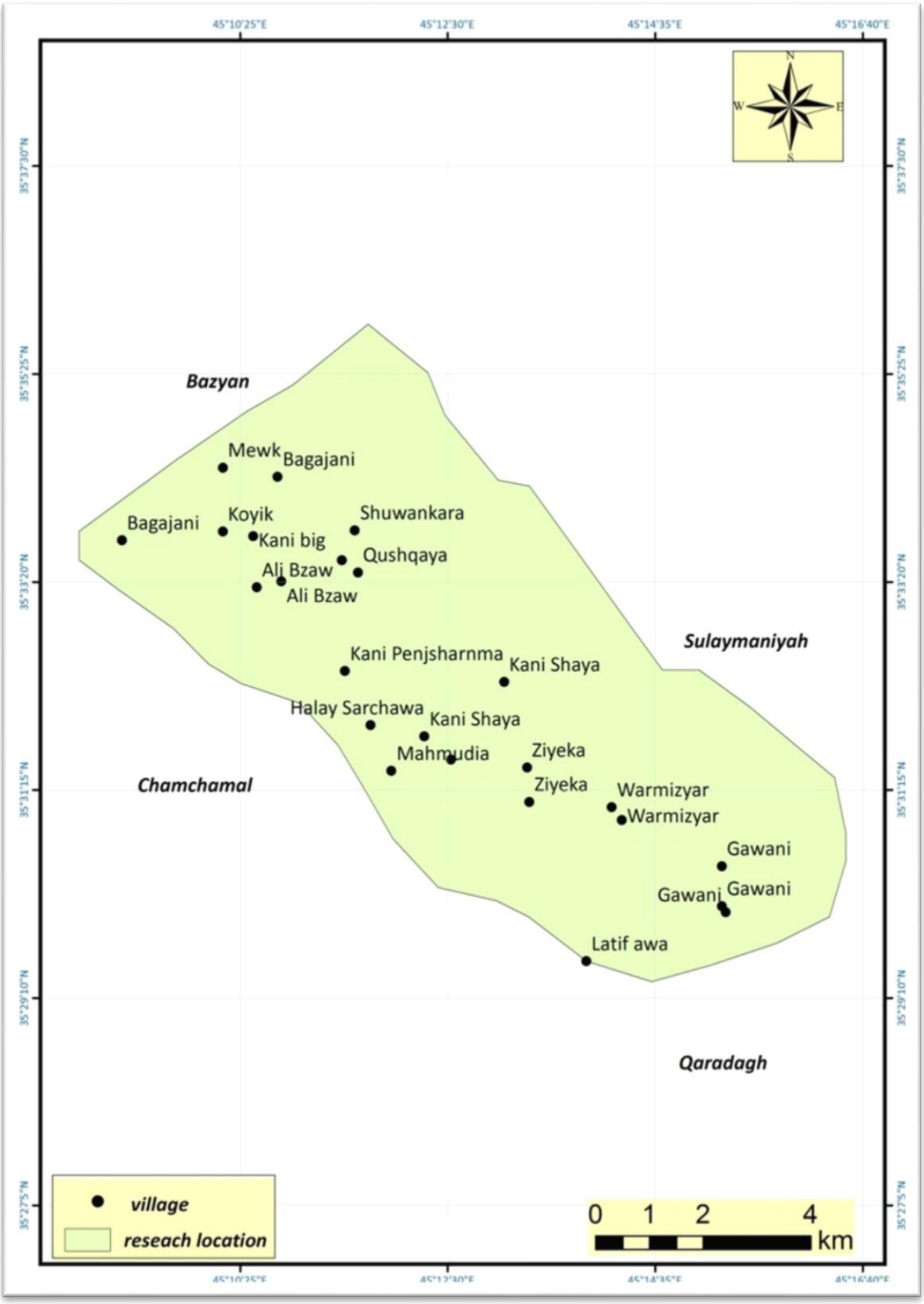


Figure 4.20. Villages coordinate in Tainal watershed depending on table 4.5. and ArcGIS 10.1 program

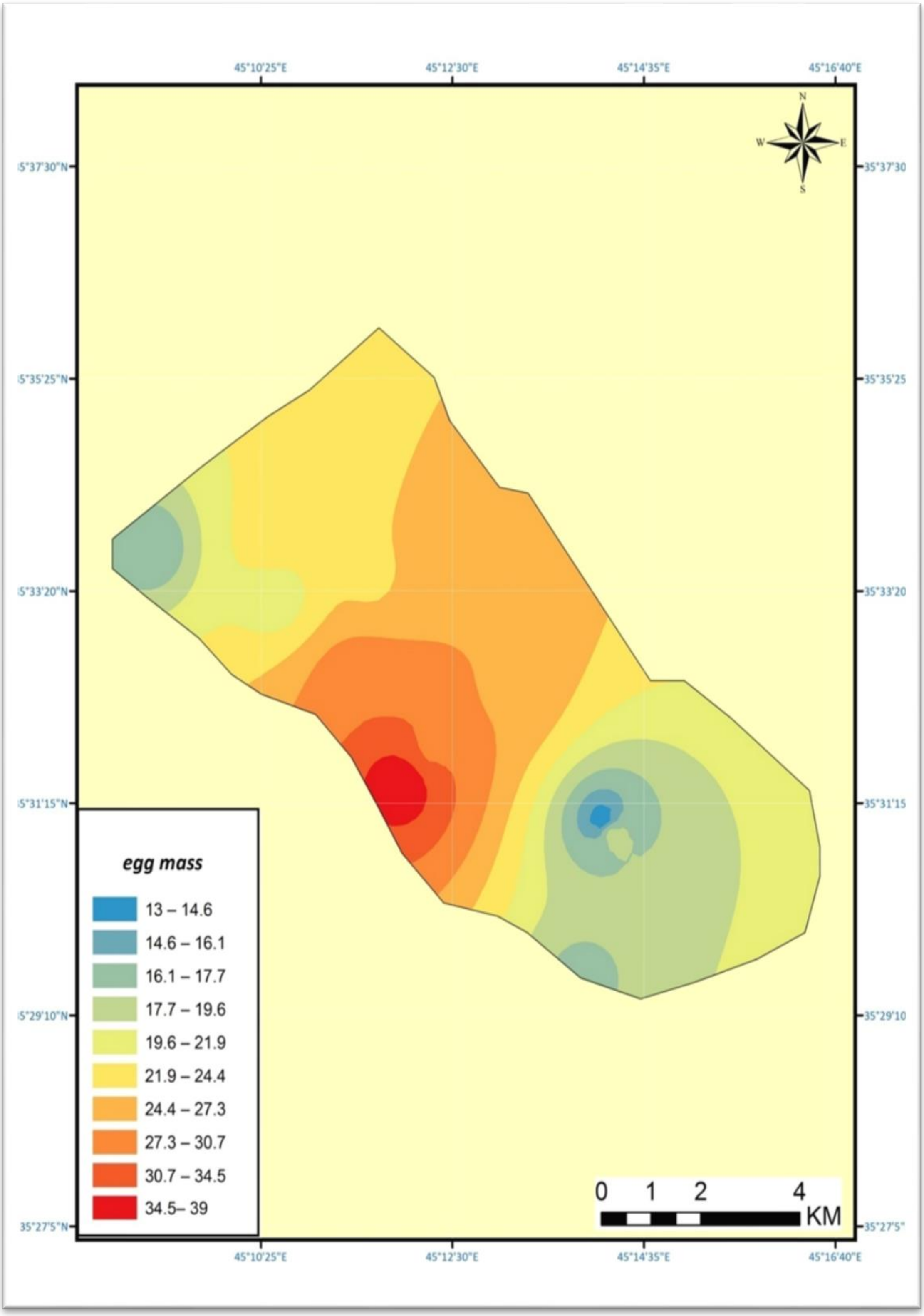


Figure 4.21. Depending on Table 4.9. Survey for distribution of (egg mass) nematode in study area

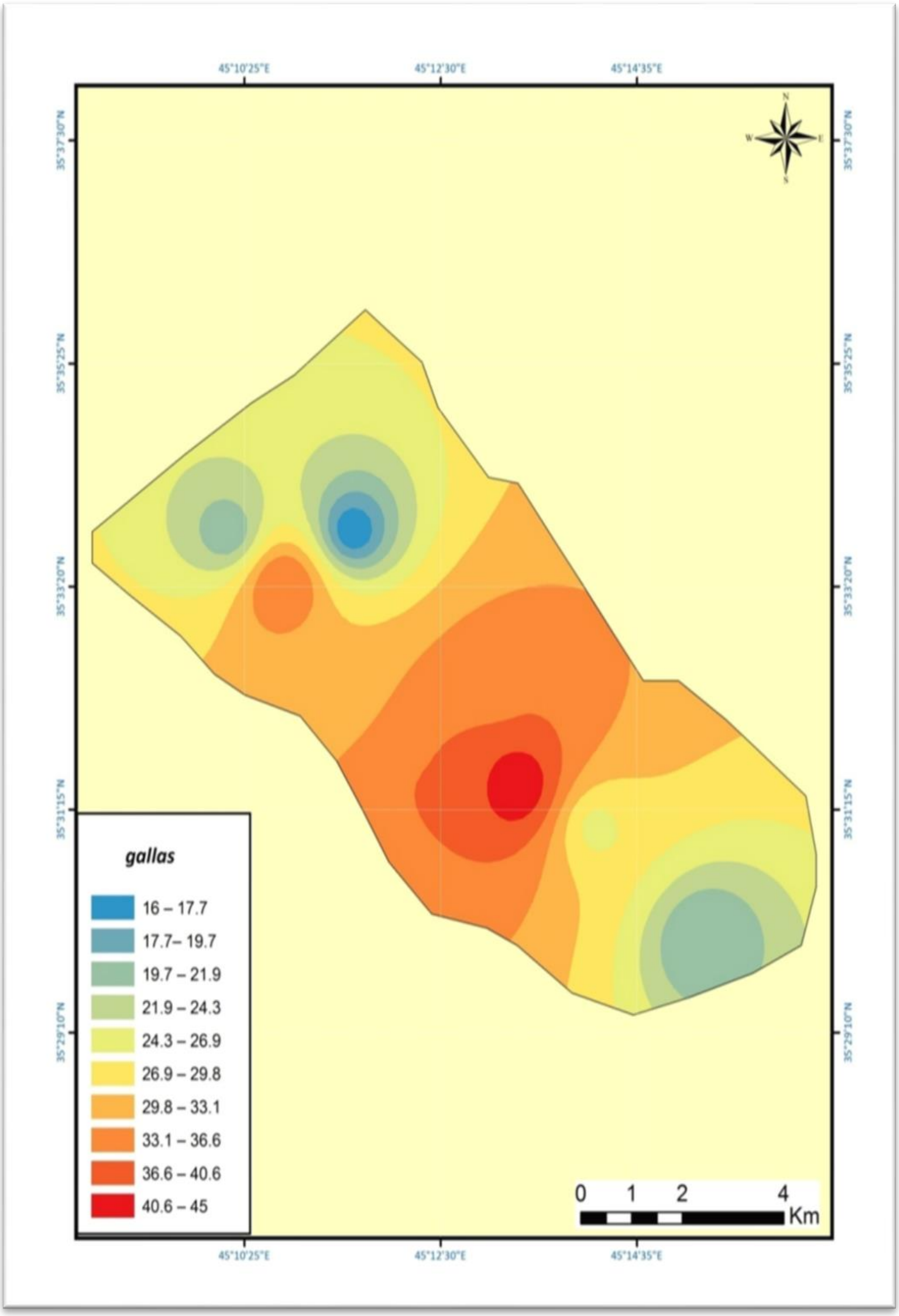


Figure 4.22. Depending on Table 4.9 Survey for distribution of (Galla) nematode by ArcGIS 10.1 program

From Figure 33 and Table 4.9. we see spread of root-knot nematodes Larvae in (Mahmudia, Kani Penjsharnma, and Kani Shaya) with populations in 706, 695, 622 /250 g. Soil. were the highs it in these area, after our investigations in this matter for many years farmers in this sits did not use the Scientific or rights ways to control or prevent the spread of this worm and we see the reason of speared this worm it use the plow without sterilized for other farms as reported from (Abdul Fattah et al. 2015).

Improving plant and human, soil health the ultimate goal of ecosystem management is to improve plant health. Adding organic matter to soil is a basic practice in agroecosystem management even this practice does not inhibit soil pests it still can increase crop yields, which is the main target for a grower. (Wang and Robert 2005).

From our investigation we will describe how the following factors influence distribution of nematode species within the green houses that we visited.

1. initial introduction site; The most striking feature of nematode distribution is the irregularity of infested areas. Damaged crops will appear as irregular patches or streaks that may vary in size, shape, and number. These variations usually reflect the compounding of nematode stress on a plant by such other factors as physical soil differences and irrigation. Previous patterns of cropping, initial introduction, and soil movement through cultivations are also important factors. Consider a cropping history, management practices, such as irrigation. Other cysts containing viable eggs are introduced by contaminated harvesting or cultivation equipment, tractor or shelves, human feet; nematode becomes established during host crop development and, over a period of years, increases population levels. as the population increases, the sites gradually enlarge in area and, when the nematode population reaches a damaging level, the sites show as unthrifty or damaged plant areas within the field. In later years, under short rotations, these areas enlarge further and coalesce until large areas of the green houses become uniformly infested.

2. Placement of infested plant material; In a greenhouse that is uniform in soil characteristics, cropping history, and in past and present management practices, cucumber that come from different seed lots are planted. Some are infested with stem and

bulb nematode during the growing season, irregular areas of poor-growing infested plants are visible across the green house.

These areas correspond directly to those in which the infested seeds are planted and are interspersed between areas of good growth where no infested seed material is planted. If this riled is subsequently planted to another host crop in a short rotation, then the ensuing infection and plant damage will correspond to those previous introduction sites. In this example, the primary determinant of nematode distribution is the placement pattern of infested preparative plant material. If environment and management conditions favor nematode infection, such as under rotation with other susceptible crops, then the areas of infestation will spread and coalesce until the entire area is infested.

3. Movement of agricultural equipment; the potential for transporting nematodes in soil on farm equipment, hand tools, rented implements, commercial harvesters, truck tires, and other implements is easily overlooked. In the Bazian plane of Tainal watershed which many growers farm have their own land and greenhouses they concede about how found ways to clean their own equipments before they use it in a uninfected green houses.

4. cropping patterns; Differences in cropping history of a greenhouse that is now uniformly planted to a crop susceptible to root knot nematodes (Meloidogyne sp.) can be responsible for the irregularity of root knot damage within that green house. Let us assume that a portion of that green house was previously an established tomato on which root knot nematodes increased to high levels, while the remainder of the green house was in eggplant of root knot nematode. The pattern of plant damage due to root knot nematode infection will correspond to the previous tomato area where nematode population density is much higher.

5. Soil management’s patterns; consider a greenhouse that, following a long history of root knot nematode infection, is widely infested with this nematode. The soil texture is clay loam, and the grower has a single irrigation line across the green house. The individual vines adjacent to the irrigation line show improved growth within the area of services line. Poor growth in this area is related to the low water holding capacity of the this part of soil, which compounds stress on the infected plants by further limiting the

root systems' uptake of water and nutrients. The improved growth near the concrete irrigation line is due to water leakage or availability that enhances the frequency of water supply to nearby plants, thereby reducing stress on those plants.

This indicates that improved frequency of irrigation can alleviate some plant stress in this damaged area. Although nematode populations may be higher in this areas in a green house such as this, the example illustrates that a different set of factors - in this case, soil and management factors can influence the pattern of nematode incidence and plant damage within a field (Baird et al. 1996).

6. threshold nematode population may indicated crop rotation and other strategies to manage nematodes are not being used adequately in these area many of the green houses recently put into cucumber production in Bazian city cucumber and tomato became a excellent host for the species that distributed in this area witch likely helped to create the current nematodes problem in vegetable .the cucumber be the major crop in Bazian plane.

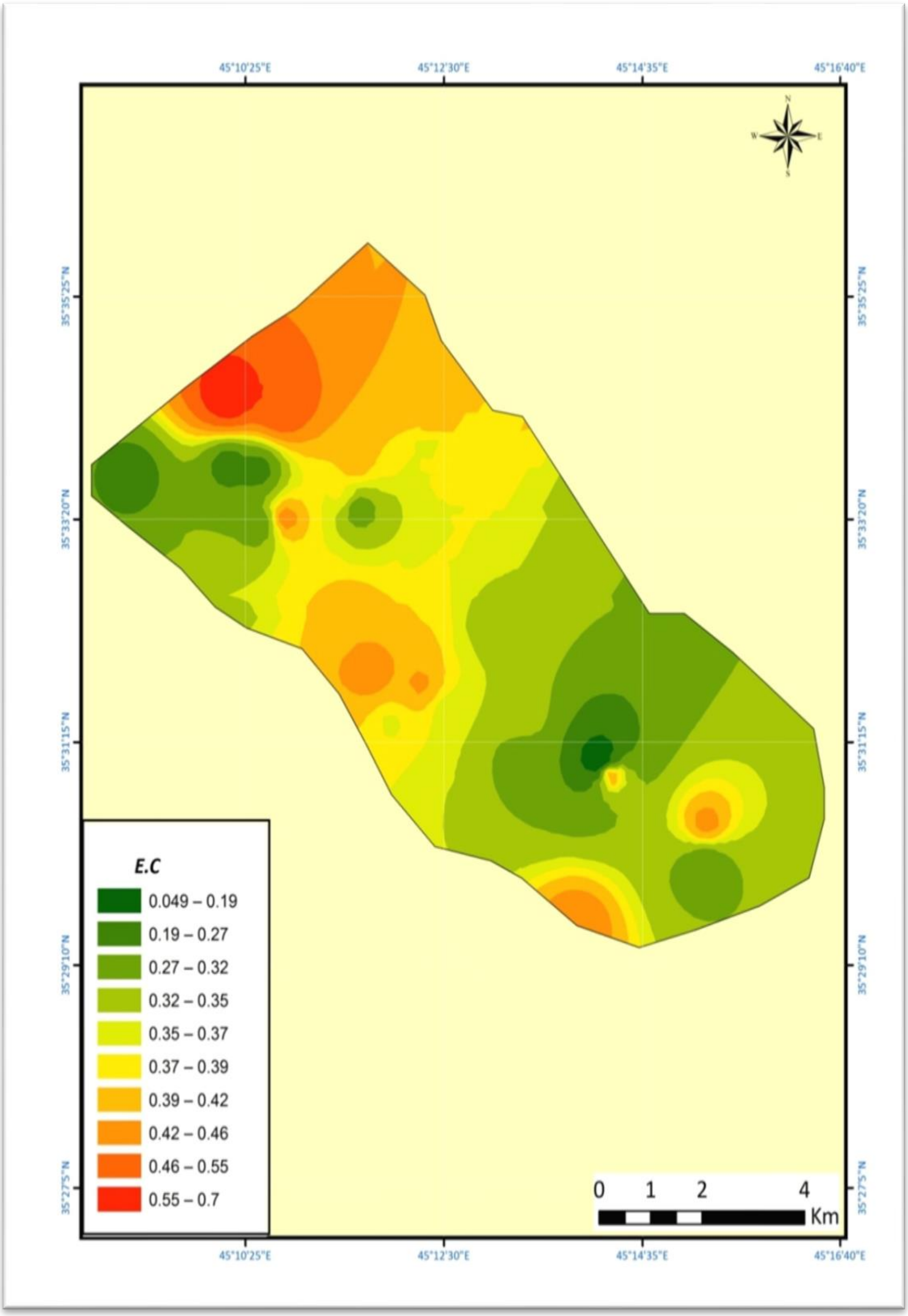


Figure 4.23. Depending on Table 4.7. and ArcGIS 101 Survey for soil fertility showed distribution of E.C

From Figure 4.23. and Table 4.7. we see the how the diffrency between the 22 sits that we study in (Mewk 0.70 and Bagajani 0.59, Latif awa 0.47, halay Sarchawa 0.45) the E.C. was the highs it reason may be return to using high quantity of chemical fertilizer as reported from (Davi and carlos 2016).

In these villages farmers are using green manure and organic fertilizer all the time and when these rich-nutrients decompose, salts and ions in the soil in its liquid phase are increased. Such changes exert an influence on soil EC, which is regulated by many soil fertility attributes, such as pH, P, K, Mg, Ca, OM, cation exchange capacity (CEC) and by the contents of other soluble salts (Peralta and Costa 2013; Aimrun et al. 2009; Bronson et al. 2005; Sudduth et al. 2005).

EC-soil property interactions are is identified simply, since the magnitude of the reactions regulating soil EC levels are complex and dynamic and this is important to investigate the changes on EC in soils treated with different wastes, soils EC reflects the sum of salts and ions in the soil solution, the levels of which are regulated by the type, composition and amount of waste added to the soil.

Soil EC is index used to delineate site specific management sits, since it is highly correlated to crop yield (Li et al. 2008).

EC could be an additional soil fertility index. Soils EC have different ranges in this area and however, it changed (from 0.23 to 0.7 ds/m) by the addition of organic matters in this area, mainly when the soil was incubated with chicken and animal manures and other compost. Regardless of the magnitude of the soil electrical conductivity change, the soil EC values found in this study were below the range considered safe for plant growth.

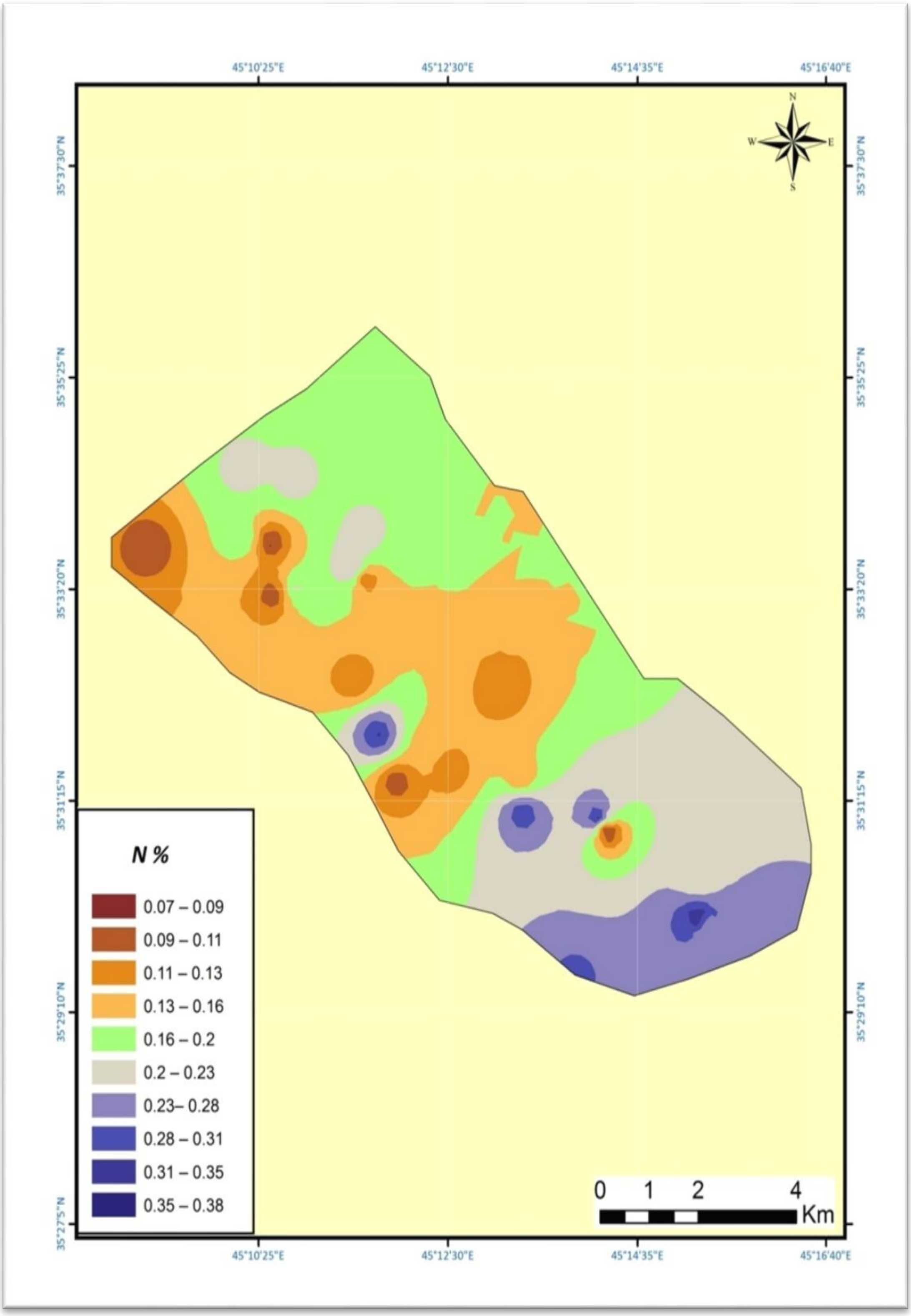


Figure 4.24. Depend on Table 4.7. survey for soil fertility distribution of total N. By program ArcGIS 10.1

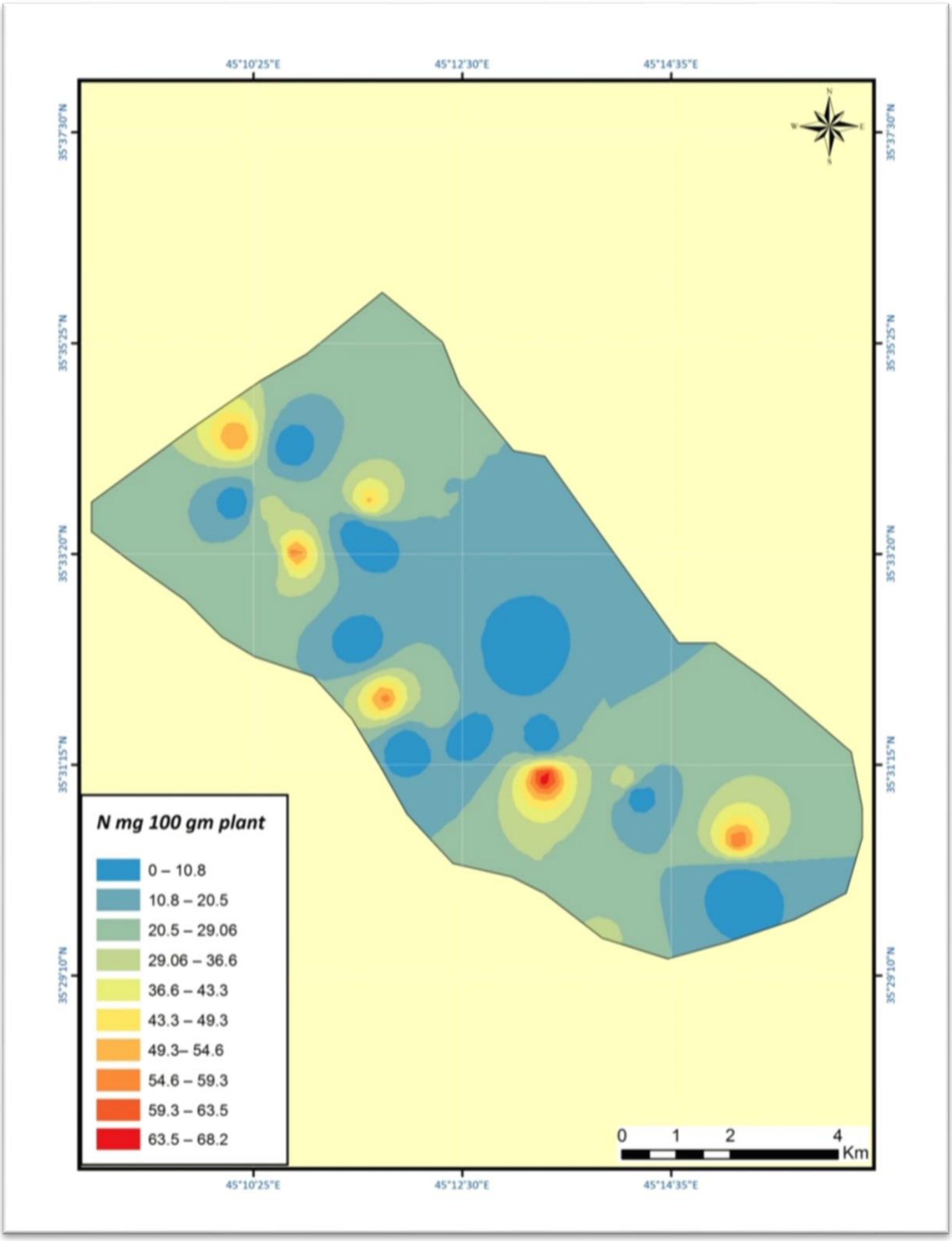


Figure 4.25. Depend on Table 4.7. Survey for soil fertility plant analysis distribution of N .By ArcGIS 10.1

Nitrogen is available to plants as either (NH_4^+-N) or (NO_3^--N). Our farmers use animal manures and other organic matter as a important sources of N for plant growth.

Our farmers depend on three source of Nitrogen; mineralization of organic microbial decomposition of animal and plant residues in soil gives mineral nitrogen, nitrate and ammonium, forms of nitrogen that plants can absorb from the solution of soil. Soil organic matter also is an important source for N.

Biological fixation of atmospheric N_2 this N source is unavailable to plants without catalytic conversion to mineral N (NH_4^+) by highly specified microorganisms beside the plants under greenhouses doesn't get it directly.

Rainfall, Precipitation contains both nitrate and ammonia. The total input from precipitation is small a certain amount of the dissolved N is return to reactions of atmospheric N_2 during lightning events, From our investigations the method of application use and quantities have a important effect on resides of N in soil, farmers do Crop residue incorporation probably for the differences in surface soil N concentration between tillage treatments (Wood and Edwards 1992).

Some Farmers use crop residues don't remove from the greenhouse at harvest and that have a risks of disease carryover root exudates and more crop residues is response to mineral N fertilizer application were the reasons why N fertilizer application improved the soil organic matter,(Christopher 2007). From Figure 4.24 and Table 4.7. (Shwankara 0.38 , Ziyka 0.32 , Gawani 0.32 ,Kani shaya 0.29) we see the law ration of N in most of the area and off course that return to the lowest of adding compare with taking from soils (J.Bonner and J.E. Varner, eds. 1965). Ratio of N in tissue plant (Figure.36, Table 20) cleared in Figure and Table, in (Ziyeka 68.2, gawani 60.4, Ali bzaw 59.7) it have the highs it ratio of N in plant tissue this is a low quantity of N in plant tissue as (Lenaldo et al. 2010) reported. This return to not use a scientific program depending on soil analysis, generally most of the soils in this area is under the moderate range (< 0.2 %) like (London 1984) nreported.

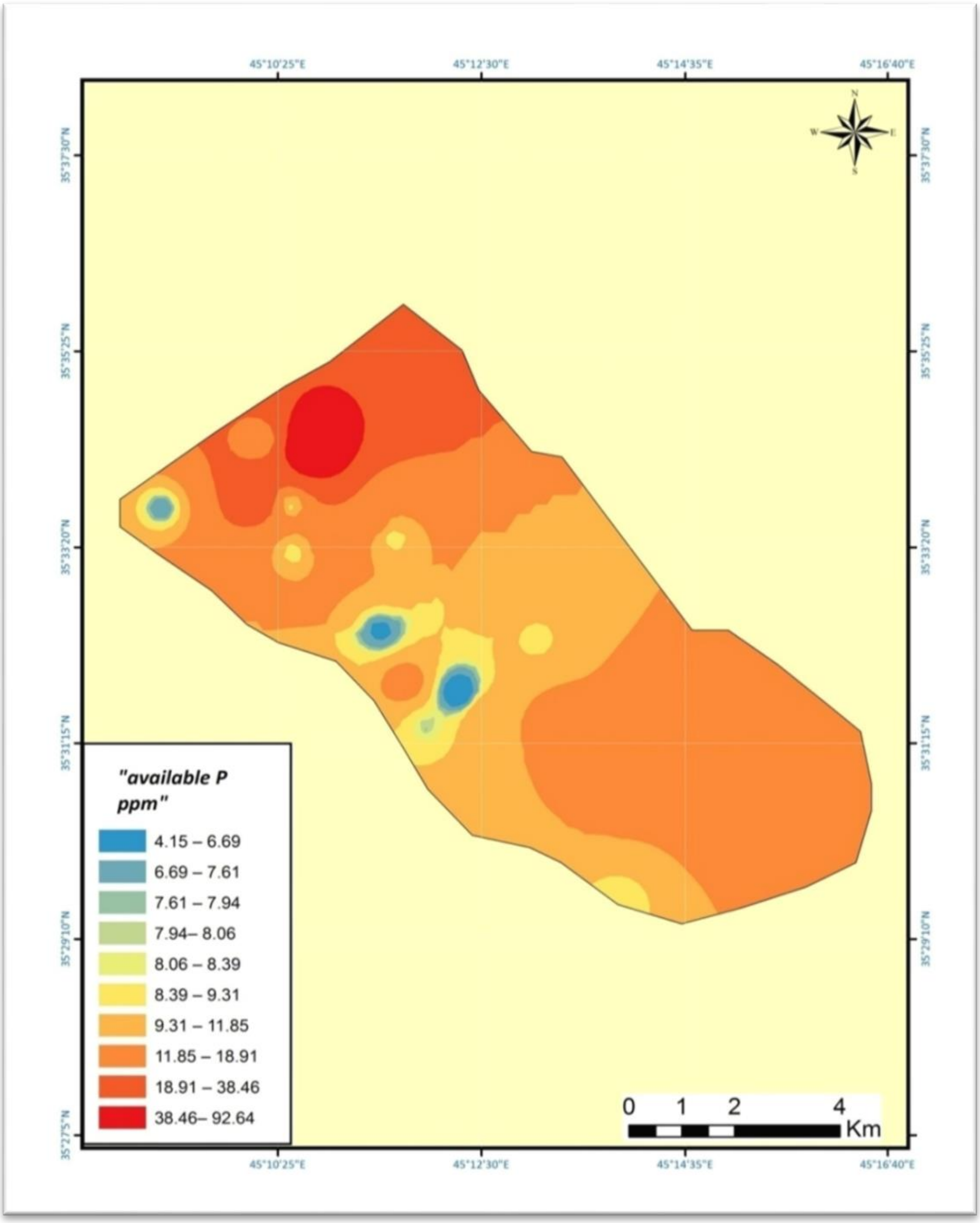


Figure 4.26. Depend on Table 4.7.,Survey for soil fertility distribution of available phosphor By ArcGIS 10.1

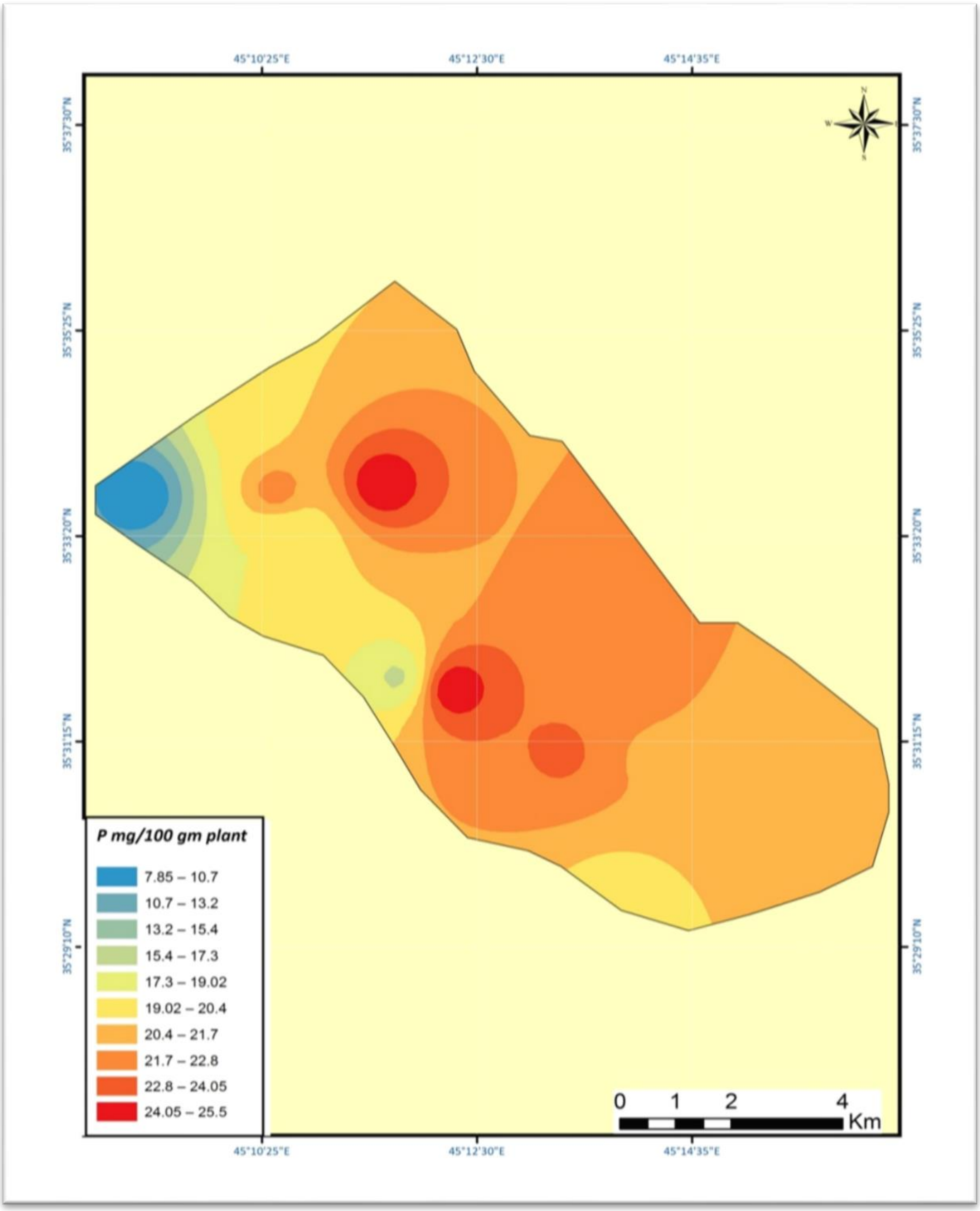


Figure 4.27. Depend on Table 4.8. Survey for soil fertility plant analysis distribution of P by ArcGIS 10.1

Because of using plant and animal residue and chemical and organic fertilizer so our farmers have a good source for Phosphorus, ratios in soils inn these area were in higher in (Bagajani 92.64 mg/kg, Kani penjsharma 25.9 mg/kg, Gawani 21mg/kg) this a high quantity in soil as in Figure 4.26. Table 4.7.

Forms of soluble P are $H_2PO_4^-$ and HPO_4^{2-}, which the proportion between them depend on pH. In pH 7.2, they are in equal concentrations In pH 6.2, the ratio $H_2PO_4^-$: HPO_4^{2-} is 10:1, and at pH 8.2, 1:10. (Phillip 1999).

(Figure 4.27. Table 4.8.) In (Kani Shaya and Qushqaya) Phosphorus ratio were the highs it (25.5mg, 25.3mg) these ratio are low comparing to plant need as (Lenaldo et al. 2010; Bonner and Arner 1965) reported.

Nájera et al. (2015) reported that phosphorus in range (8–18) ppm it is medium content.

Ecosystems were characterized by relatively high total available N and P content and high EC values. We can keep the ecosystem healthy by high soil OM content and low soil pH values. Soils in this study low in fertility, as indicated by low available P concentrations and low EC values (Neher et al. 2005)

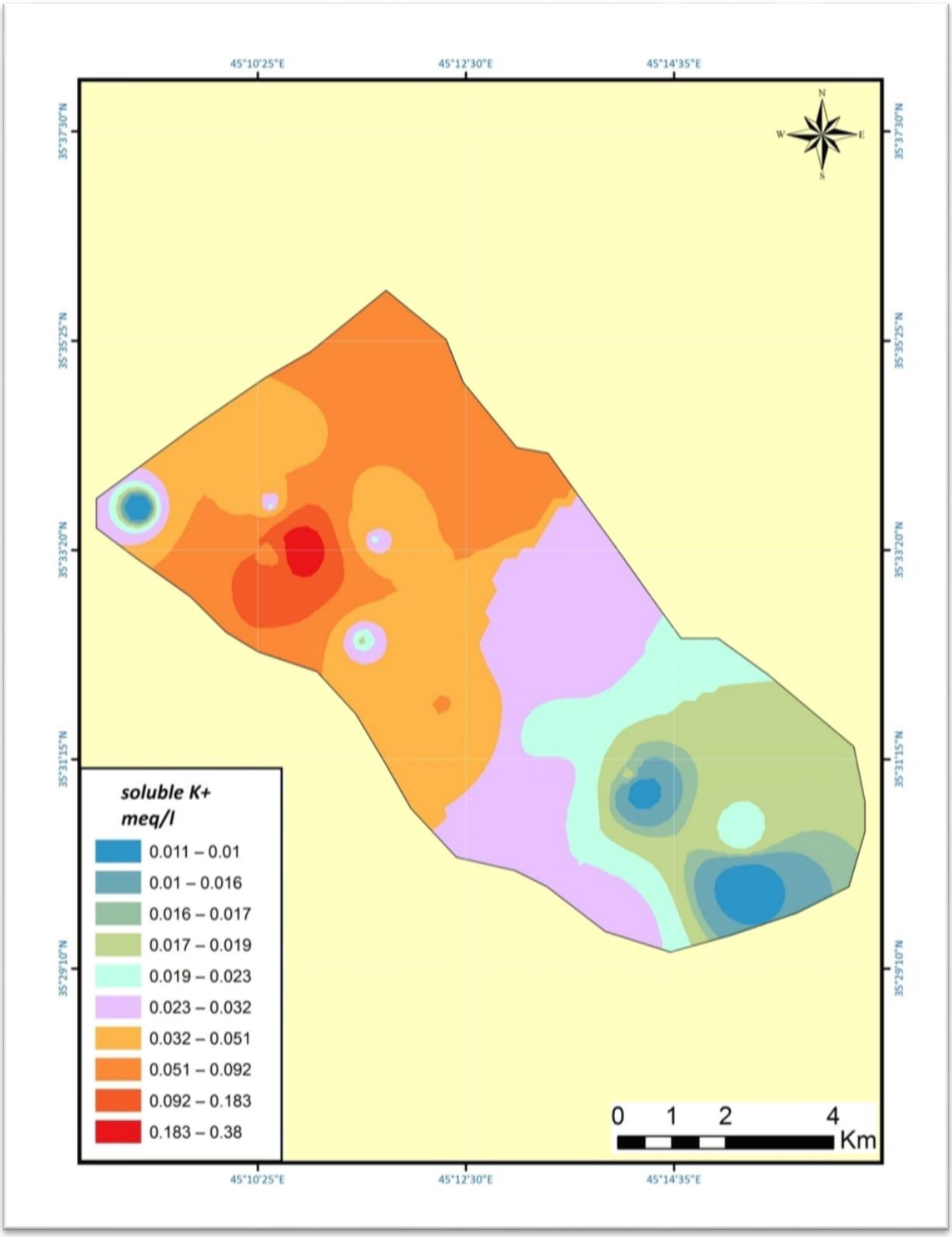


Figure 4.28. depend on Table 4.7. Survey for soil fertility distribution K by ArcGIS 10.1

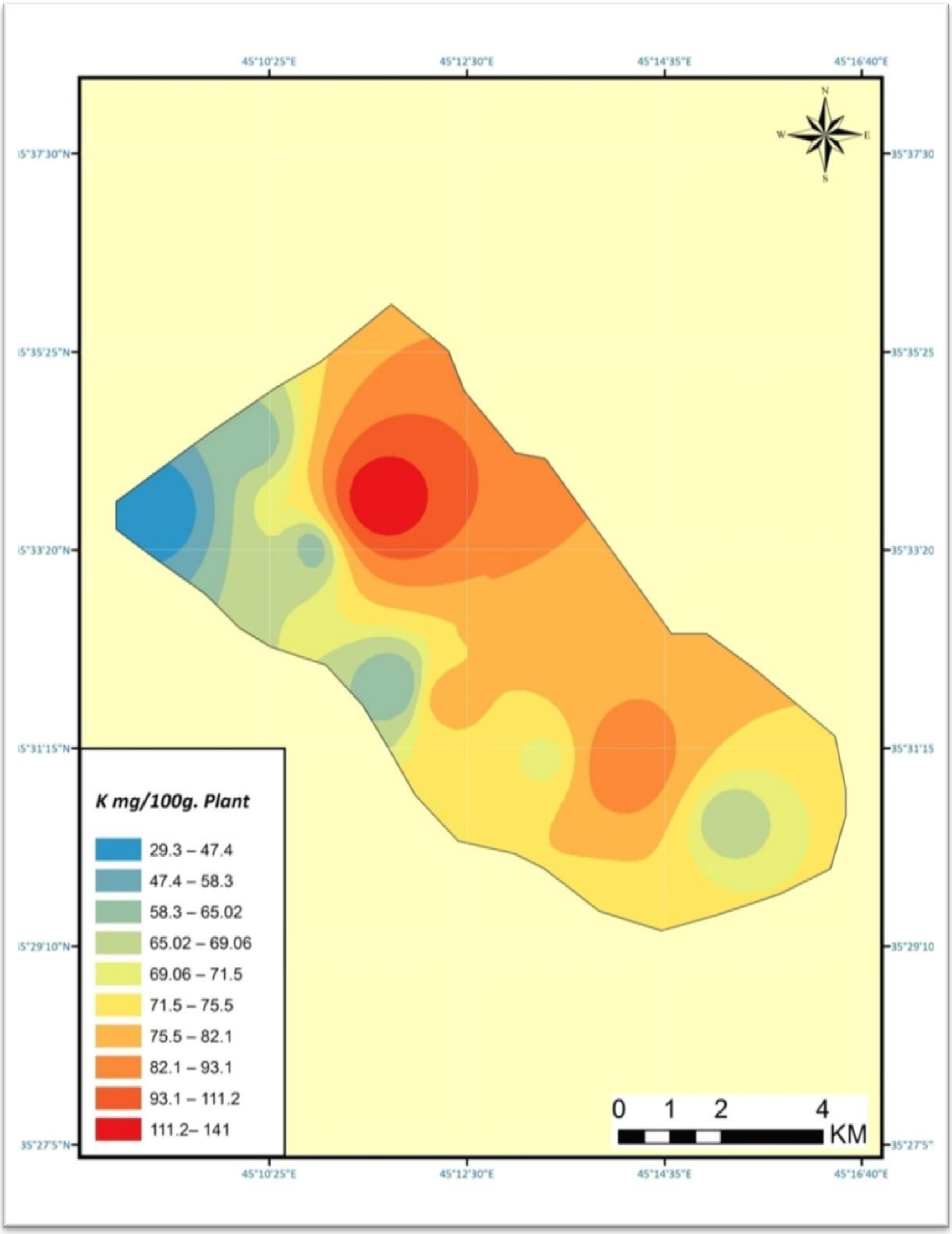


Figure 4.29. Depend on Table 4.8. Survey for soil fertility plant analysis distribution K by ArcGIS 10.1

Potassium is the "universal cation" like they say in the biological systems, in the all pH levels have no toxic, even at soil and plant levels, farmers like to use K in their crops they depend on chemical fertilizer at first to supply them with K and also an organic sources.

(Figure 4.28 Table 4.7.) In (Mewk 0.065m.eq./l, Ali Bzaw 0.055 meq./l. , Kani Penjsharnma 0.042meq /l.) we have the highs it value of K but it is low value for K in soil in this area depending on (Najera et al. 2015).

And in (Figure 29 Table 4.8.) tissue plant in (Warmizyar 91.8mg, Kani Shaya 78.6 mg, Kani big 71.6 mg) were the highs it in this area but these values are low comparing to (Lenaldo et al. 2010; Bonner and Varner 1965).

Continuing suing these greenhouses of course will depletes soils of mineral nutrients, because of the removal of nutrients contained in the produce sold. Since using these green houses and increase in farm productivity and efficiency has not always resulted in a corresponding increase in the replenishment of mineral nutrients to the soils through commercially available means.

this is because many growers in our reign do not have sufficient management expertise to account for or replace all plant nutrient elements removed .there has been relatively little effort to replace minerals removed by continuing growing. There are evidence from our survey widespread mineral nutrient depletion in these farm and range soils.

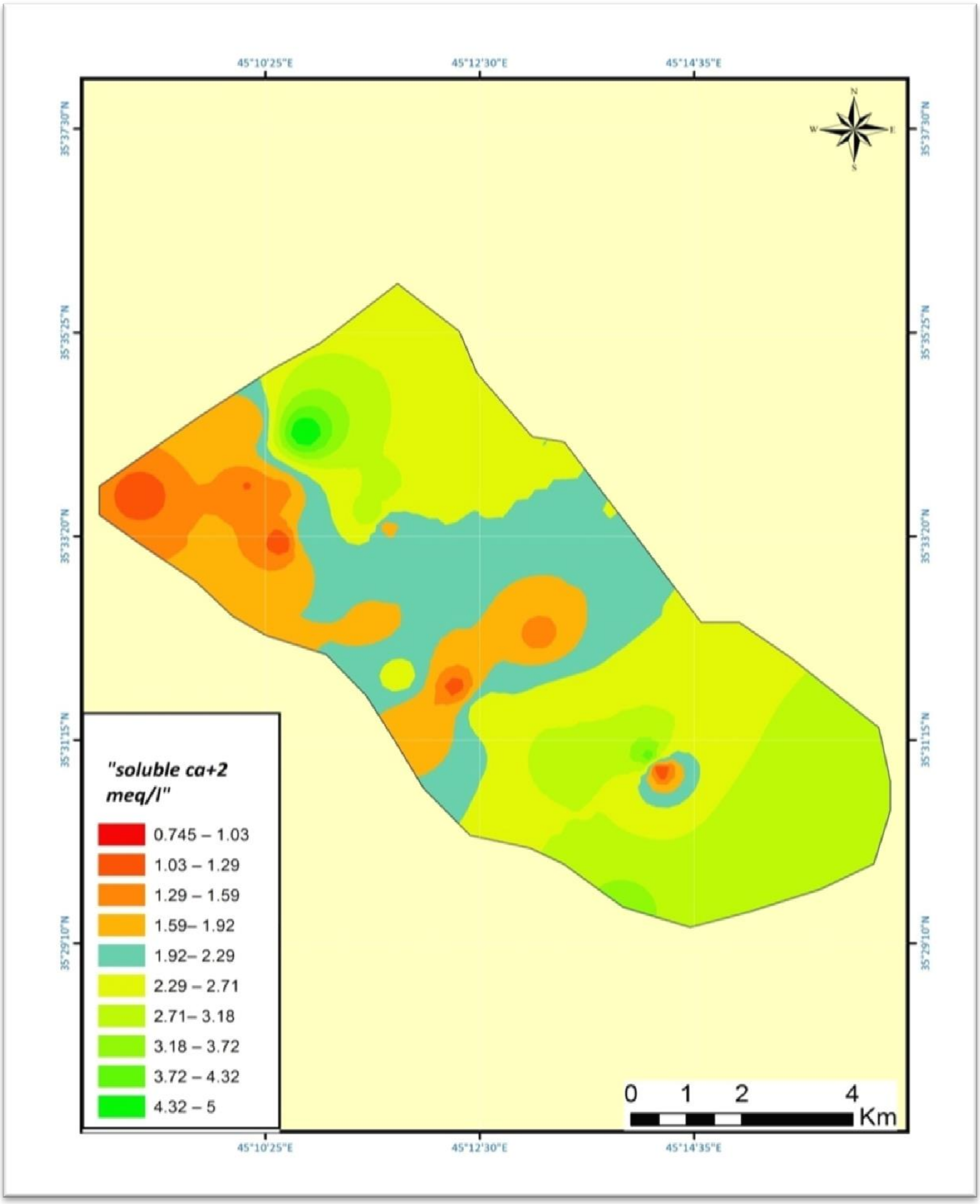


Figure 4.30. Depend on Table 4.7. Survey for soil fertility distribution of soluble Ca by ArcGIS 10.1

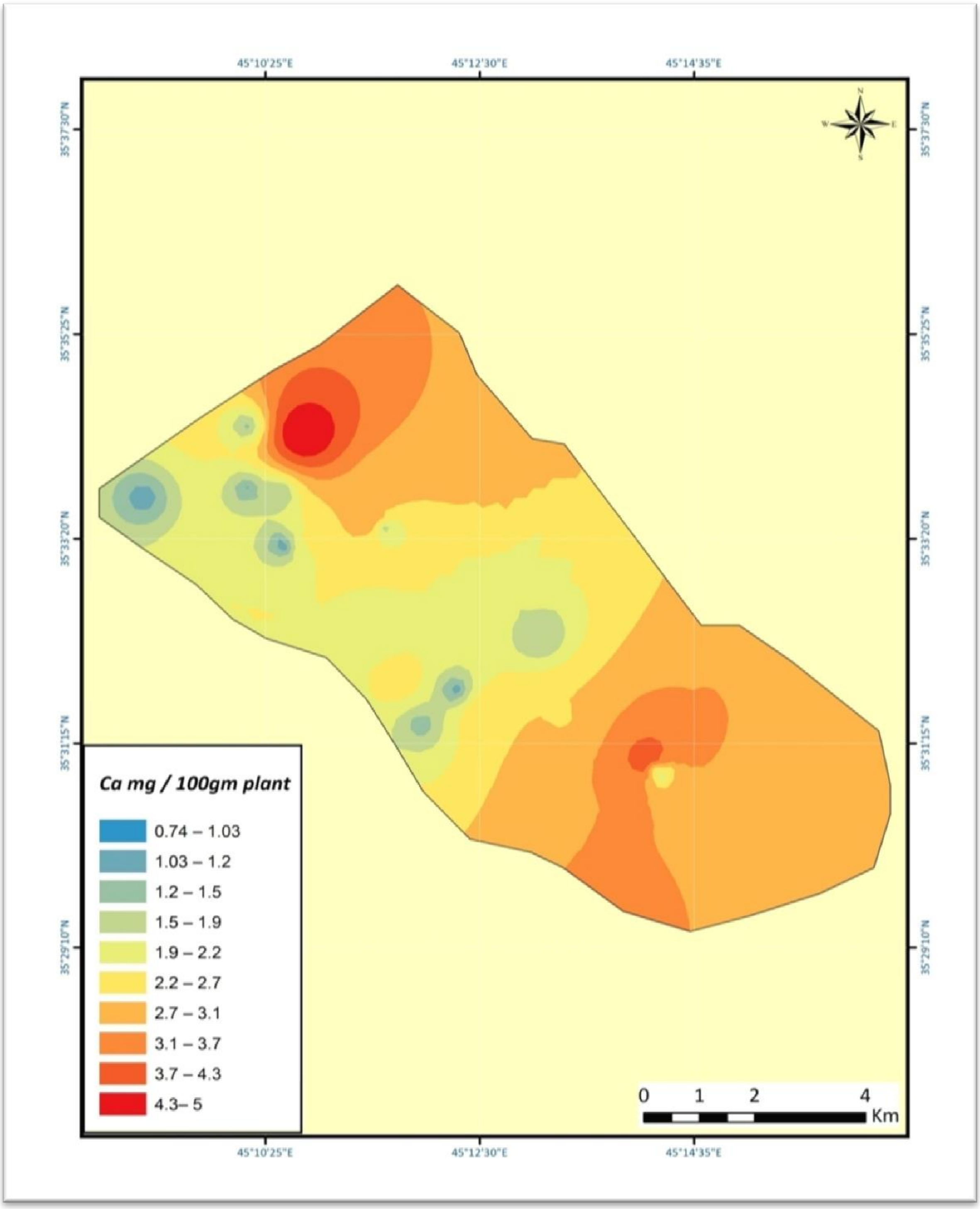


Figure 4.31. Depend on Table 4.8. Survey for soil fertility plant analysis distribution Ca, by ArcGIS 10.1

(Figure 4.30 and Table 4.7) farmers in this area use Ca not widely, in (Bagajani 5.0 meq/l. and Gawani 4.1 meq/l, Latif awa 3.3m.eq/l) these are the highs it in this area but (Najera et al. 2015) said soil should content in medium average (4.1–8 e.mol/kg.) but in the other places the Ca ratio is lower so the need to use some calcium source as a fertilizer.

In plant tissue the matter is different depend on (Lenaldo et al. 2010) and (Bonner and Varner 1965) since Ca value was in (Ziyeka 54.5mg and Gawani 48.4 mg) comparing with 50gm/kg (Figure 4.31 and Table 4.8)

But in the other sits were lower, calcium is present in the cytoplasm at levels that would indicate that it is a micronutrient small fluctuations

The important of Ca levels in the cytoplasm have a role as signaling mechanisms for environmental stress. Ca pumps are directed out of the cytoplasm, either to vacuoles, where it may be precipitated as calcium oxalate, or across the plasma, the function of the majority of plant Ca is structural, in the cell walls of shoots and roots so our farmers need to knew these basics' on calcium.

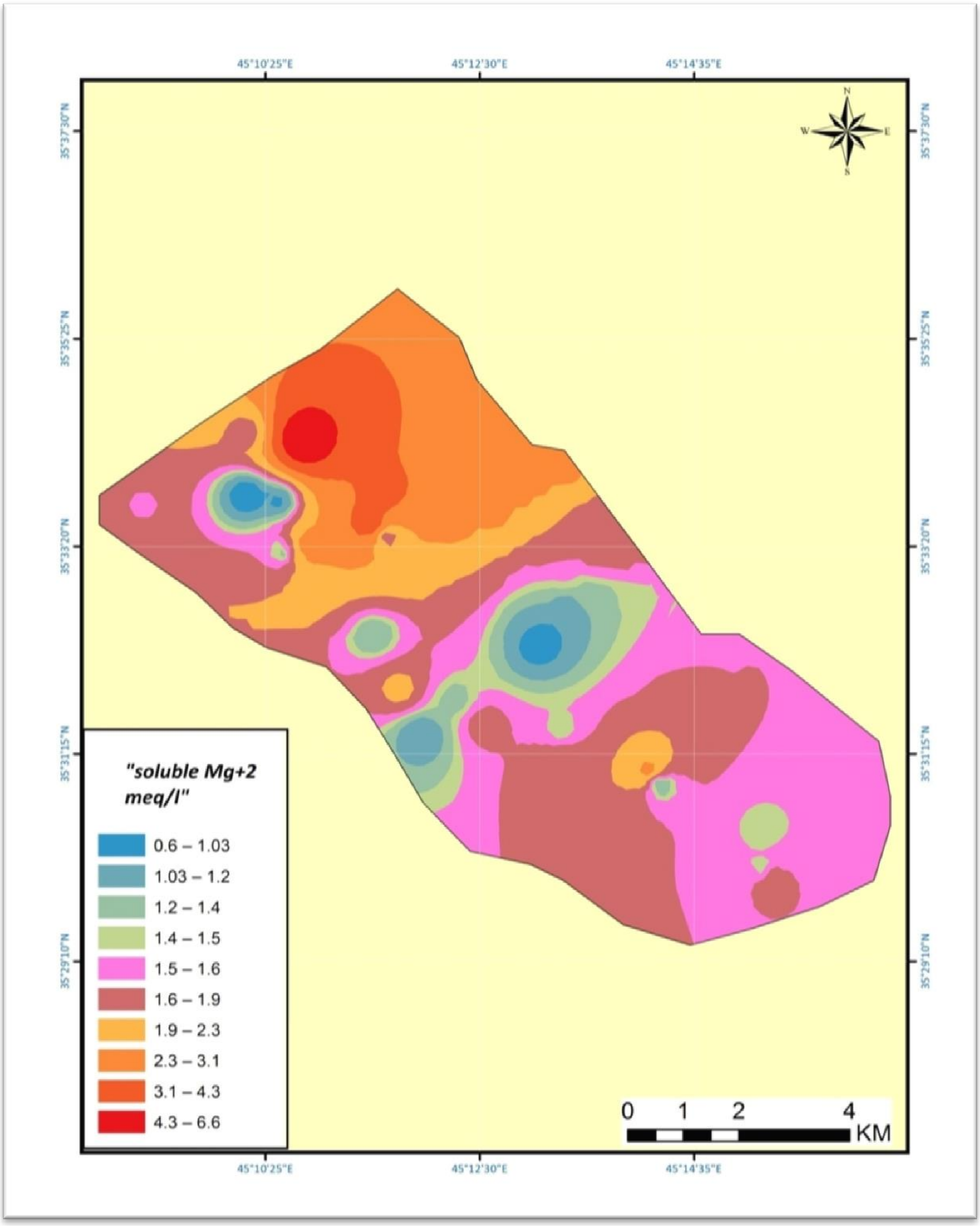


Figure 4.32. Depend on Table 4.7. Survey for soil fertility distribution of Mg ArcGIS 10.1

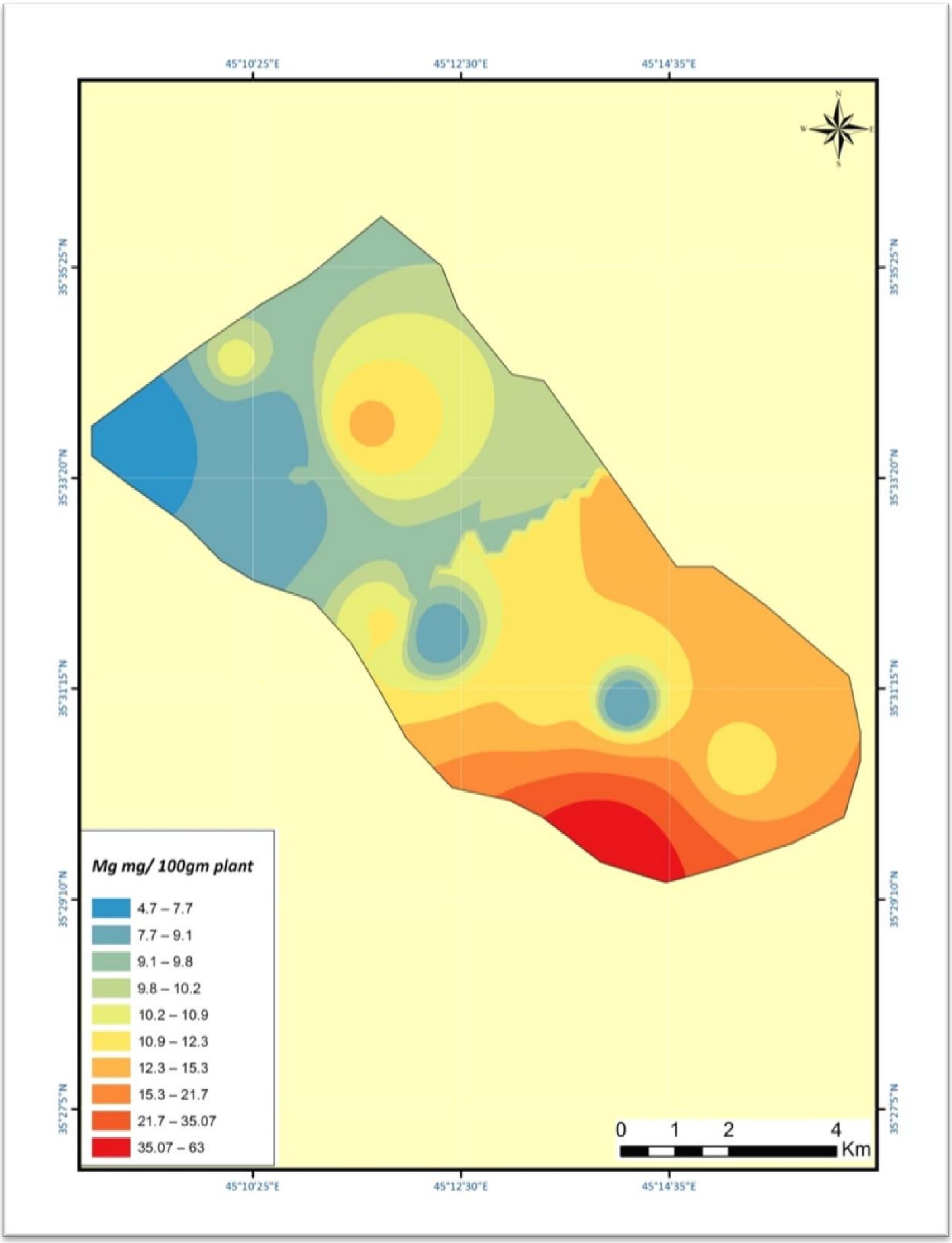


Figure 4.33. Depend on Table 4.8. Survey for soil fertility plant analysis distribution Mg ArcGIS 10.1

The most familiar function of magnesium is representing the central ion in chlorophyll molecule, (Figure 4.32 Table 4.7) in this survey farms in (Tui awlia 3.8m.eq/l and Shuwankara 3.4m.eq/l.) contain lower ratio for Mg. like (Najera et al. 2015) reported.

(Figure 4.33. Table 4.8), in plant ratio of magnesium was higher in (13.15 mg, in Shuwankara and 11.5 mg in Ziyeka) so these are very law ratio as (Lenaldo et al. 2010; Bonner et al. 1965) said.

When we visit some greenhouses we recognize some of Mg deficiency we saw some yellow breaks through between the veins and around the leaf edges instead. Other colors, such as purple, brown or red, also appear. Older leaves suffer first, some of it die because they're not given any treatment.

Farmers need to know the importunity for a long-term solution by apply a yearly mulch of some compost. This will conserve moisture, and provide the soil with sufficient quantities of magnesium to keep the plants healthy.

Perhaps shortage of some nutrition and plant pathogenic nematodes are two factors that limiting vegetable production in this area in our survey we recognize that the Mg and Ca are important factors limiting the vegetable production.

As with the nutrients problems plant parasitic nematodes affecting on the vegetables it will make a series problem facing the farmers there for they help to pass this (Hue et al. 2004).

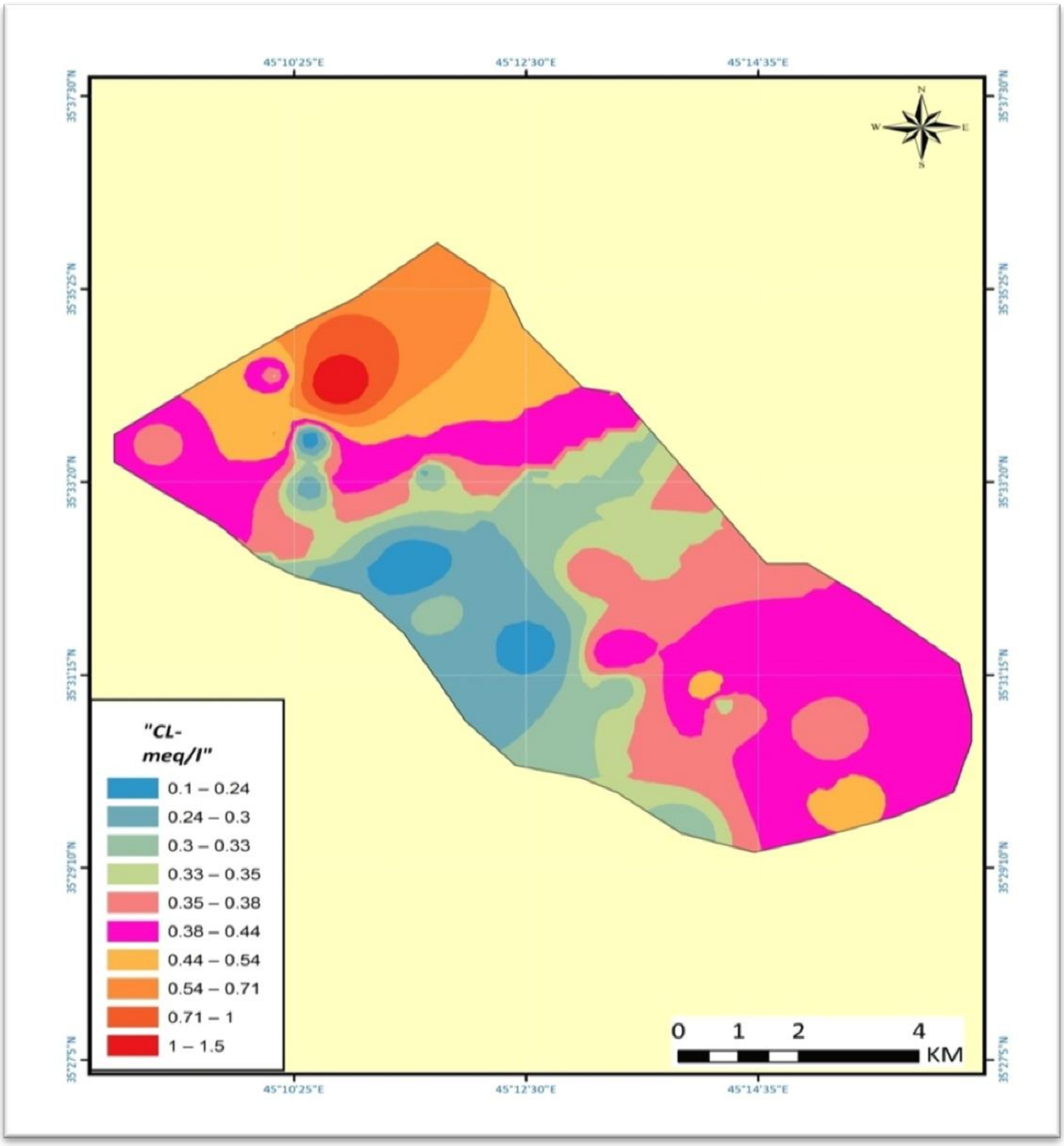


Figure 4.34. Depend on Table 4.7. Survey for soil fertility distribution Cl by ArcGIS 10.1

Chloride is the most recent addition to the list of essential elements. Although chloride (Cl) is classified as a micronutrient, plants may take up as much chloride as they do secondary elements, ratio is soils were (koiyk 0.55m.eq/l and gawani 0.55m.eq/l) (Figure 4.34. Table 4.7).Chloride is important in the opening and closing of stomata. The role of the chloride anion (Cl^-) is essential to chemically balance the potassium ion (K^+) concentration that increases in the guard cells during the opening and closing of stomata.

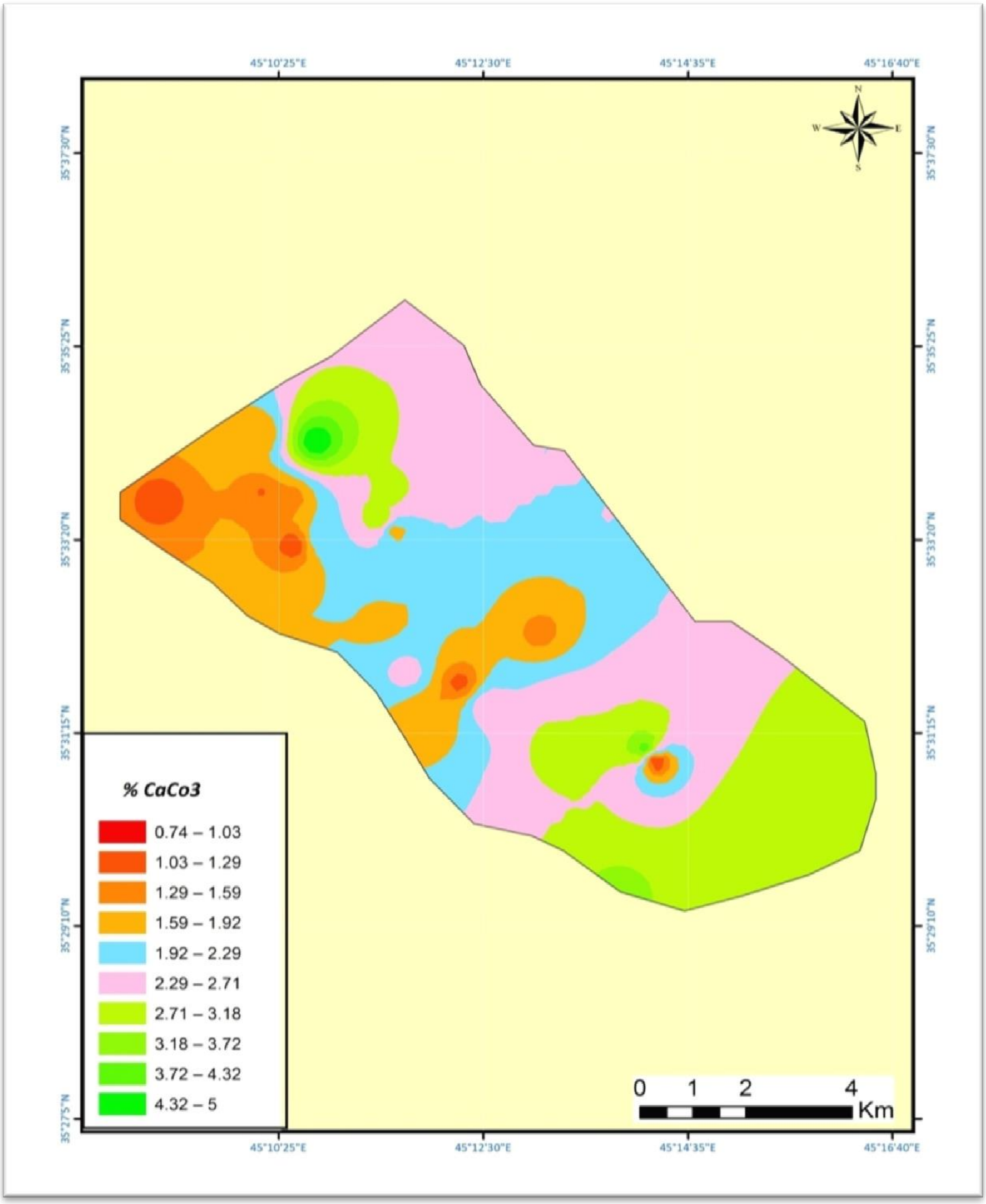


Figure 4.35. Depend on Table 4.7. Survey for soil fertility distribution of CaCo3 by ArcGIS 10.1

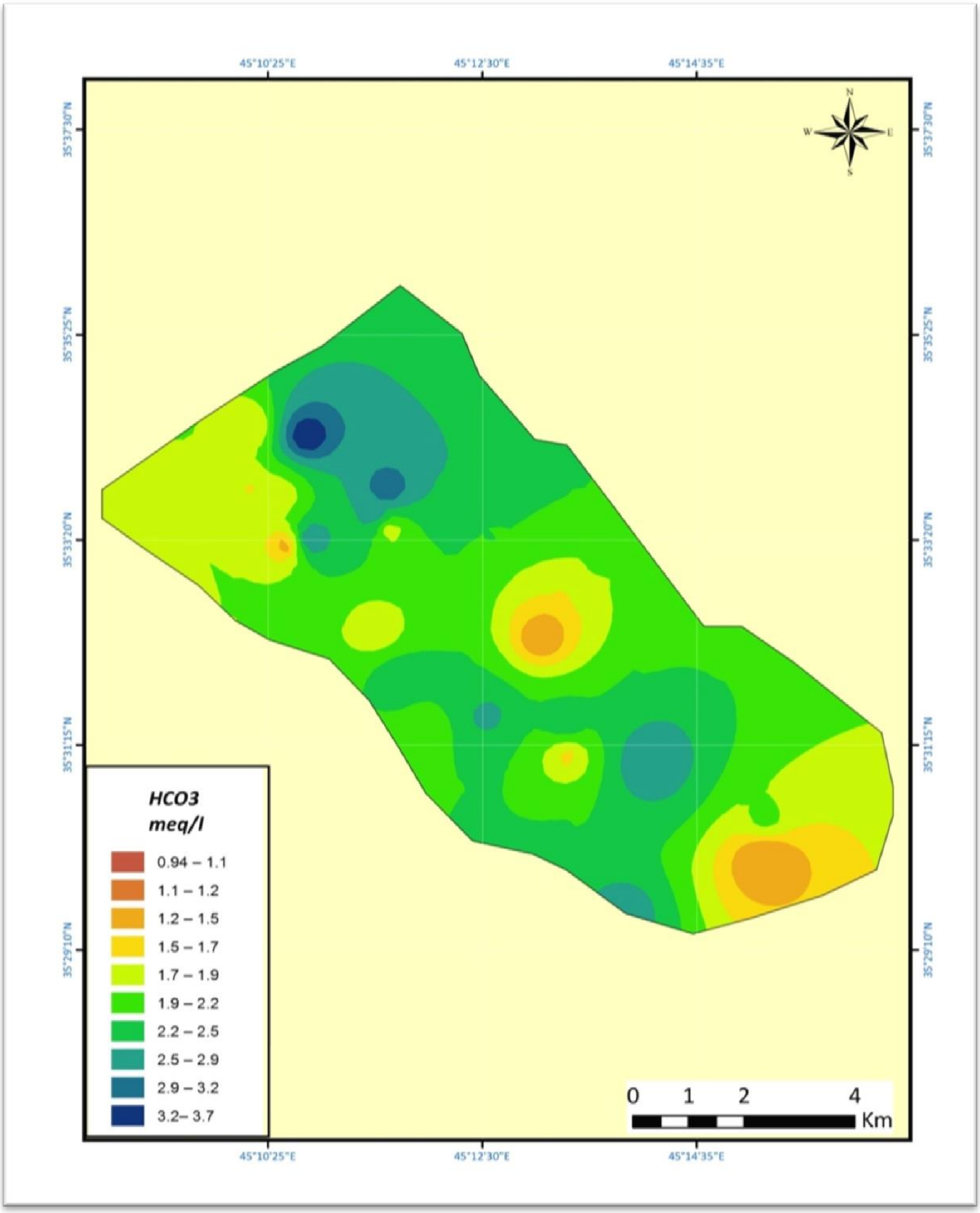


Figure 4.36. Depend on Table 4.7. Survey for soil fertility distribution of HCO_3 by ArcGIS 10.1

High $CaCO_3$ is a typical problem after heavy irrigation which makes rhizospheric alkaline and imbalance in nutrient status resulting in reduce root growth and poor plant development, soils farmer in (Upper Bagajani 14.2%, Mewk 10%, Lower Bagajani 9%, Ziyeka 8.1 % , Ali Bzaw 8.1%) (Figure 5.49, Table 5.19) have the highs it ratio in this area Calcium carbonate, the main component of limestone, is a widely used to neutralize soil acidity and to supply calcium (Ca) for plant nutrition. The term "lime" can refer to several products, but for agricultural use it generally refers to ground limestone.

The presence of excessive $CaCO_3$ (15-40%) (FAO 1972) is not a big problem in our reign soils even in some places it is close, in green house the temperature in summer will increase making a tendency to evaporation from the surface and replacement from the water Table below. The groundwater which is drawn up often contains large amounts of dissolved $CaCO_3$ and on evaporation the $CaCO_3$ is deposited within the soil-body resulting in an accumulation of this substance. Depending on temperature, water content and concentration of CO_2 in soil, $CaCO_3$ decomposes into calcium ions (Ca^{2+}) and hydrogen carbonate ions (HCO_3^-) and hydroxyl radical (OH^-).

Correcting calcium problems is usually not difficult. Liming to the proper pH is the first consideration to supply Ca to the crop. If additional Ca is needed, and the soil pH is already correct, neutral amendments such as gypsum ($CaSO_4 \cdot 7H_2O$) or other fertilizer products are available. Gypsum can also be used to correct high salt conditions in the soil. Such conditions may be a natural condition of the soil.

In other hand Calcium, for all practical purposes, is not considered to have a directly toxic effect on plants. Most of the problems caused by excess soil Ca are the result of secondary effects of high soil pH. Another problem from excess Ca may be the reduced uptake of other cation nutrients. Before toxic levels are approached in the plant, crops will often suffer deficiencies of other nutrients, such as phosphorus, potassium, magnesium, boron, copper, iron, or zinc.

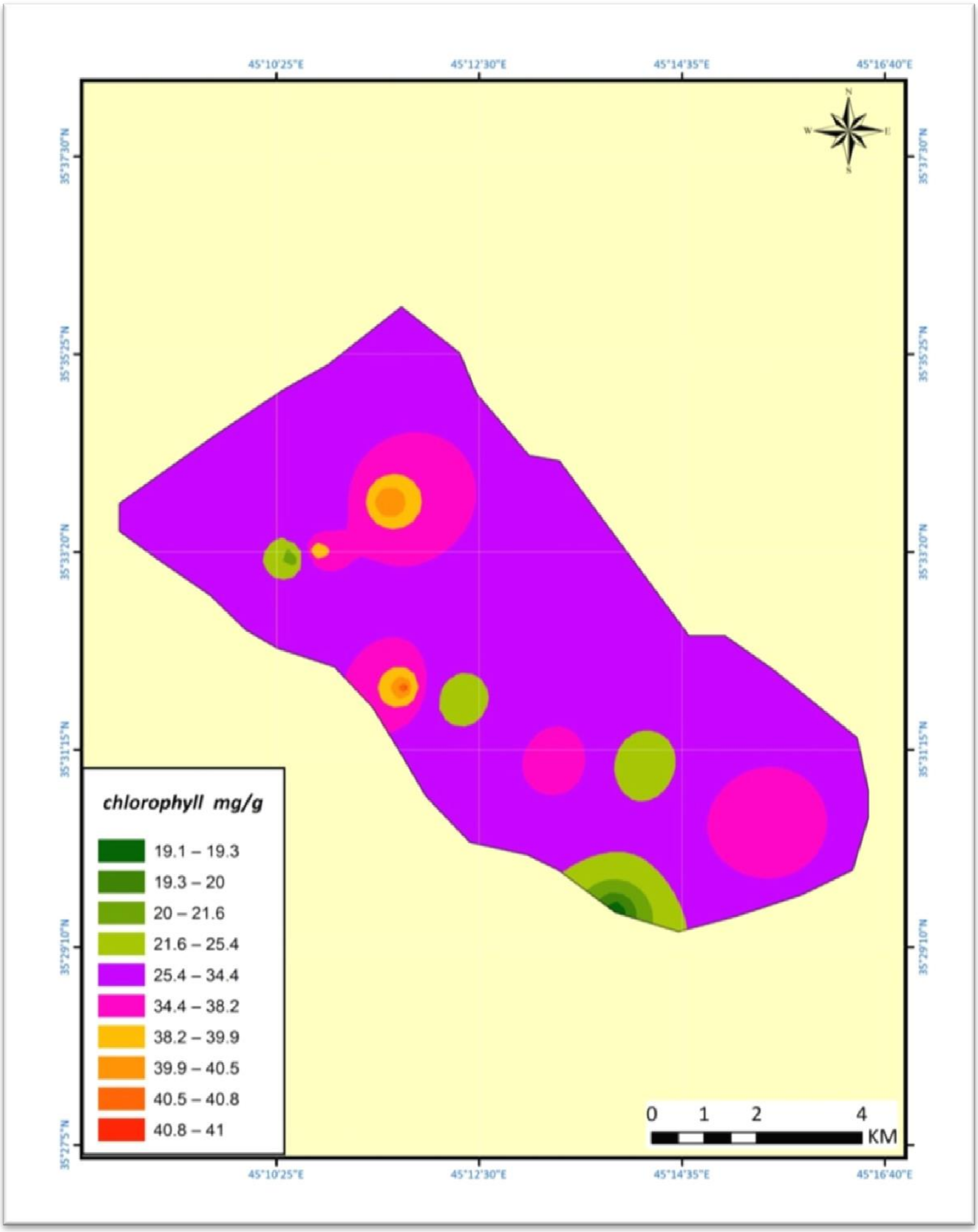


Figure 4.37. Depend on Table 4.8. Survey for soil fertility plant analysis for chlorophyll. by ArcGIS 10.1

Leaf chlorophyll is a direct indicator of nitrogen status and growth rate of the plant. From Figure 4.37. and Table 4.8. the amounts of chlorophyll in collected Samples were in (Ali bzaw 41mg/g and Shuwankara 41mg/g) and that agree with nitrogen ratio in plant. (Liu et al. 2012). In order to limit oxidative damage under stress, plants have developed a series of detoxification systems that break down the highly toxic reactive oxygen species, catalyses and peroxidases. Peroxidase comprises one important class of pathogenesis related proteins implicated in "defense responses," in which an important role is to catalyze the formation of phenolics radicals at the expense of H_2O_2 (Gaspar et al. 1991). Phenolics compounds in plants play a vital role in their defense system, particularly redox response and free radical scavenging. Further, accumulation of phenols at the site of infection is characteristic in plant defense response, and causes rapid cell death and prevents penetration of pathogens Increase in phenolics compounds due to nematodes infection has been reported in several studies (Nagesh et al. 2004; Sarna et al. 1987). Chlorophyll is an important bimolecular which led to photosynthesis, and allows plants to absorb energy from light. Nematode infection reduces chlorophyll content and ultimately the carbohydrate supply to the nodule resulting lower nitrogen fixation.

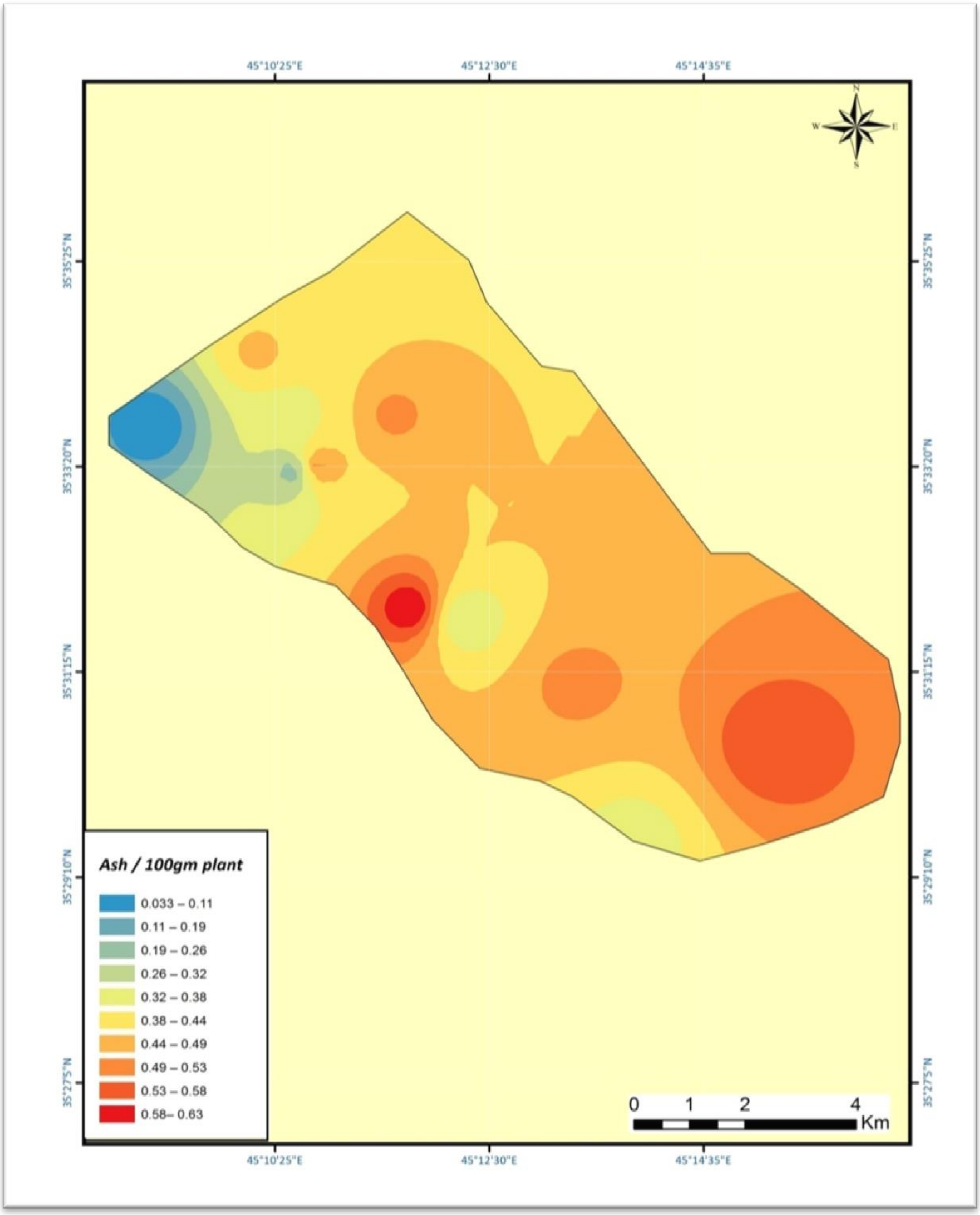


Figure 4.38. Depend on Table 4.9. Survey for soil fertility plant analysis for Ash ratio. by ArcGIS 10.1.

From Figure 4.38 and Table 4.9. the ratio of Ash is lower than the unusual as the highs it ratio were in (Mahmudia 0.63 g and in gawani 0.58g) and that’s lower than 1% as (István et al. 2015).reported.

The parasitism of plants by Meloidogyne spp. Alters nutrient partitioning in the plant the infection of the plant directly impacts nutrient and water relations necessary for plant growth (Hussey and Williamson 1996).

With some of the impact being the removal of nutrients or a reduction of their concentration in plant tissues (Sijmons et al. 1991). The severity of the impact is directly related to the number of nematodes feeding on the roots. Ultimately, the nematode infection disrupts physiological processes throughout the plant and is manifested as stunting, nutritional deficiencies or excesses, wilting, and diminished yields.

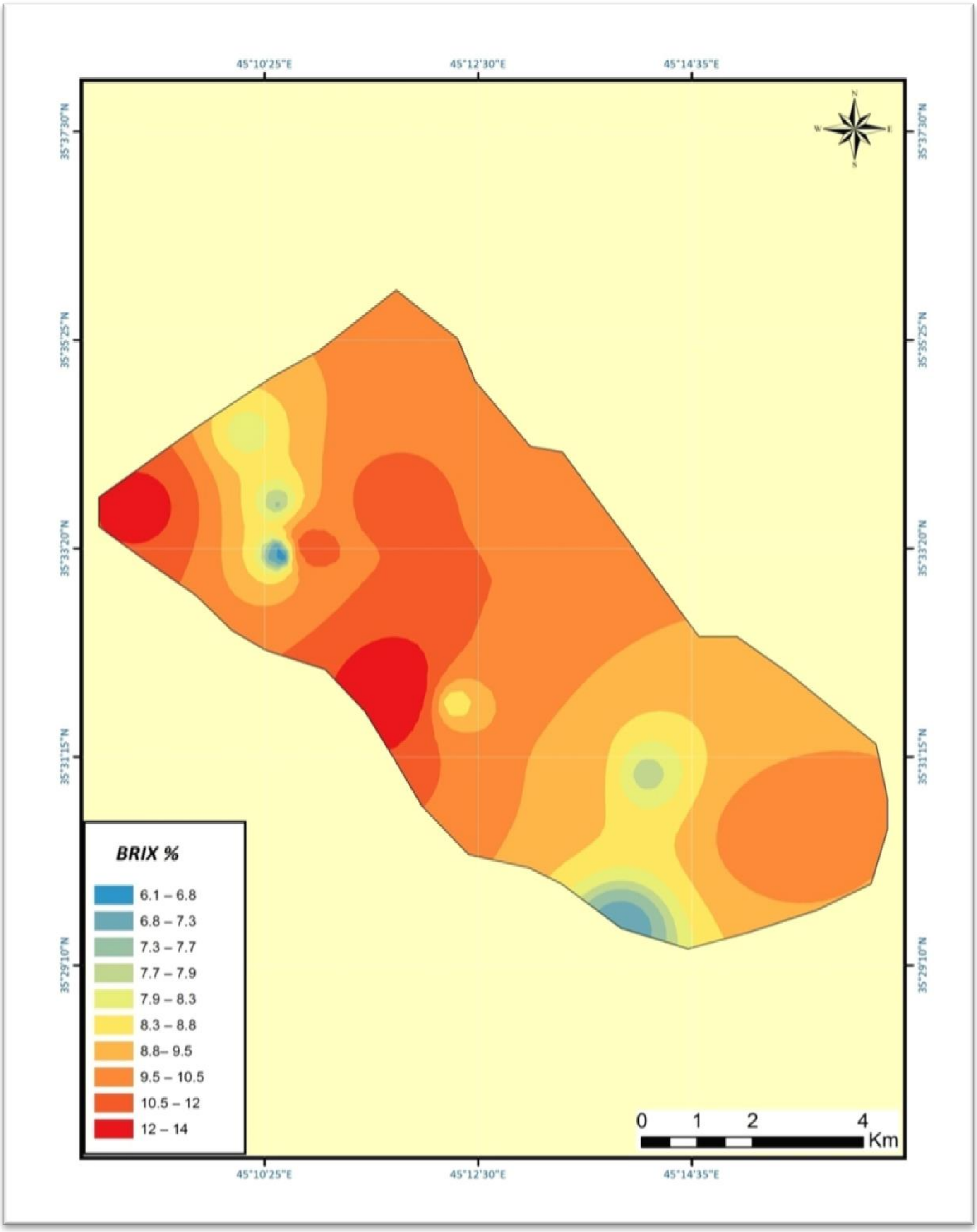


Figure 4.39. Depend on Table 4.8. Survey for soil fertility plant analysis for BRIX .by ArcGIS 10.1

In villages (Bagajani 12.6 %, Ali bzaw 11.5 %) ratio of BRIX have the highs it ratio and this ratio are high or excellent as (Rocky et al. 2014). Brix is a measure of the dissolved solids of a liquid. Brix predominantly measures the sugar content of a liquid (in our case plant sap).

Brix is mostly a measure of sugars and minerals dissolved in water, however many other chemicals may be present and contribute some small factor to the Brix reading These may include amino acids, lipids, and any suspended particles or colloids particles or colloids Brix is measured on a scale that quantifies the amount of light that is bent (or refracted) when passing through a liquid the amount of light refraction depends on the density of the liquid (which is influenced by the things mentioned above - predominantly sugar). Brix levels in broadacre crops and pastures will generally vary from around 4 to 20. It is a Refractometer that we can use to measure these levels, but more on that later.

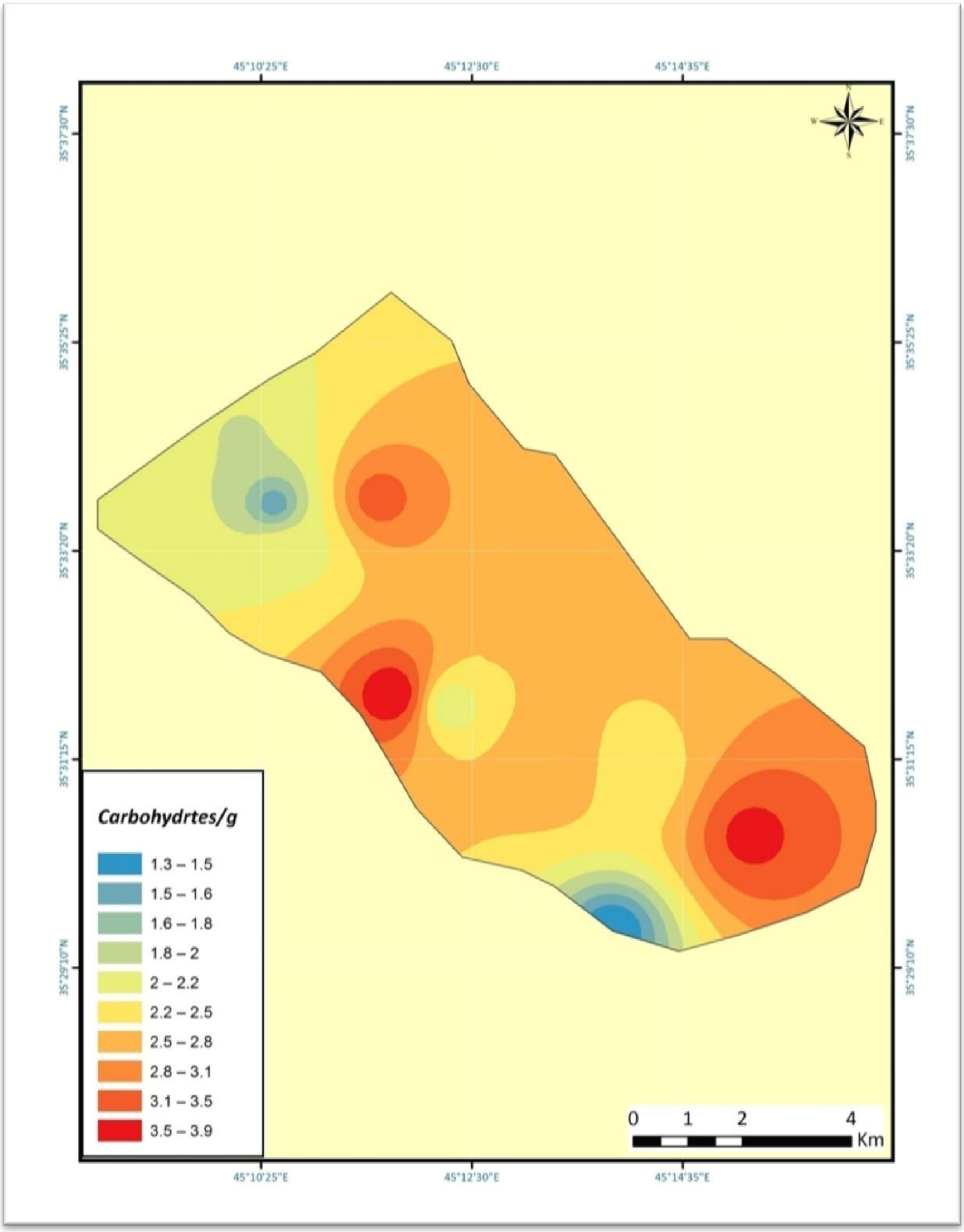


Figure 4.40. Depend on Table 4.9. Survey for soil fertility plant analysis for carbohydrates .by ArcGIS 10.1

From Figure 4.40 Tables of 4.9. Each village (Halay Sarchawa 3.95 g, Gawani 3.7 g, Shuwankara 3.4 g). Plants produce a high diversity of natural products with a prominent function in the protection against predators and pathogens.

These mechanisms include pre-existing physical and chemical barriers, as well as inducible defense response in the form of induction of defense-related enzymes that become activated upon pathogen infection10. In parasitic nematodes, they are particularly crucial for digestion of host tissues and evasion of host immune responses (Thakur et al. 2014).

Pathogen infection and various a biotic stresses lead to overproduction of reactive oxygen species such as superoxide anion (O2-), singlet oxygen (1O2), hydrogen peroxide (H2O2) are produced continuously as byproducts of various metabolic pathways are highly reactive and toxic. They cause damage to proteins, lipids, carbohydrates and DNA resulting in oxidative stress (Sreedhar et al. 2013)

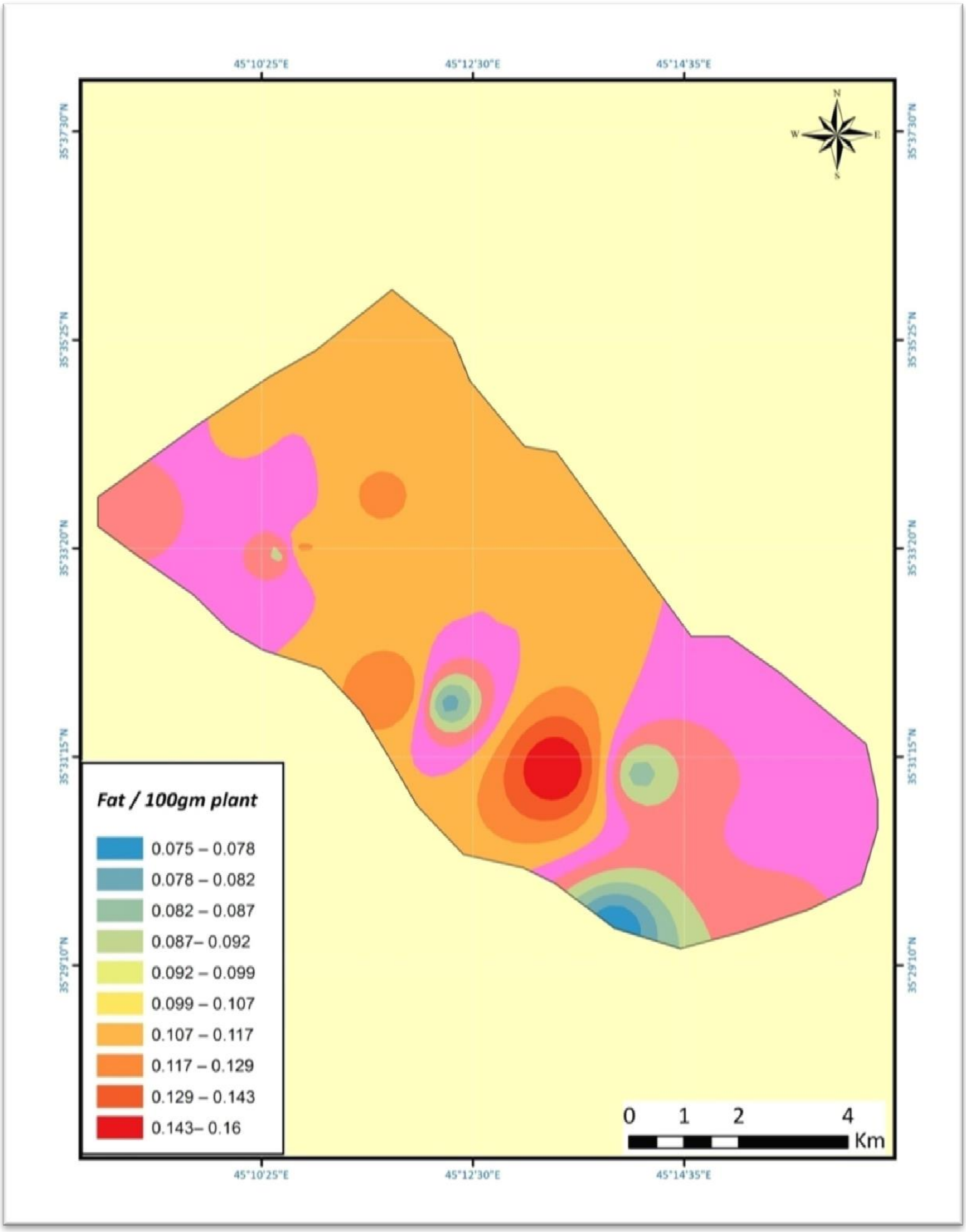


Figure 4.41. Depend on Table 4.9. Survey for soil fertility plant analysis for Fat ratio. by ArcGIS 10.1

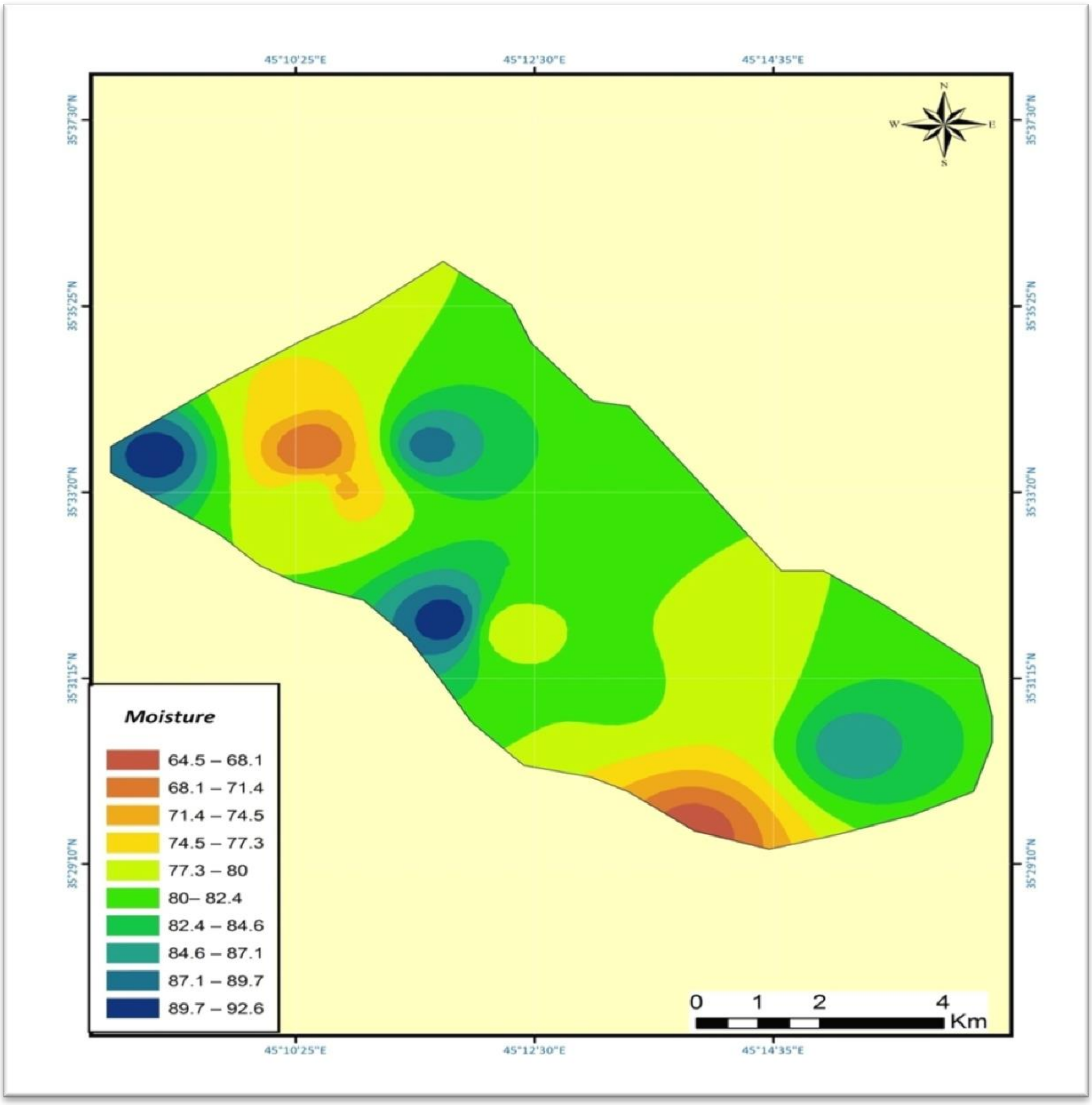


Figure 4.42. Depend on Table 4.9. Survey for soil fertility plant analysis for moisture ratio by ArcGIS 10.1

Figure 4.42. and Table 4.9. show us in (Halay Sarchawa 92.6%, Bagajani 91.9%, Shuwankara 89%) were and this moderate ratio some low compeering with cucumber average water contain 96% Shipley et al. (2002).

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

Concept of sustainability conceder as a goal become widely accepted, the Dominant healthy agricultural still considers high yields and reduced environmental impacts to be in conflict with one another (Keller and Brummer 2002).

Requirement for nutrients in agriculture will not be easy to overcome given the economic constraints imposed on production- oriented farming systems. Nutrient is important in agroecosystem, and hence environmental losses, can be reduced through intentional management of intrinsic ecosystem processes. The goal of survey fertility under this framework would be to balance nutrient budgets as much as possible while maintaining these reservoirs.

Agroecosystem practices that increase the capacity of the ecosystem in ways that contribute to reduced needs for surplus additions should be emphasized in conjunction with breeding for cultivars and their associated microorganisms that do not require surplus additions of soluble nutrients. Understanding the role of using natural fertilizer (resources) to maintain fertility of soils and have a healthy agroecosystem throw Soil fertility management can have many effects on plant quality, which in turn, can affect nematodes or any insect abundance and subsequent levels of herbivore damage. The reallocation of mineral amendments in crop plants can influence growth rates, survival and reproduction in the insects that use these hosts (Jones 1976).

We found evidence to suggest that natural fertilizer practices can influence the relative resistance of agricultural crops to insect pests generally. Like Increased N levels in plant tissue was found to decrease pest resistance (Phelan et al. 1995).

Agroecosystem management using Organic soil fertility practices approach to having healthy agroecosystem can also provide supplies of secondary elements, time to time Lacking in conventional farming systems that rely primarily on artificial sources of N, P, and K. Besides nutrient concentrations, optimum fertilization, which provides write balance of elements, can stimulate resistance to insect attack (Luna 1988).

In this study survey we discover that farmers are using chemical nematicides that effect of most nematicides is only temporary; nematode populations are never eliminated completely with a single nematicides application. Since nematode eggs are resistant to nematicides treatments, it is important that nematicides be applied after egg hatch. Application of nematicides to soils where the temperatures exceed $23^{O}C$ ensures that most nematode species are in the adult or larval stages when they are most susceptible to the nematicides. It should be recognized, however, our opinion is to use natural resources as a improvements or fertilizer.

Watering and fertility practices are critical to the recovery of turf grasses damaged by nematodes. It is important to maintain conditions that allow turf grass roots to regenerate and to proliferate. This means improving the physical, chemical, and biological conditions in the soil and maintaining proper pest control practices. It is important that these cultural practices be implemented concurrently with the nematicides application to prevent nematode populations from returning to prenematicide levels. Without attention to these management factors, control with nematicides will likely be unsatisfactory.

5.2. Recommendations

1. Several varieties are resistant to nematodes and should be used where nematodes are present. Rotation with resistant varieties and nonghosted crops is as effective as fumigation. Resistant tomato varieties are not effective against the species Meloidogyne hapla, but are effective against M. incognita, M. Javanica, and M. arenaria. Some crops are susceptible only to kind of nematodes that relatively Tolerance to even that species. Certain there are varieties are resistant to some or knot species.

2. Soil solarization can provide control of many soil borne diseases, nematodes, and weed pests.

3. Although soil sampling provides more detailed information, checking for root galls is a simple way to confirm that aboveground symptoms are caused by root knot nematode injury.

4. Check the roots of a few plants in midseason or later, even if the crop appears healthy. Check earlier if you see wilting, poor growth, or other symptoms; galls may appear as soon as a month after planting. Carefully brush or wash soil from roots to look for galls. Be sure to check some plants in the smoothest part of the soil, where damage is most likely.

5. Check the roots of rotation crops as well, but remember that galls will not be present on non-host crops and may not be as obvious on other susceptible crops as on tomatoes. If the field has been fallowed or planted to a non-host crop, look for root galls on nightshades and ground cherries.

6. Other weeds may also have galls but are less reliable indicators of root knot activity.

7. If you find galls on any host plant, you can assume that susceptible varieties of tomatoes in the same soil would be infected. However, absence of root galls on other plants does not necessarily mean the soil is free of nematodes that could injure tomatoes.

8. Striving for optimum growing conditions by addressing other a biotic and biotic plant stress factors such as soil moisture, nutrition, insect pests, and other diseases may minimize nematode damage.

9. Nursery nematode control program, to deal with the crops that widely infected, and make a direct connection with the farmers.

10. Many of growers in our reign do not have sufficient management expertise to account for or replace all plant nutrient elements removed so the need some help to teach them when soil benign depleted.

11. Arrange some training coerces to learn how to use some portable instruments like portable Refractometer, leaf area meter, PH meter, EC.meter, SPAD, irrometer, chlorophyll meter, and others that very useful.

12. Give the farmers some lectures about the befifate of using natural improvements like dry yeast or others that tested by researchers.

13. Show them the benefit of using mist spry system in summer to improve the green houses humidity and to keep the water table far from the growing root system.

14. Starting the process of organic farming on real organic basics by putting the rules for productions starting from soils until harvesting and marketing.

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Graduted from Basra University, Agriculture Faculty, Dep. Of soil and Land Reclamation 1997-1998

Language:-

Language	Status	Note
Kurdish	Excellent	Mother tongue
Arabic	Excellent	Second Mother language
English	Good	

Work background:

Work place	**Job Title**	**Year**
South Oil Com.	Sand blaster-Super visor	1993-2000
Directory of research Agriculture	Researcer	2003-2009
American University of ornamental and Forestry.	FarmAgricultural Manager	2009-2011
Enviromental Organzation	Farm Manager	2011-2013

Awards place	**Description**	**types**	**Year**
South Oil Co.	Sand blaster and preparing	Course and Traning	1992
Minestry of Agriculture / Iraq/irbil	Green House Installation	Practical Training Course	2006
Directory of Agriculture Instruction / Irbil	Agriculture under Green Houses	Training Course Certificate	2007
Italy-Franse – Lebanon	Green House managements	Training Course Certificate	2008
American Unversity / Sulaimaniyah	Sustaibal Agr. and soil Improvement		2010

published Research(EFFECT OF DATE CULITIVATION AND MULICHING ON FLOWRING AND YIELD OF EGGPLANT UNDER GREEN HOUSES).

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Another Research under publishing (INTEGRATED CONTROL OF NEMATODES ON EGGPLANT)