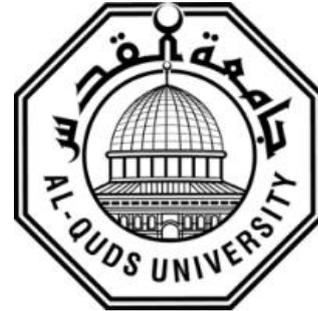


**Deanship of Graduate Studies
Al-Quds University**



**Legislative Framework to Institutionalize the
Management of the Local Plants and Seeds Among
Farmers**

Inaam Yosri Amro

M.Sc. Thesis

Jerusalem-Palestine

2021/1442

**Legislative Framework to institutionalize the
management of the Local Plants and seeds among
farmers**

Prepared By:

Inaam Yosri Amro

**B.Sc. Agriculture Engineering/ Nutrition and Food Technology
Department - Hebron University-Palestine**

Supervisor: Dr. Jawad Hasan Shoqeir

**A thesis Submitted in Partial fulfillment of requirements for the
degree of master Agriculture Extension Program at Institute of
Sustainable development, Al-Quds University**

2021/1442

Thesis Approval

Dedication:

“Say: Allah will see your works and so will His Messenger and the believers; then you shall be returned to the Knower of the unseen and the visible and He will inform you of what you were doing.” [Quran 9.105]

Praise be to Allah in the beginning and in the end

To whom was the first assistant at this journey, to my dear mother and father Hayat and Yosri

To my husband Motasem, who has been a source of support during the challenges of graduate college and life.

To my child Qusai I love you to the moon and back

To my sisters, brothers and friends thank you from depths of my heart.

Inaam Amro

Declaration:

I certify that the thesis submitted for the degree of master is the result of my own research, except where otherwise acknowledged, and that this thesis (or any part of the same) has not be submitted for a higher degree to any other university or institution.

Signed:

Inaam Amro

Date: 15/6/2021

Acknowledgement:

First, I would like to thank God for giving me the strength to do this study

I also would like to express my sincere gratitude to my supervisor Dr. Jawad Shoqeir

I want to thank Union of Agricultural Work Committees (UAWC), for help and funded this research

Thanks to Al-Quds University for their support.

I would like to thank my parents, brothers, sisters, my husband, and my child thank you for being there for me.

Thanks to my friends who have always been a great source of support, they never fail to make me happy, thank you for being there for me when I need you.

Thanks to everyone who contributed to the success of the project.

For you all

Abstract:

Agriculture is the most dominant use of land on Earth and will remain so as the population of the world and the demand for global food increase. There are many important agricultural inputs; among others, seeds is one of the most important agricultural input. Seed is a core element of many debates on technology creation and transition, biodiversity, globalization, and equity, in addition to seed significance in processing, food security, and rural development. Therefore, the sustainable availability of good quality seeds is a significant issue for sustainability.

A local variety is defined as a plant variety for a particular crop produced by traditional farmers through its cultivation in a particular area over the centuries and farmers select the superior plants and through compulsory selection through exposure to local pests and diseases, but it has not been subject to modern methods of improvement. Local seeds are also known as a cultivar produced by traditional farmers, the local variety is adapted to local environmental conditions and agricultural practices and is also compliant with the tastes and uses of society. It is also classified as a single crop plant that has evolved from wild plants found in nature, through compulsory selection.

The prevalence of threats to local seeds, virus-infected seeds, and the presence of companies competing for national products, as well as the precipitation and fluctuation of rainfall, leading to the decline and extinction of those domestic varieties which are suitable and adapted to the prevailing climate and topography. Have for the time being led us to consider the effects of this poor situation.

The presence of commercial agricultural enterprises depending on the introduction of imported hybrid seeds and the ability of enterprises to promote their products and sell them to markets has led farmers to refrain from growing local seeds, irrespective of the problems and disadvantages of using improved seeds.

The problem of the study lies in the absence of a national strategy to support farmers' use of local seeds, despite their adherence to them as a heritage asset. Thus, the reasons for the reluctance to use the seeds were discussed and a recommendation were introduced to govern and support the use of local seeds. The identification of a policy and legislation regulating the relationship between the Ministry of Agriculture and the local seed farmers in order to help their re-establishment in the region. Within the Institutional implementing and organizing framework, the national authority which will have the mandate and legal power to effectively enforce them should be defined by seed laws.

Aiming at examine the different factors influencing local seed management and its reactions to local seed management in Palestine to achieve the research goal of developing guidance to increase the effectiveness of local seed management projects, the study provided a systematic qualitative analysis and then developed a detailed methodology including conducting interviews and collecting research data.

Data obtained from interviews, and literature reviews, were analyzed using the system-specific analytical method of contextual interdependencies and information coding. The purpose of data analysis is to achieve the relevant contextual factors and coping strategies in Palestine for local seed management. the results are presented in the form of a policy prief for improving the management of the local seed sector in the Palestine, this can be investigated through the various relationships and interventions between governmental and non-governmental sectors in local seed sector that will have effect the management of this sector in Palestine based on the CIT theory. All countries of the world are trying to preserve their pure strains (landraces) from their local seeds, as they are a source of biodiversity and genetic yield. It is important to know that, developed countries have made great strides in preserving local seeds. So as, a policy was developed to guide and make recommendations to policymakers in Palestine about the roles, they can play in designing and implementing methods for controlling and maintaining the local seed sector. Where they should increase research and innovation in this field, making use of the highest efficiency from the available funds in light of the low or almost non-existent government budget to finance research and development projects, especially since this field lacks sufficient data to take advantage of all available resources.

Some points were recommended at different levels to be considered by all local seed relevant stakeholder, at the Ministry level like the development of ministerial institutions specialized in improving and producing local seeds (National Seed Bank), Cooperating with other countries to make national seed banks similar to what they have to gain experience in this sector, Organizing training courses for farmers and agricultural engineers continuously according to the seasons and clarifying the importance of local seeds. in addition to Gathering local information and the experiences available from farmers, verify the information in a thoughtful manner to develop the information and adopt it as sound and reliable information.

Also, some points at civil and non-governmental institutions level like

developing existing local seed banks and seeking to open new branches at the governorate level, cooperating in establishing local seedbanks with government agencies, supporting farmers in marketing their local varieties and related products at reasonable prices, providing farmers and those in need of local seeds free of charge or at a nominal cost to ensure the continuity of projects. facilitating the establishment of real partnerships between different institutions and also with the government sector, in addition to the financial support for farmers with expanded reclamation projects that will serve the farms and focus, through these projects, on local agriculture and focus on financing that ensures project sustainability.

Table of Contents

Declaration:	I
Abstract:.....	III
Table of Contents	VI
List of Tables	VIII
List of Figures	IX
List of Abbreviation:.....	X
Chapter 1: Introduction.....	1
1.2. Problem Statement.....	5
1.3 Research objectives:	5
1.4 Research Question.....	6
1.5 Thesis outline:.....	6
Chapter 2: Literature review	7
2.1 Local seed.....	8
2.2 Seed Policies and Legislation.....	12
2.3 Local seed in the Palestinian law	15
2.4 Contextual Analysis.....	16
2.4.1 Contextual Interaction Theory.....	16
2.4.2 Contextual interdependencies:.....	18
Chapter 3: Methodology.....	21
3.1. Research Design.....	22
3.2 Data collection:	22
3.3. Review of legislative framework:.....	22
3.4. Stakeholders Interviews:	23
3.5. Data Analysis and Coding:.....	24
3.5.1. Code tree:.....	24
3.5.2. Coding processing:.....	25
Chapter 4: Results and Discussion	29
4.1 Vertical spatial interdependency:	30
4.1.1 International level (Fund).....	30
4.1.2. Dependency on national level (policies):.....	31
4.2. Horizontal spatial interdependency:	32
4.2.1. Strategies.....	33
4.2.1.1 Strategies/Challenges	33

4.2.1.2. Strategies/Cooperative point.....	35
4.2.2 Local seed	36
4.2.2.1 Local Seed /Importance	36
4.2.2.2. Local seed / Protect	38
4.2.2.3. Local seed/ Production	39
4.2.2.4. Local seed /willing of farmers	41
4.3. Coping Strategies:.....	42
4.3.1. Management:.....	43
4.3.2. Technology	44
4.4. Temporal interdependency:.....	44
4.4.1. The Turning point	45
Chapter 5: Conclusion and Recommendations.....	47
5.1. Conclusion:	48
5.2 Recommendations.....	50
5.3 Limitations of the study:.....	51
References:.....	53
المراجع باللغة العربية:.....	55
Appendices	56
Abstract in Arabic:.....	72

List of Tables

Table 2.1: A comparison between local seeds and imported hybrid seeds. (Arab Agricultural Engineers Association, 2010) translated	9
Table 3.1: Interviews that were conducted from 2019 to 2020.....	23

List of Figures

Figure (2.1): Layers of context that affect the characteristics of the actor. (Bressers and de Boer, 2013).	18
Figure (2.2): Sectoral Interdependencies System. (Socio-political contexts as a whole, such as the political system, government, rights structures, environment, community and culture, and other economic sectors such as agriculture, electricity, technology , infrastructure, health and safety, etc. (Schillinger 2016).	20
Figure 3.1: Code tree, which divided into four main code groups, each group consisting of many sub-codes. The code tree was built based on the analytical legislative framework of contextual interdependencies.	25
Figure 3.2: Main workflow in the ATLAS. Ti version 8 software. Source: (ATLAS. Ti 8 User Manual).....	26
Figure 3.3: Query tool in ATLAS. Ti software that obtains the code groups, codes, the scope and term, and the list of quotations that are the result of the Query	27
Figure 3.4: Linkages between ATLAS. Ti entities (Code group, Sub – Code, Quotation and Document) by using the network tool	28
Figure 3.5: Sample of data analysis report, which includes (the Code group, Sub – Codes, the quotations and the number of quotations) by using ATLAS.ti software	28

List of Abbreviation:

ARIJ: The applied research institute-Jerusalem

BERC: Biodiversity and Environmental Research Center

CAPD: Cooperative Association for the Protection and Development of local Seed

CBD: Convention on Biological Diversity

CIT: Contextual Interaction Theory

CSS: Seed supplier

EQA: Environment quality authority

FAO: food and Agriculture Organization

HU: Hebron University

IFDA International Foodservice Distributors Association

GSPC: Global Strategy sustainable growth

MoA: Ministry of Agriculture

NARC: National Agricultural Research Center

PARC: Palestinian agricultural relief committees

UAWC: Union of agricultural work committees

Chapter 1: Introduction

Chapter 1: Introduction

Agriculture is the most dominant use of land on Earth and will remain so as the population of the world and the demand for global food increase (Tanentzap et al. 2015).

An agricultural system is an assemblage of components which are united by some form of interaction and interdependence and which operate within a prescribed boundary to achieve a specified agricultural objective on behalf of the beneficiaries of the system (FAO, 2018).

Seeds is one of the most important agricultural inputs components; seed is one of the most important components for agricultural network occupations. Due to continuous improvement and selection over time, it is the storehouse of the genetic capacity of yield organisms and their assortments (FAO, 2018).

Seed is a central figure in many arguments about technology development and transition, biodiversity, globalization, and equity, as well as seed's role in processing, food security, and rural development. As a result, the long-term availability of high-quality seeds is a critical concern for long-term sustainability. (Louwaars 2007).

Farmers select the superior plants and through compulsory selection through exposure to local pests and diseases, but it has not been subjected to modern methods of improvement. Local variety is identified as a plant variety for a particular crop produced by traditional farmers through its cultivation in a particular area over the centuries, and farmers select the superior plants and through compulsory selection through exposure to local pests and diseases, but it has not been subjected to modern methods of improvement. (Jaber 1999).

The fast growth in the population of the world has contributed to an increase in food resource demand. There has also been a need for high-yielding crop varieties, which has facilitated the substitution of local varieties with standardized formality and genetic characteristics suited to high productivity varieties. There has been a decrease in the diversity of agricultural genetic materials and production has been based on a small number of crops. At the cost of local varieties, the pattern towards the use of improved varieties that offer plants with standardized formality, physiological, and hereditary characteristics increased. (Hreimat, 2001).

Local seeds also known as a cultivar produced by traditional farmers, the local variety is adapted to local environmental conditions and agricultural practices and is also compliant

with the tastes and uses of society. It is also classified as a single crop plant that has evolved from wild plants found in nature, and through selection its plants are also distinguished in their features. Those exposed to local pests and diseases then pick the local variety from the superior plants by exposure (Hermat 2001).

To save seeds, a measure was taken at the global level in 2008 through the creation of the 'Svalbard Global Seed Vault'. This seed bank is situated on a small island off the coast of Norway in the permafrost and has become the world's most diverse seed repository. The seeds are stored in three underground chambers and are replicated samples of seeds held worldwide in gene banks, thus representing protection against seed extinction. This type of conservation is known as 'ex situ', which literally means 'conservation offsite'. This is the opposite of 'in situ' conservation methods in their natural habitat where conservation is carried out. Conservation ex situ is a useful additional step, but it is not an optimal solution on its own. This is because, even for major crops, the highly advanced facility still retains a comparatively limited share of diversity. Most significantly, ex situ conservation does not enable crops to continue grow in agricultural sector , this is necessary for the longer-term survival of agro-biodiversity. To ensure the successful and long-term survival of genetic diversity, it is generally accepted that ex situ and in situ Two conservation methods should be promoted in an integrated manner (FAO, 2014).

Communities use their local knowledge to fulfill the food protection, nutritional, therapeutic, cultural, and spiritual requirements of their communities. Seed selection and seed conservation, storage and exchange are also based on information that has been practiced and tested for thousands of years and has been supported in continued progress in plant breeding. Traditionally, as they were involved in the collection and deciding on the amount and variety of seeds to be stored, it was the responsibility of women to conserve seeds. In this regard, women have played a major role at farm level in the conservation of diversity. However, this traditional position has been somewhat eroded with the advent and increased use of high-yielding varieties. While it can still be argued in general that women are more dependent on local systems, men are more interested in growing commercial crops in general, resulting in gender gaps in local seed knowledge and skills (Center for Education and Documentation, 2009; World Bank, FAO, IFAD, 2009).

Seed saving is the process of extracting seeds at the end of the season in the appropriate way for each crop and preserving them for the next season. Seeds of a local variety has the ability to pass down from generation to generation, but due to the emergence of formal education,

it is now disappearing. Consequently, to a certain degree, this has restricted the transfer of information from parents to children. However, in the sense of climate change and the need to minimize biodiversity loss, restoring this knowledge and teaching young people how to save seeds is very relevant, particularly as scientists discover the wealth of local knowledge available in communities and the remarkable amount of agro-biodiversity that is mainly maintained by small-scale farming communities (Bendsen & Motsholapheko, 2003).

The commission for Plant Genetic Resources at the FAO addressed international concerns about plant diversity loss in 1985, and more recently at the conference of the parties to the Convention on Biological Diversity (CBD) in 2002, which culminated in the Global Strategy sustainable growth, GSPC is intended to restore plant diversity. GSPC involves in situ and ex situ conservation as key ways of maintaining seed crops. Both methods of conservation have the same purpose, but they do not exactly have the same ability to retain crop diversity and retain the capacity of farmers to conserve and use seeds (Dewi, Gonzaléz, 2015).

Scientific groups are currently discussing the durability and adaptive potential of conventional seed crops and the efficacy of their methods of conservation (Dewi, Gonzaléz, 2015). It is important to ensure the conservation of plant genetic resources, whereas a legal basis for this reason should be provided to permit the conservation, through in situ use, of varieties threatened with genetic erosion within the context of seed trade legislation (FAO, 2012).

The analysis of the general status for the local seeds would contribute to an understanding of the reason behind the unjustified approach to the use of hybrid seeds from the perspective of the institutions operating in their sector, government agencies and farmers. It will also help to regulate the relationship between official bodies and farmers, to understand where the efforts to protect domestic seeds will be focused, and to define effective conservation measures and strategies for domestic seeds. Noting that the failure to carry out the research methodology study maintains that the practical procedures for the maintenance of varieties are not successful as necessary, in particular that more than one institution has worked to develop and produce domestic seeds and to bring them back to the market, but to no avail. Despite local seed involvement in the local market, the return of farmers to grow improved seeds and not to plant domestic seeds is very troubling and must be changed to the right direction to avoid the problem.(FAO,2009)

Because of local seed significance and the shortage for implications of studies on the seed, in addition to the depletion of domestic seeds, the study problem was predominate. Furthermore, to identify a national policy and a law regulating the relationship between government agencies, farmers and private institutions with a view to the production and conservation of domestic seeds through special development projects.

This research is significant that the Ministry of Agriculture and the institutions working in the field of domestic seed production and security including farmers. It is also critical for all Palestinian farmers because it has an impact on the growth of the Palestinian agricultural sector and plant and biodiversity conservation. In addition, the importance of these local seeds and their nutritional and agricultural value, as these landraces bear the best characteristics of resistance to pests, local climatic conditions, where they are multiplied and their seeds bear the same characteristics of the parents without losing any of their characteristics which can improve and selected naturally. this research was planned into Five Chapters.

1.2. Problem Statement

The problem of the study was in the absence of a national strategy to support farmers' use of local seeds, despite their adherence to them as a heritage asset. Thus, the reasons for the reluctance to use the seeds will be discussed and a recommendation will be introduced to govern and support the use of local seeds. The identification of a policy and legislation regulating the relationship between the Ministry of Agriculture and the local seed farmers in order to help their re-establishment in the region. So that if these goals are achieved and the problem is solved by this research, the Palestinian farmer will be the most benefited after institutionalizing and preserving the municipal seed sector to support its farmers and demonstrate its environmental, nutritional, and economic importance.

1.3 Research objectives:

This research aims to study the laws related to local seeds in the Palestine, specific objectives were defined as the following:

1. Knowing the current policies applied to preserve local seeds in the Palestine
2. Submit a proposed local seed management policy can be applied in Palestine in this context.

1.4 Research Question

This study answers the following research questions:

1. What are the legislative frameworks which currently applied to protect local seeds?
2. Cooperation mechanisms between local seed processing and preserving stakeholders?

1.5 Thesis outline:

The overall research study was divided into five chapters:

1. Chapter 1: Introduction and the problem statement for the local seed situation in Palestine are included in the chapter. Furthermore, the research questions, the objectives for the study, were included.
2. Chapter 2: literature review on the local seed crisis in Palestine linked to national laws and strategies. In addition, to clarify the principle of contextual interaction, which was the basis for the entire study of the thesis.
3. Chapter 3: Methodology adopted in the analysis is identified.
4. Chapter 4: Results and discussion.
5. Chapter 5: Conclusion and recommendations.

Chapter 2: Literature review

Chapter 2: Literature review

The literature on local Palestinian seed resource management, including local seed protection, seed policies and regulations, local Palestinian law seed management, was reviewed in this chapter. In addition to collecting data from interviews with representatives of governmental and non-governmental organizations and institutions working in the field of seeds, these data were analyzed to find out the contextual theory of interaction that is considered the foundation of the study of the thesis is explained..

2.1 Local seed

Local varieties that have grown relatively from primary (wild) plants found in nature are known as single-crop plants, and sometimes local variety crops vary in their characteristics. This is due to its cultivation in an area over centuries by compulsory selection due to its exposure to local pests and diseases and the choice of superior plants by local farmers. (ARIJ, 2001)

Dajneh, 2006 explained what is developed in a specific ecosystem or atmosphere, and it is the seeds which the local people of the country worked to select and maintain in a local agricultural environment for farmers, local seeds are known as authentic seeds, seeds which farmers keep selecting and storing from crop fields.

In rain-fed agriculture, local seeds are in most cases better than hybrid varietal seeds and have sustainability characteristics. However, in irrigated agriculture, it differs by kind, variety, location and many other factors as local varieties have achieved incredible results in competition with hybrid varieties, And there is still reliance on hybrid varieties in protected agriculture and more work and effort is required to increase the space occupied by local varieties in irrigated and protected cultivations (Al-Saeed 2004).

In recent years, the need for strategies to save living organisms from extinction has arisen after climate change and human practices have led to the disappearance some of them in previous decades. The emergence of the concept of preserving by the establishment of seeds and genetic seed banks, as well as through parks and gardens, these strategies focused on preserving local varieties resulting from natural selection, which adapted to environmental and natural conditions, agricultural practices and consumer taste compatibility, conservation on the farm is a dynamic process that gives way the plants to develop and adapt to the nature. Thus, the farmer becomes historically responsible for the conservation of biological and

genetic diversity and it is an ongoing process regardless of social and economic changes (Al-Saeed 2004).

As shown in Table (2.1) the comparison between local seeds and introduced seeds, which clarify the differences between them and the superiority of local seeds in most of the comparison characteristics.

Table (2.1): A comparison between local seeds and imported hybrid seeds. (Arab Agricultural Engineers Association, 2010) translated

Imported seeds	Local seed	Indicator
High	A few	Production cost
need special technologies, expertise, and specialists	The farmer can produce it himself	Production experience required
High	Low	The price of seeds
Cheap	High	Fruit prices for the consumer
Non-resistant except for drought resistance hybrid varieties	Generally resistant	Drought resistance
Mostly unsustainable, as they are produced in different environmental locations, except drought resistance hybrid varieties	Locally endemic pests	Pest resistance
Very high, through imports	Rarely because all species are local	The possibility of agricultural pests entering the country
cannot be reproduced	It can be reproduced by farms	Reproduction
pose a burden on the national economy and drain a lot of money, perpetuating dependency and contradicting the	Promote and contribute to building the economy and promoting the principle of food sovereignty	Its role in the national economy

principle of food sovereignty		
-------------------------------	--	--

The most prominent fundamental characteristics of local varieties are that they are well suited to local conditions and play an important role in agriculture. The different regions are characterized by the cultivation of distinct local varieties, although the level of demand for seeds is limited, due to the climate diversity in Palestine, it is distributed among many local varieties, this allowed local seeds to be produced and grown in more than one season and place, which made them resist degradation and extinction (Alrajabi, 2013).

Palestinian local seeds are the most important agricultural inputs, because of the presence of many species, varieties, and local breeds; this is due to the diversity of land conditions and climate (Alrajabi, 2013)

The use of plant origins, such as local varieties and wild genotypes, are key components in the development of appropriate germplasm, and are a safety valve for food security and sustainability of agriculture and plant production through their resilience to climatic, biological and non-biological changes (Hremat 2001).

The local varieties of vegetables in the Palestinian areas play an important role in rainfed agriculture, which dominates 90% of the cultivated land, and the economic saving process resulting from the cultivation of quality local seeds is of main importance for farmer (Jaber 1999).

Local seeds are an important national wealth that must be preserved because they constitute sources of local plant genetic genes, which are of great importance in preserving the potential of local plants. Its great role in controlling agricultural pests and reducing the use of chemicals (Shtayeh, 2005).

The domestic seeds enable farmers to collect and store seeds for the next season of the same plants, which cannot do in the case of growing plants of hybrid seeds that are intended for agriculture and the farmer cannot produce seeds for the coming seasons, one generation only. This obliges the farmer to buy fertilizers and chemical pesticides, which are necessary for the growth of plants, leading to continuous erosion in soil fertility (Kurzm, 2010).

However, domestic seeds grow well with domestic fertilizer or humus. The commercial interest behind the dumping of the Palestinian market hybrid seeds and the necessary chemicals directly threatens the domestic seeds. It is also known that domestic seeds are suitable for dry or semi-dry climates and do not require much water, unlike hybrid seeds.

Hence, the importance of farmers returning to the production of domestic seeds for the next season, particularly in the cultivation of cereals and vegetables. A few years ago, the Palestinian farmers relied on the seeds and seedlings of their own, which are less expensive and more resistant to disease. However, the prevailing idea today is that farmers assume that improved seeds and seedlings produce greater production and easier cultivation ignoring their consumption of a large amount of water and their need for medicines and chemical fertilizers, which are harmful to the soil and many other nature resources (Kurzm, 2010).

Most of the local seed's varieties have disappeared. For many years, seeds companies (foreign) have flooded the market with hybrid and improved seeds leading to the disappearance of Palestinian domestic seeds. As a result, we have only to buy new hybrid seeds and their chemicals, every new season. This means Environmental imbalance, increase in the cost, and dependency at Israeli and other foreign seeds companies that continue to control our food; thus, deprive us of the real food security, which means stop purchase of seeds and seedlings for agriculture. (Kurzm, 2010)

Some of the local agricultural institutions and associations have worked to improve many species and varieties, especially rainfed ones. Some associations have achieved satisfactory results, which returned local varieties and species. Domestic seeds proved to be the most suitable for the conditions of farms and environment of our country. However, farmers, despite these results, still cultivated of imported and hybrid seeds, this is evidence that the local seeds are collapsing (Alrajabi, 2013).

We must take concrete measures to preserve, increase and classify the domestic seed assets and to clarify their economic and environmental importance while supporting farmers, finding appropriate markets, and controlling the production inputs of hybrid seeds and chemicals. The factors that led to deflation in traditional and historic local agriculture have led to a deepening food security crisis and dependence on foreign agricultural inputs (Kurzm, 2011).

It is evident that seed conservation and development programs in Palestine, despite their importance in the field of studying the reality of local seeds and their conservation, have mostly been confined to small groups of farmers and a few crop varieties, and most of them lacked of sustainability and community participation or society's reliance on itself to secure seeds. Most of these programs lacked the use of appropriate statistical methods to demonstrate the relative importance of crops grown in a particular region (Shtayeh 2005).

Establishing such local systems requires coordinating cooperation between the local seed sector and farmers' seed practices and taking advantage of the technical and scientific capabilities of the formal seed sector to strengthen seed systems for farmers, and initiatives related to establishing local seed systems may include community based seed banks and conservation genetic sources of crops and their improvement (Josep A Garí, 2003).

Local seed banks can work towards achieving a two-purpose goals: preserving local seeds and improving access to them, which ensures continuous food productivity in addition to increasing income sources in targeted communities. Promoting diversification of varieties of traditional food crops. local seed banks are expected to work to assist the rural family in planning and practicing agriculture according to the specific environmental conditions and according to the economic situation, labor market situation, nutritional needs and marketing potential (Shtayeh,2005)

The importance of protecting local seeds is that they are linked to Palestinian history and they are reservoirs of genes that have been preserved for millions of years. They are made up of societies that have special genetic isolation, such as disease sensitivity, drought resistance and adaptation to climate change (Alrajabi,2013).

2.2 Seed Policies and Legislation

The seed industry is evolving in various ways around the world, as different weights are given to the different policies and local institutional and commercial settings offer various opportunities. In several nations, with varying proportions, farmers' and formal seed systems run side by side. There is also variance in the balance between public and private positions in local seed systems. These variations are evident between countries and areas at the country and between crops and farming systems. Policymakers are challenged to develop policies and legislation that help each of these different seed systems where they are most successful (Louwaars, Boef, 2012).

Government policies for the growth of the seed sector in developing countries have grown considerably over the last three decades. National governments played a significant role in the growth of the seed sector until 1980s. National agricultural research programs and other government agencies have since largely disengaged themselves from the processing of seeds. This has led to the growth of a competitive private seed sector in some countries and

for certain crops, but the local seed sector has collapsed in many other countries and for many crops, while no private seed sector has arisen to replace it. Since the seed industry is not able to provide sufficient access to quality seed for farmers in many developing countries, the farmer-managed seed sector will continue to be the main source of seed for farmers (FAO, 2015).

As the farmer-managed seed sector often lacks the capacity to give high-quality seeds with new characteristics, in particular higher yields and better resistance, the respective functions of the public, private and informal sectors and the need for cooperation should be addressed by national seed policy. In order to ensure the development of seeds of crop varieties that are useful for diverse and changing agricultural systems, Louwaars *et al.* 2012 proposed that countries should establish integrated approaches that improve both the formal and farmer-managed seed systems and their links. The African Union has introduced a model strategy of integrated seed systems in accordance with these guidelines (Visser,2017).

While regulation is significant, many aspects of operations in the seed sector are better handled through voluntary procedures set out in policy papers. The law and policy are complementary: the policy offers priorities and frameworks, while the law gives legal force to certain main issues, especially those related to seed quality (FAO, 2015).

Some national seed policies acknowledge the significant role of the informal sector and encourage assistance, or even official recognition, in areas such as extension, farmers' training schemes, local seed banks, conservation of germplasm and regulation of seed quality. The farmer-managed seed sector is not known at all in other nations (Visser, 2017).

Mutonhori and Muchati, 2013 clarify all seed policies seek to ensure that farmers, especially small-scale farmers, have access to a variety of major crops and varieties of high-quality seeds. This goal is often not realized in practice due to multiple factors, such as:

1. Lack of financial resources to allow farmers to buy seeds and related inputs such as fertilizers and pesticides.
2. Restricted market access for seeds.
3. Uncertainty regarding the benefits as opposed to local varieties of fresh germplasm.
4. Lack of information about the identification and quality of seeds.
5. Uncertainty regarding yields and fluctuating prices of produce.
6. Lack of ability to satisfy phytosanitary demands.

7. Lack of appreciation and funding for seed systems for local / small farmers.

Seed laws specify the principles regulating the production and selling of seeds, identify the competent authorities, define prohibitions and responsibilities relating to the marketing of seeds, and may provide for the registration of seeds and sellers and lay down additional quality requirements (FAO, 2015). They represent a fundamental problem: because farmers are unable to determine the quality and variety of seeds accurately at the time of purchase, they need to be covered by creating a legal duty to guarantee the quality of the seed (Visser, 2017).

Even if seed policies consider the seed systems of farmers, seed laws may focus solely on the formal seed systems, ignoring their possible effect on the systems operated by farmers. Legislation in many countries focuses on incentives to establish commercial markets and little has been done to prevent conflict with the seed systems of small-scale farmers. Seed laws have been reviewed in several developing countries over the last decade: mandatory rules on seed certification and release of varieties have been replaced by voluntary rules in a number of Latin American, African and Asian countries to encourage the growth of the seed industry; on the other hand, India has made voluntary rules more mandatory to improve the safety of farmers((Visser,2017).

The law applies in theory to all seeds and planting materials in many countries, but enforcement is limited in practice to major crops that are important for national food security. Despite the awareness of the importance of the small-scale farmers' sector, very few countries have clear exemptions for farmers' seed systems in their private sector-oriented seed laws, which can make marketing of local varieties, landrace seeds and farm-saved seeds legally illegal for improved varieties (Louwaars, *et al.* 2010).

According to Louwaars, 2005 Seed laws usually include the processes and requirements for:

1. Variety release systems that seek to register only varieties of established value via the formal seed system to be made available to farmers.
2. Certification of seeds to monitor and ensure varietal identification and purity in the seed chain.
3. Crop quality control that monitors other seed features such as viability and seed health, protecting producers of bona fide seeds from unfair competition.

4. The following seed policy areas would usually be included in seed legislation, as stated in the FAO Voluntary Guide for National Seed Policy Formulation, adopted in 2015 (FAO, 2015).

FAO, 2015 Policy Objective: Regulating seed production and marketing to protect farmers and the industry from fraudulent sales of low-quality seeds is the primary objective of seed legislation. Crop legislation also seeks to stimulate research and innovation, encourage a fair market for seeds, one in which farmers have access to seeds of the varieties they need at a price they can afford, and promote food protection and sustainable rural livelihoods, as well as sustainable management of plant genetic resources.

FAO, 2015 policy scope in terms of the legislation on seeds, defines the types of seeds and other items (such as seedlings) to which the law applies and the practices of seed management to which it applies. Only selected plant species or varieties of species recorded in the national catalogue may be included in the scope of the legislation. Only seeds of a specific category (e.g. certified seeds) or all kinds, including uncertified seeds, can be protected by this policy. It is also possible to control different processes within the seed manufacturing and marketing chain, such as seed registration, certification, distribution or trade.

Definitions according to FAO, 2015 policy: To promote compliance, the seed law should include simple definitions. In line with international standards, key words such as 'seed', 'registration', 'marketing', 'marking' and 'inspection' should be clearly defined so that all stakeholders view them in the same way.

Regulating the stage of pre-marketing. The pre-marketing process includes all stages prior to the marketing of seeds, including testing and release of varieties, processing of seeds, regulation of quality and certification. Regulating this stage is not a requirement for a viable seed supply chain, although some or all of its phases appear to be controlled by most countries with seed laws today. Instead, countries were only able to determine to test and regulate the quality of the seed as sold, irrespective of the circumstances under which it was marketed.

2.3 Local seed in the Palestinian law

Concerning the stipulated Palestinian law and policies, there are no laws and articles that directly deal with local seeds or their preservation, distribution, and other operations, but they are generally mentioned in Article 27, which states: "*Agricultural genetic resources shall be deemed to be a property of the state and shall be subject of the principle of national sovereignty. The state shall also respect the individual property rights in the common local strains*" According to the first article of the Palestinian Agriculture Law with definitions, "genetic materials are defined as any genetic elements of the plant, animal, microbial or other origins, containing units carrying genetic traits and of actual or potential value". In addition to Article 28, which clarified the methods of preserving assets and agricultural biodiversity as" The Ministry, in coordination with other competent authorities, shall maintain and use agricultural biodiversity in accordance with the general policy, in the following ways: 1- Inventory of local breeds and genetic origins. 2- Preserving and maintaining genes and genetic origins. 3- Adopting specific sources and mechanisms for the propagation of genetic assets and strains." (MoA,2003)

2.4 Contextual Analysis

Ingram (2011) characterized the environment as "used to display the quantities of complex characteristics that recognize one geographical and temporal space from another. In this way, the context is given a spatial and temporal dimension, including verifiable occasions and the progression over a longer timeframe of relevant factors".

Barnyard (2005) emphasized the importance of the need to effectively discuss the different sections of the context to consider its latent capacity and possible impacts in a review on strategy use. This research is becoming a perpetual measure of thought, but it is never easy to study effectively, there is a risk of learning, and there is no contextual influence on viable use.

2.4.1 Contextual Interaction Theory

Contextual Interaction Theory (CIT) was founded by Hans Bressers, the Dutch policy researcher, in the 1990s of the 20th century.

The Theory of Contextual Interaction(CIT) clarifies the complexities of modes of social interaction and is expected to be central and consistent (Bressers, 2009). The first principled statements of the hypotheses are:

1. Processes of policy are not structuring, but processes of social interaction between a group of actors (people, organizations). Policy transition mechanisms and project realization are included in these policy processes.
2. The behaviors and relationships of these actors can be affected by several factors, but only because and to the degree that they affect the relevant characteristics of the actors involved.
3. These features are their motivations (which influence their actions), their cognitions (information considered to be real, from which the situation is interpreted) and their resources (capacity and power provision).
4. These three features affect each other, but without losing much perspective, they cannot be restricted to two or one.
5. The process is shaped by the characteristics of the actors, but is also affected by the direction and perceptions of the process and can therefore alter gradually during the process (Bressers, 2007).

With respect to CIT, actors are empowered and conscious of their behaviors and decisions in the social interaction process, such as the data they use to recognize the situations and the assets available to them, regardless of whether they are real or intangible. Although the process itself typically affects these actors, external factors, referred to as the context of the process, often have a strong effect on them. This configuration is divided into three layers that appear in Figure (2-1):

1. Specific context: considerations that are specific to the current situation, such as geography, including the current and potential availability of local seeds in our research, and outstanding institutional arrangements.
2. Structural context: variables established by government structures and the existing system for rights and their various components that are usually considerably more stable than the specific setting as specified at a broader level, such as the national level.

3. Wider context: variables that are not directly associated with the included policy mechanisms, but rather with general circumstances that are constant over longer timeframes and are not affected by individual operations for the most part.

These separate classes are used to differentiate systems in which policies are controlled and actors interacting with each other are involved. The implications of the process and whether a policy can be enforced viably have an effect along with them.

In contextual interaction theory, the staggered, multi-actor arrangement, institutional and different contexts are addressed as variables that influence the stakeholders' motivation, observation and assets (in reality, they are only as powerful as they are). There is space to imagine additional contexts as an alleged contextual interaction theory at the point where boxes with complex attributes are collapsed into the system. These contexts are shown in figure 1 as overlapping entities. The shape can be read better from right to left, which means that the previous circle is given meaning by of move to the left, excluding the possibility of direct effect on wider contexts. The most direct context for such situations and prior decisions made in the context of the situation that constitute direct insight into and often the starting point of the method studied (Bressers, 2007).

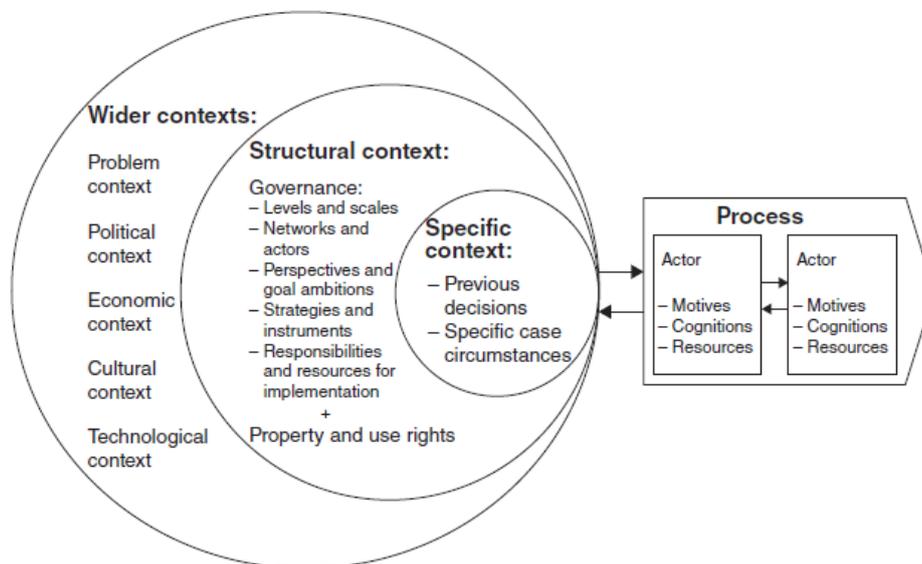


Figure (2.1): Layers of context that affect the characteristics of the actor. (Bressers and de Boer, 2013).

2.4.2 Contextual interdependencies:

Although in various systematic systems the time portion of contextual variables is generally interpreted, the more comprehensive background of policy processes is also agreed to remain moderately consistent, including, for example, social, financial and political circumstances (Schillinger, 2016).

Nevertheless, the more detailed background is less constant and therefore volatile. In developing countries, the predominant theoretical assumption along these lines is considerably less stable and predictable than in developed countries. This triggers the need for an increasingly distinct study of contextual variables. Therefore, contextual considerations are of a more complex type.

Three types of correlations are described based on previous insights:

1. **Sectoral interdependence:** relations in various sectors (e.g. governance, economy, and technology) between contextual variables and processes
2. **Spatial interconnection:** interactions between various metrics (such as local and national vertical dependency) or different locations (horizontal bonding).
3. **Timeline:** relations between modern and ancient contextual influences, or the impact of historical events on current conditions.

Sectoral and spatial interdependencies are related to the (CIT), which represents connections between the different levels of context that not only influence the attributes of actors and policy processes, but also each other. The more detailed sense of the CIT involves issues such as the general political system in society, financial circumstances, social foundations, and mechanical advancement within the general population, structuring these divisions. these divisions structure the establishment of sectoral interdependency (Figure 2.2) (Schillinger, 2016):

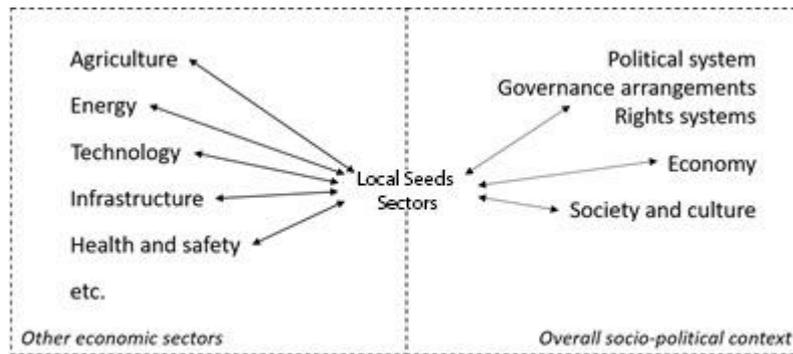


Figure (2.2): Sectoral Interdependencies System. (Socio-political contexts as a whole, such as the political system, government, rights structures, environment, community and culture, and other economic sectors such as agriculture, electricity, technology, infrastructure, health and safety, etc. (Schillinger 2016).

Chapter 3: Methodology

Chapter 3: Methodology

This chapter deals with a detailed explanation of the process and procedures under which this study was performed under accordance with the scientific principles of empirical research to achieve this study's ultimate goal; this chapter contains the summary of the methodology that include research design, data collection and data analysis.

3.1. Research Design

This study aims to examine the different factors influencing local seed management and its reactions to local seed management in Palestine to achieve the research goal of developing guidance to increase the effectiveness of local seed management projects. The study provided a systematic qualitative analysis and then developed a detailed methodology including the creation of interview questions and the collection of research data, which can be narrowly divided into different phases as listed below.

3.2 Data collection:

Data collection lasted 19 months; from Sep 2018 to Mar 2020. The initial five months were to examine legislative framework and writing to demonstrate signs of change of the circumstances before the vital data was gathered and analyzed.

There are two sources of information: records review and interviews with important stakeholders. All disclosed interviews, reviewed to be ready for the analysis stage.

3.3. Review of legislative framework:

During the study, the available policy documents, professional reports, and scientific studies were gathered, analyzed, and evaluated and the necessary information was collected, which included detailed background information on local plants and the control of seeds in Palestine.

3.4. Stakeholders Interviews:

Formulating an interview guide concept was the first step in the interviews. Identify stakeholders and related entities (stakeholder evaluation), identify particular local concerns to be included in the interview guide (accurate interview guide) and collect context information in line with previous literature review and theoretical framework.

Semi-structured interviews were performed with government officials, private sector leaders, local and international non-governmental organizations, academic institutions and communities in Palestine with special expertise and decision-makers on the subject of local plants and seed control in Palestine. Interviews were performed face-to-face with stakeholders by contacting them, introducing the topic of the study and clarifying the purpose of the interview by booking an advance date. Table (3.1) includes a list of all the interviews.

According to the context under which it operates and its administrative role, a collection of questions has been established for each stakeholder to obtain information on how they are influenced and affected by the current legal status of local seeds and what the impact of legislation on the production of local seeds in Palestine.

Twelve face-to-face interviews were conducted with stakeholders, the notes and responses received were recorded. All interviews were conducted in Arabic and the results were translated into English, and the information was then analyzed using "Atlas ti" qualitative analysis software.

In Table 3.1, names of the institutions and the focal point person for the interview from these institutions and his/ her position and the date of the existing interviews with them are shown.

Table 3.1: Interviews that were conducted from July 2019 to Sep 2020.

Date of interview	Organization / Department	Job title	Code
11/7/2019	Ministry of Agriculture	crop manager Director of Plant Quarantine and other	MoA
30/1/2020	Union of Agricultural Work Committees	Seed bank manager	UAWC

9/6/2019	Palestinian agricultural relief committees	Seed bank official	PARC
4/2/2020	National Agricultural Research Center	Researcher from the center and other	NARC
10/9/2019	Academics and experts	Head of the Plant Production Department	HU
24/12/2019	Biodiversity and Environmental Research Center	Chairman of Board of Directors	BERC
26/9/2019	Environment quality authority	Adviser	EQA
25/7/2019	Cooperative Association for the Protection and Development of local Seed	Association director	CAPD
20/1/2020	Farmers	A group of farmers	Farmers
29/2/2020	Seed supplier	One of the owners	CSS

3.5. Data Analysis and Coding:

Analysis of data obtained from interviews, and documents reviews. Data analysis was carried out using the system-specific analytical method of contextual interdependencies and information coding. The purpose of data analysis is to achieve the relevant contextual factors and coping strategies in Palestine Palestine for local seed management.

3.5.1. Code tree:

The code tree was developed as a starting point in the study to categorize the collected data through interviews. Noting that one statement can be encoded in more than one group, each group contains several group-related codes and the following code tree was used during the process of study, Figure 3.1.

Multiple categories may fall into the processes surrounding local seed management. The categories are non-exclusive and frequently overlap the relationship between the horizontal spatial interdependence in the governance arrangement and the vertical spatial interdependence at the international level. In order to get the answer to the research query, the interactions between various categories are an important part of the study.

Noting that the local seed management processes will fall into several categories. In certain situations, the definitions are non-exclusive and overlap, e.g. the relationship between the relation of horizontal spatial interdependence in the governance system and vertical spatial interdependence depends on the international level. The interactions between different categories are an important part of the study for the research question to be answered

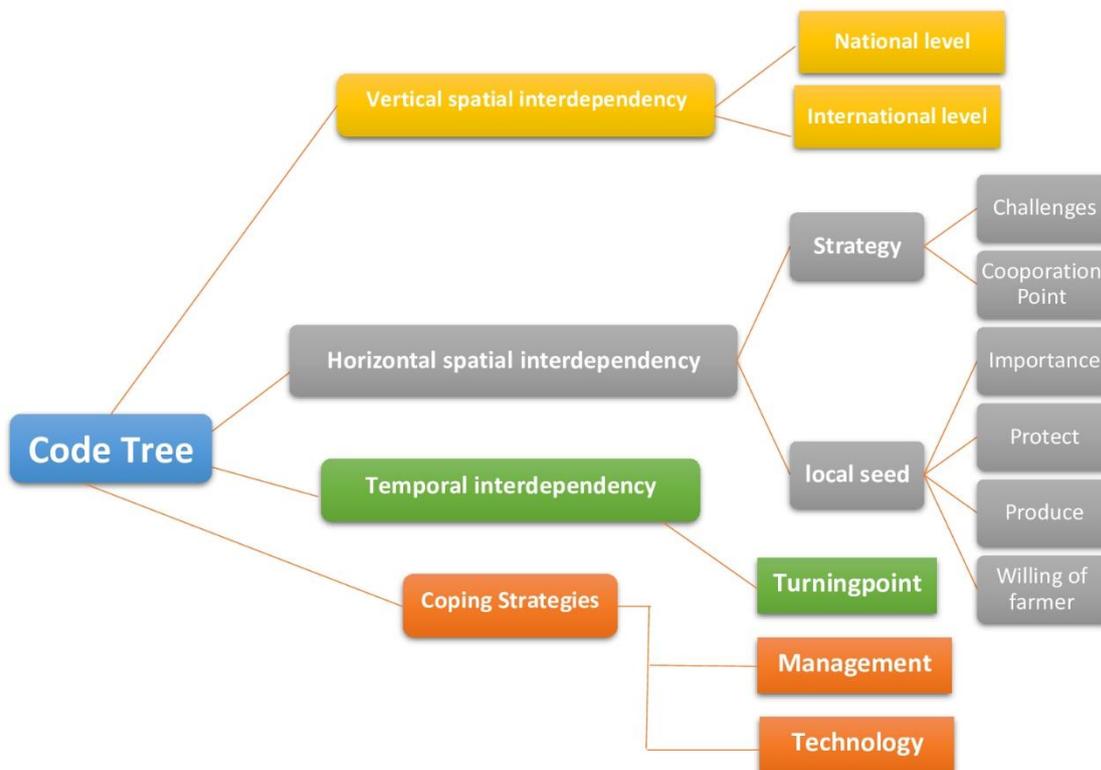


Figure 3.1: Code tree, which divided into four main code groups, each group consisting of many sub-codes. The code tree was built based on the analytical legislative framework of contextual interdependencies.

3.5.2. Coding processing:

By using qualitative analysis software "Atlas. ti" collected data can be grouped through all interviews conducted based on the organized analysis adopted to address research question. This program consists of codes, each code indicating an issue or factor found in the previous conversation with stakeholders, a collection of codes offering the full picture of the specific category.

After the code tree has been programmed, all reports are applied to the software, and all data is encoded into the code and the related category, noting that it can be encoded in more than one code in sentence. The encrypted data is subsequently presented by reporting a property within the program; this could categorize the entire class-related data to facilitate the next steps in the study. Figure 3.2 represents working with ATLAS.ti 8.

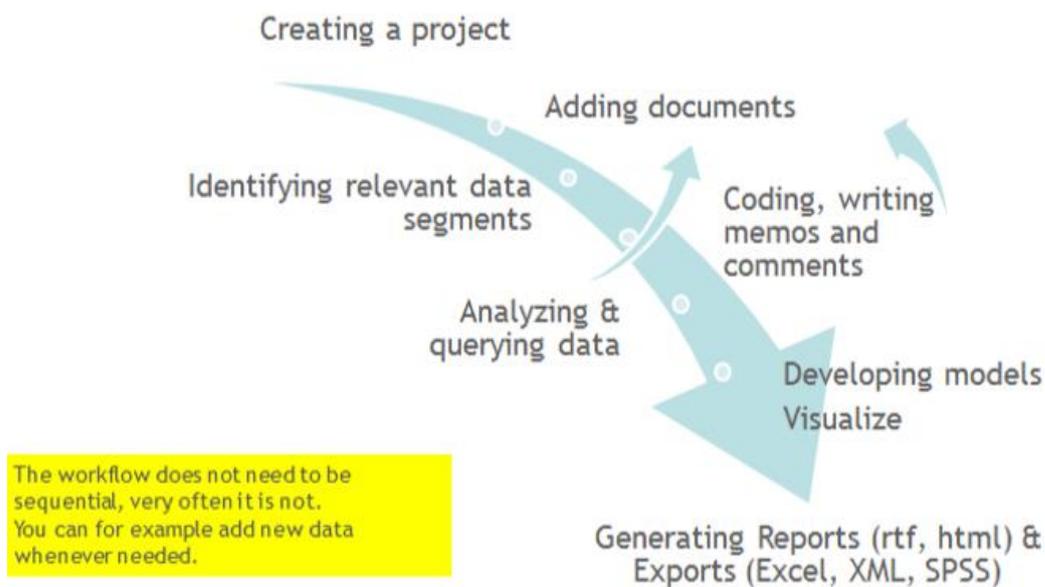


Figure 3.2: Main workflow in the ATLAS. Ti version 8 software. Source: (ATLAS. Ti 8 User Manual)

In Atlas. ti two tools were used, one building on another:

1. Query tool: allows all segments allocated to a specific code (or belonging to a code group) to be viewed simultaneously, allows all encoded texts to be displayed in a specific code as they are displayed on a single page, besides speeding up the process of accessing and opening quoted and encrypted texts in the original file, as presented in figure 3.3.
2. The Networks Tool: enables the framework to be conceptualized by linking sets of similar elements in a visual diagram together. Relationships between codes, quotes,

memos, records, and groups can be conveyed with the support of networks. As figure 3.4 shows .

Using the network tool, after the query tool 's results (list of quotations) were generated. The relation between the quotations and the corresponding code category, sub-code, and document was created.

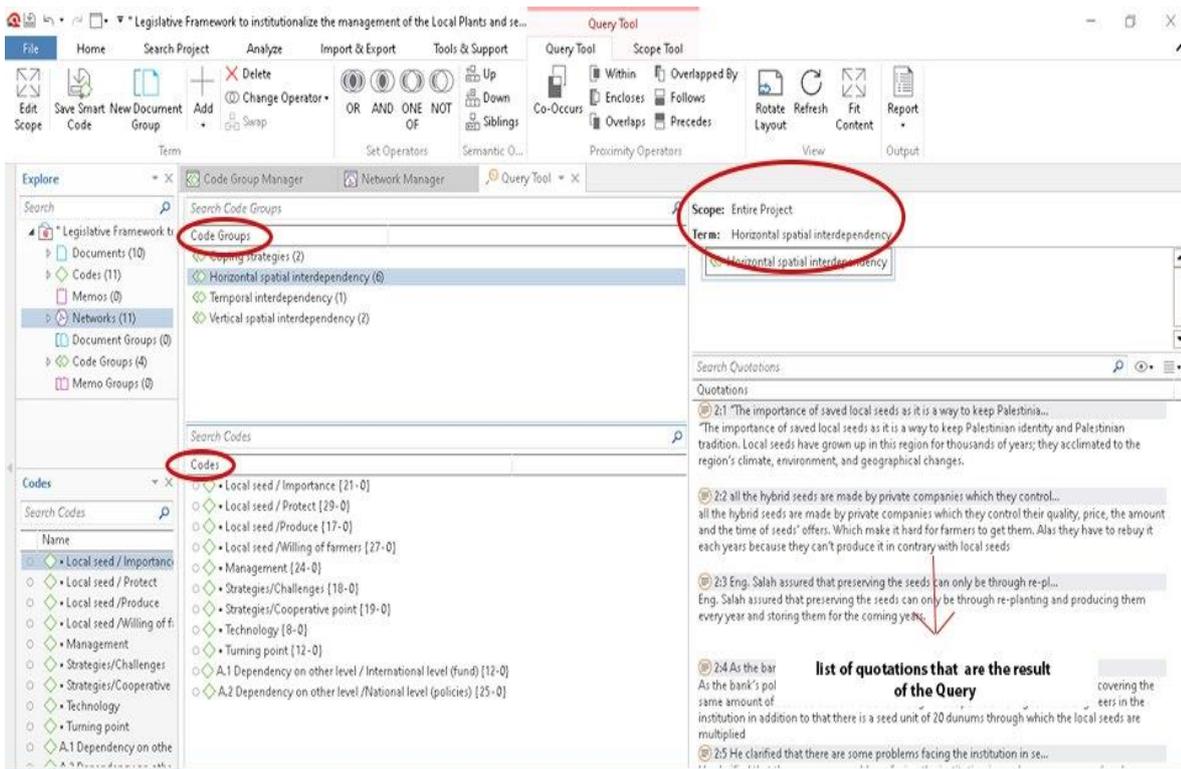


Figure 3.3: Query tool in ATLAS. Ti software that obtains the code groups, codes, the scope and term, and the list of quotations that are the result of the Query

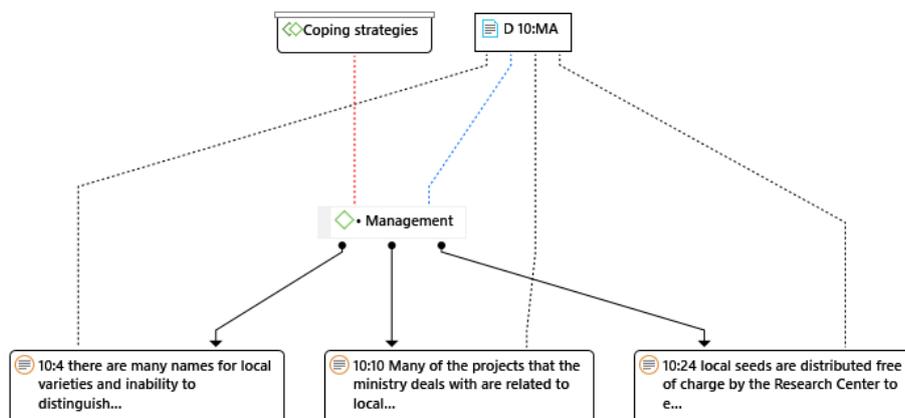


Figure 3.4: Linkages between ATLAS. Ti entities (Code group, Sub – Code, Quotation and Document) by using the network tool

This program makes it possible to create a report that can be saved separately and/or printed for all sectors that are encoded in a text file. This makes it easy to see all the various sections of the text found in the report and easy to read text access. The report is a full description of all the codes, texts, and files that were entered and processed in the program, where each party classifies the code sets separately with the encoded texts and the source of texts from the files is shown in figure 3.5.

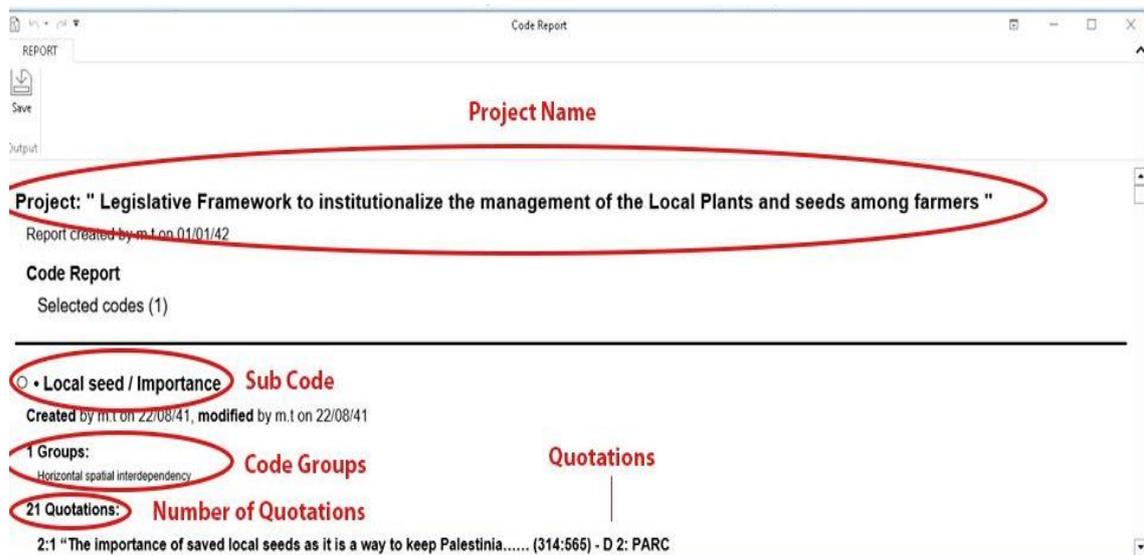


Figure 3.5: Sample of data analysis report, which includes (the Code group, Sub – Codes, the quotations and the number of quotations) by using ATLAS.ti software

Chapter 4: Results and Discussion

Chapter 4: Results and Discussion

This chapter includes both data analysis and discussion that was obtained from semi-structure interviews and records reviews. The preparation of the data to be studied was carried out using a program for qualitative analysis (Atlas. Ti vs. 8), and research was carried out using a system linked to the CIT theory.

Twelve interviews were conducted documenting the views of all local seed sector stakeholders at all levels (regulatory and international non-governmental organizations). All information is addressed in clarity in the following pages, to explain the relationships between various levels and sectors.

4.1 Vertical spatial interdependency:

The research problem lies in the lack of legal regulations regarding local seeds in the region despite their great importance to farmers and the Palestinian agricultural sector. In this element addresses dependence at the international and national level, and its significance in Palestine 's local seed management.

4.1.1 International level (Fund)

During the interview and when asked the next question:

Does the budget of local seeds and its support is enough? On the other hand, do we need to increase its' budget?

Opinions ranged between two opposing points of view. On one hand, the representative of Ministry of Agriculture explained the insufficiency of financial support, he said:

The respondent of MoA mentioned, "*The total dependence in this sector depends on external financing and this makes work on it within the conditions of the financiers and their fields and automatically the funding will be insufficient to include all aspects related to local seeds.*"

The respondent of PARC also supported this point: *"explained the importance of financial support and intensification in this sector, however the current support does not meet the purpose which make it Cause to intensify the efforts among all the concerned institutions to support local seeds , and he emphasized that the donors are not interested in local seeds as in new approaches and aspects"*.

On the other hand, respondent of NARC was disagreed with them, he said, *"The support is large and sufficient, but it is not well targeted. There is a mismanagement of channeling support in the right direction."*

"There is support but it is separated, so the financial 'resources are good but the problem is how to implement."

It is to be noted that the two previous views express most of those interviewed during this research, as the other parties were divided among these opinions.

Hence, the importance of the source of support, as the funder determines how to direct and distribute the financial support, not based on the requirements of the sector.

Therefore, it is important to determine the priorities by the ministry of agriculture, as it is the authority authorized to impose laws, and to distribute tasks to the contributors in the local seed sector in line with the aspirations and requirements of this sector.

4.1.2. Dependency on national level (policies):

During the interview when the following two questions were asked:

- How is Ministry of Agriculture is working to support local seeds at the present time?
- How can the Ministry of Agriculture support local seeds and identify their farmers?

The university representative clarified an important point through his answer, which came as follows.

The respondent of University confirmed, *"The Ministry is the core of work and guidance for teamwork and is the only body empowered to direct and support all teamwork and give capabilities to institutions working in this field."*

The representative of the ministry explained that there is a system for the ministry, he said:

The respondent of MA said, *"A public system was issued in 2005 called the system to regulate the seed sector in general (attached to the interview). However, after this system was dealt with, many deficiencies were discovered, as he said a new system is creating during this period that improves the position of seeds however It has not been adopted yet because it needs many modifications."*

However, the respondent of Companies of seed supply *"The Ministry is absent from this field"*

"There is no way to register seeds at the local or even international level as the system from 2005 is far and not implemented and there are many workshops to update the system"

This confirms, in a way, that there is a defect in the system adopted in 2005, which includes the issue of local seeds.

However, the representative of the UAWC explained the importance of the ministry's role, as she said, *"Having a strategic goal in the ministry plan which cover funding for local seed projects and there are many workshops and partnerships with them through the ministry's research center."*

Although the representative of the ministry of agriculture emphasized the existence of a system related to local seeds, this system is not efficient in managing this sector, which calls for creating a system and policy that manages local seed sector in a more organized and effective manner.

The researcher thinks that the ministry of agriculture makes it difficult to establish and operate local seed banks. As some governments, consider them 'competitors' of the government-controlled conservation system. Others are worried about community-based organizations at large. For example, in China, while some opportunities for local projects have been generated in recent years, existing agricultural and biodiversity-related policies do not support conservation by farmers and their communities (Songand &Vernooy, 2010).

4.2. Horizontal spatial interdependency:

This factor has two issues to discuss which are strategies and local seed, and its importance in local seed management in Palestine.

4.2.1. Strategies

4.2.1.1 Strategies/Challenges

We can begin with the following question: What are the obstacles you face in planning for local seeds field?

The topic had more than one split, and the participants interacted in different ways with this question as BERC representative focused on, *"The presence of high competition for local seeds by hybrid seeds and what large companies offer from hybrid seeds, especially as the resulting crops are usually highly productive and appropriate in terms of shape, size and other aspects which suitable for intensive crops."*

He also made an important point regarding the ability to obtain pure local seeds and the problems this faces " Also, the presence of local seeds within the widespread use of hybrid seeds on a large scale has become the presence of pure local seeds difficult and very little and the so-called available local seeds can be impure enough to call them pure local seeds, there is a need to purify local seeds in several ways and select them to find the purest and the best varieties."

As he mentioned at the end of the meeting the importance of having a policy and strategy that defines how to access pure local seeds and unifying these methods between all institutions working in this sector.

While the representative of UAWC raised another completely different problem, which is the issue of competition between local and hybrid seeds, he said.

"It was more difficult, as the competition between local and other seed was very large. For example, in planting a dunum of tomatoes, the local variety produces a kilograms, while introduced seeds produce tons, so it was difficult to convince people about them."

However, she explained that the importance of local seeds at this time stems from the emergence of the water and drought crisis, in addition to many problems related to seed cultivation, where she said *"However, the water crisis, drought, and many problems have become apparent for exotic seeds produced by companies, new diseases that eliminate whole crops and they are unable to adapt to climate change. All this has led to high demand for our seed bank."*

UAWC representative also pointed out that one of the biggest problems facing the sector is the loss of many types of local seeds and the need to preserve the existing ones ,*"The biggest challenge is that we can save all of present variety in our country, as many variety are lost."*UAWC representative also made it clear that the interest in local seeds by the ministry is important, but the absence of a law or clear system regarding them makes matters vague, as he said: *"One of the strategic objectives of the Ministry of Agriculture is to preserve the genetic varieties, including wild, cultured or local ones. Since we started preparing local seed bank, they recommend the work, and it has subsequently established the existing gene bank. They began preparing a law concerned with seeds, but until now it had not been issued."*

The respondent of PARC also stressed the importance of a clear law and order governing the local seed sector and the ineffectiveness of the existing system, he said: *"clarified that there was no clear strategy or interest from the government to manage local seeds and he confirmed the need of Palestinian national bank led by the Ministry of Agriculture and the need to register local varieties in the name of Palestine"*

He also noted the need for real cooperation in establishing the system in a way that suitable the conditions of the region and explained that there is a problem in cooperation between institutions and even with farmers, where he said *"that the greatest obstacle they face: the absence of cooperation with other private institutions and the governmental institutions, the lack of cooperative from farmers specially those who don't get back the seeds they take from seeds bank, Lack of financial support for local seed projects and fragmentation of ownership of the lands"*.

As for the representative of the ministry, he emphasized that there is a gap in the currently approved system, where he said: *"A public system was issued in 2005 called the system to regulate the seed sector in general. However, after this system was dealt with, many deficiencies were discovered, as he said a new system is creating during this period that improves the position of seeds however It has not been adopted yet because it needs many modifications."*

Here, we see that cooperation between the parties working in the local seed sector is the basis for reaching an efficient and practical system that governs the local seed sector from defining and distributing tasks under the Ministry of Agriculture management, as it is the

entity capable of organizing matters formally and that this will only happen by issuing a system and policy that defines, How to manage the local seed sector.

It would be some farmers' rights acts or provisions, which, in principle, are favorable towards local seed, but the actual implementation may not be evident. One of the problems is that smallholder farmers are not allowed to produce and market seeds. In certain cases, stringent laws exist, such as a seed certification rule, which is based on standards established for the formal seed system, such as distinctiveness, uniformity, and stability. Like in India, the local seed banks established by the National Board of Plant Genetic Resources are under its strong control and operate as mini-gene banks (Malik *et al.*, 2013).

4.2.1.2. Strategies/Cooperative point

This axis shows the importance of cooperation between the various parties to obtain an effective strategy on the ground, and when asking the following question: Is it possible to create partnerships between the Ministry of Agriculture and other institutions and companies working in this field to obtain adequate support in local seed sector?

The representative of the ministry then replied, *"One of the Ministry's most important priorities is*

the integration of efforts for all institutions working in this field, and cooperation currently exists, but not sufficient, but the ministry's ambition to make this cooperation stronger and greater".

As for the respondent of EQA mentioned. *"The principle is that there should be a program at the national level by the Ministry of Agriculture, so that tasks and complementarities are identified between the relevant authorities in the matter"*.

However, the representative of the supply companies made it clear that the ministry should only direct the work not direct it with its stuff , he said: *"In my opinion the Ministry should not work by itself, just organize, and move the work to private institutions"*

"In the media, there are partnerships and cooperation between the ministry, institutions, and universities, but there is no real cooperation, as each entity works individually and there is no integration in the work."

There is an emphasis by all parties on welcoming cooperation and the existence of modalities for cooperation, but the actual implementation on the ground is not based on a true partnership. Here it is necessary to point out the need to create real partnerships between institutions and the Ministry of Agriculture. Through targeted plans and the distribution of tasks among these partnerships to ensure the achievement of correct outputs for these plans. In this way, it is an actual implementation of real partnership between all parties. This can only be accomplished through establishing a clear system in which priorities and responsibilities are defined at the MoA.

4.2.2 Local seed

4.2.2.1 Local Seed /Importance

The most important and first thing to be asked about and what justifies the conduct of this research in particular is the importance of local seeds when the following question asked

In your opinion what is the importance of conservation of local seeds?

The answers came as follows, the representative of UAWC gave a comprehensive explanation of the importance of local seeds and their advantages, which indicate the importance of preserving them, as UAWC representative said, *"First, there is environmental, healthy, sovereign, social, heritage, and cultural importance. We are dealing with seeds, not as seeds, as something related to our history, our popular foods, the harvest season, and our costumes."*

"On the environmental side, it reduces the pollution of salts resulting from fertilizers in the soil and helps the plant to build strong roots until it searches for water, thus reducing the erosion and problems in the soil."

"What distinguishes it is that it is rain fed and in some cases it is the only possible option for farmers due to drought in many areas, especially in areas C, which are considered the most important agricultural areas and there are no water sources and the inability of the farmers to reach water or dig wells, It is also the solution under climate change, drought and high soil salinity due to its ability to withstand these conditions."

"On the sovereign side, these seeds give the farmer the right to multiply and benefit from its seeds without having to return to companies and nurseries."

In addition to the nutritional value, because the plant grow difficult conditions

As the consumer prefers it, it brings back memories in addition to the special taste and flavor"

"Therefore, in this situation, local seeds they are safe to the farmer in addition to their distinctive characteristics as they are as a directive for individuals for health options and organic agriculture, which is easy to apply with local seeds as well as keeping them includes the ways of preserving, using them, which differ from other varieties as they are Associated skills and knowledge."

BERC representative also explained that the importance and sensitivity of local seeds makes them an important issue and confirmed that should be owned by government agencies, *"Pest and disease resistance, drought tolerance. People get used to the taste of these plants, their genetic genes can be used to collect varieties and crops in general in the future in addition to the national and genetic importance of these seeds."*

"At the end, it is a national genetic source and it belongs to the country and a non-governmental party cannot adopt this sector, so no party has the right to be the genetic resources of a certain category or to transfer these resources to other bodies, this exposes the genetic source to the risk of ownership by other parties and thus deprives the country of Benefiting from it and developing it. Therefore, the official authorities must be the authority authorized to develop this sector and protect and participate farmers in caring for and not be subject to looting from any party, especially foreign parties."

The representative of the university did not disagree on the importance of local seeds, but he made clear that their importance does not necessarily necessitate their use in production in the event that they are inefficient in production. Rather, he stressed the need to preserve them in order to preserve the distinctive qualities and benefit from them through research, as he said, *"local seed is important in terms of hereditary traits and characteristics in, it originated in the surrounding environment, its importance stems from the presence of the characteristics, it's a national treasure and if it is not used in these times. It has not been utilized except that it is a storehouse for future generations from a scientific point of view, in addition to its connection to the Palestinian heritage and the necessity of preserving it as an integral part of it."*

"Preserving it must be in order to preserve the distinctive characteristics, and in the case of high and competitive production of other varieties, but in cases of lack of preference and competition, we must take advantage of the local characteristics"

Hence, we see the importance of local seeds, the constant need to pay attention, research, and the consensus of the parties on their importance is strong evidence of that, but the difference in how to use them as the call for their adoption in production caused the difference of views

4.2.2.2. Local seed / Protect

Results reviewed the importance of local seeds after reviewed from stakeholder, it was necessary to explain how important to preserve them and how, so the following question was asked:

- Do you think the importance of local seeds is limited to preservation or is there a need to revive them in the field of production?

Where the representative of the companies supplying seeds replied?

"Preserving them in seed banks and they must be multiplied, and to benefit from the distinctive genetic characteristics and strengthening them in local varieties"

However, the CAPD representative stressed the necessity of using the method of preservation in the place, as the seeds when kept outside the place lose their vitality over time, as he said *"The process of producing and maintaining seeds is continuous and renewed, not through conservation, as the seeds lose their vitality after a period of time"*

As for the representative of NARC, he explained that there is a big problem facing the local seed sector, as there is a process of obliterating the identity of Palestinian local seeds by the Israelis. As he clarified *"The main problem is that we are not a state. These sources must be registered in the name of our country, and the occupation tries to attribute these sources to them and change their names, this is a major political problem, the problem of sovereignty over resources. There is also the economic problem, as agriculture has become an investment for farmers, so we cannot impose a national crop on them."*

He also focused on the idea of local seeds should be preserved on situ by supporting the idea of home gardens is higher than economic production, because farmers prefer quick profit.

Here is what was proposed, *"In the field of production, it should be genetically improved by electing the best, it is a method that was used by farmers since ancient times. In re-cultivation it is necessary to work in situ conservation, which means it is done in the places where these seeds are still grown. We try to enhance the farmers' role in it by providing them with seeds and marketing their products and making their own festivals. As for spreading it to places where intensive cultivation was introduced, I think that farmers will not accept its re-use. This is due to several reasons, the most important of which is that their production is much lower, because agriculture is not sufficient, In irrigated areas we cannot impose these seeds on them because the primary goal of the farmer is to profit It will not achieve this goal. It is possible to spread it in areas with little water and accept it not on a productive level but on the level of a home garden"*

The representative of the ministry explained that there is a national registry for local seeds proposed by the ministry to be approved, *"there are two types of records; first record of approved seeds, which are imported from abroad (hybrid). The second record is of local seeds called the National Register. This what is proposed for approval by the Ministry in the updated system"*

Local seed may benefit greatly from policies and laws relating to cooperative production or farmer organization in general. They could include legal recognition and enforcement, technical and financial assistance, seed commercialization opportunities, and other monetary and non-monetary rewards (e.g., prizes and awards), as well as opportunities for farmers' voices to be heard at the national level. Local seed banks have achieved formal cooperative status in a number of countries (including Burundi, Mali, and Mexico), enabling them to solidify and extend their operations. (song.2010).

4.2.2.3. Local seed/ Production

After reviewing the importance of local seeds and preserving them, the following question was asked: What is the possibility of re-production of local seeds for cultivation by farmers?

A respondent of BERC clarified that to produce pure local seeds, there must be certified local seed banks with government support, as he said, *"Certainly there is a way to do this by establishing local seed banks through participation of the ministry because this work needs continuous efforts and awareness to support by government to establish local seeds"*

which leads sustainability of agriculture and thus becomes a productive sector and farmers can rely on instead of resorting to hybrid varieties, But it must be adopted by the Ministry of Agriculture and becomes a strategy so it should government seed banks and spread them in the country because they are important national genetic resources for development and production and no one may monopolize or benefit from them without the presence of laws governing the operations of trading and benefiting from the local seeds"

The representative of the ministry also expressed his regret at the retreat of the owners of large land holdings from using local seeds, despite the fact that some local seeds are comparable to the productivity of hybrid seeds.

The respondent of MA said, *"There is a noticeable decline in farmers' for local seeds, especially those with large agricultural lands"*

"It seems clear that many local varieties are not sterile, on the contrary, they are highly cost-effective, comparable to hybrids, and therefore it is possible to return them to the market."

When a representative of the supplying companies was asked about the possibility of producing local seeds through them, he said, *"We, as a trading company, are interested in promoting and selling. When farmer interested in local seeds, we will go to work on them, through improving and adding value to the seeds."*

As for PARC representative, he explained the institution's approach, which is followed by many other institutions to provide local seeds to farmers it's require them to recover the quantity at the end of the season. As he said, *"As the bank's policy relies on distributing seeds to farmers every year in exchange for recovering the same amount of seeds so that this is done through the supervision of agricultural engineers in the institution in addition to that there is a seed unit of 20 dunums through which the local seeds are multiplied"*

When meeting farmers who are already planting municipal seeds, their representative explained that the local seeds are of high value and can be used as a productive crop. He said, *"Growing local seeds is beneficial as it is the source of income. Growing it for the purpose of production and providing` seeds for the coming seasons."*

"They believe that modern varieties are more desirable and have higher yields"

In this aspect, the authorities clarified the methods of multiplying and producing local seeds and the need to protect the genetic purity of these seeds to preserve their varieties and multiply them because it is the only way to preserve and sustain them.

This work needs continuous efforts, awareness and support by government to establish local seeds which leads sustainability of agriculture.

4.2.2.4. Local seed /willing of farmers

As for the extent of acceptance of farmers to local seed, when we asked the following two questions:

How much are the farmers interested to use local seeds?

What is the reason behind farmers decrease interest in producing local seeds?

The university representative explained that there is a great responsibility for the ministry and institutions working in the sector, as he said: *"The responsibility of the Ministry and the institutions is to return these varieties to the market, which will benefit the farmer"*

He also indicated that everyone should bear the burden of studying the properties, advantages of these seeds and the benefit from them, he said *"A great burden falls on the third world in studying the characteristics of these seeds and how to get the maximum benefit from them"* also explained the farmer's viewpoint, as he is looking for profitability and does not care about other details, so he said *"The market and the profit determines production and whether or not to go to the cultivation of local seeds, and to go to intensive cultivation, which led to the incompatibility of local varieties with them, The provision of hybrid varieties produced, in addition to the goal of production mainly is what determines the extent of asyllum to cultivate these varieties."*

As the Ministry of agriculture emphasized that the lack of awareness of farmers has a great impact on whether they return to the local seeds or not. The respondent of MA said, *"Because of the awareness of farmers and their lack of knowledge of economic accounts and their usefulness"*

PARC representative explained that there is a differentiation in crops in which a farmer can accept local seeds, according to if their hybrid alternatives exist. *"Some farmers are only*

interested in local seeds that don't have a hybrid alternative such as Armenian cucumber. Moreover, small farmer tend to use local seeds while big farmers tend to use hybrid seeds."

The CAPD representative justified farmers turn to hybrid seeds due to the large advertising campaigns for importers as he said, *"The companies that produce hybrid seeds, where they made large publicity campaigns and mislead farmers with the high production quantities of these seeds"*

While the representative of UAWC explained that the farmers' desire to return to the local seeds is based on many factors, as she said: *"Depends on many aspects, at the beginning the circumstance surrounding of the farmer, the presence of a water source makes farmer directed to intensive crops, which depend on exotic seeds"*

She also explained that there is a global trend of organic agriculture, which depends mainly on local varieties, as she said *"There is an environmental and organic aspect also, as there is a global trend, such as orientation for organic production and local Variety agriculture, in addition to using them in food processing to produce traditional and local food products."*

As for this aspect, everyone showed the importance of supporting and protecting local seed farmers by spreading awareness about the importance of these seeds and their products and the importance of organic agriculture in the world, and supporting farmers who are heading towards organic and municipal agriculture, unlike large farmers who are biased towards profit through hybrid varieties. In addition to the importance of increasing scientific research to derive the best benefit from and highest profit of local seeds to increase their marketing. In addition to all defined problems and challenges as the lack of supportive conservation policies regarding the local seed in Palestine, also the huge marketing for modified seed as for their high productivity and in some species early mature varieties which encourage the farmer for a higher profit. As in Nicaragua (Malik et al., 2013), native genetic resources combined with the promotion of a few varieties of staple grains by research and extension agencies have resulted in the loss of local varieties in recent decades. All this needs to be properly planned and implemented by a competent authority with government support

4.3. Coping Strategies:

It consist of two sections, management and technology.

4.3.1. Management:

When switching to this axis and displaying the next question: Is there is a strategy to manage local seeds, and if there is a one did you participate in making it?

The university representative clarified an important point where, *"The Ministry is the core of work and guidance for teamwork and is the only body empowered to direct and support all teamwork and give capabilities to institutions working in this field."*

The representative of the Ministry clarified that there is work to develop a system related to local seeds, but it is not approved until now, he said *"The system that is being prepared by the ministry is considered improved from its predecessor and we will strive to implement it. One of the most important problems facing us is the lack of stability of climate conditions in general and the changes that occur annually, therefore the plan for this sector is often annual or seasonal and in the form of reactions to the conditions"*

As for the representative of UAWC, she acknowledged the existence of a general strategy that supports work on local seed sector, *"One of the strategic objectives of the Ministry of Agriculture is to preserve the genetic varieties, including wild, cultured or local ones. Since we started preparing local seed bank, they recommend the work, and it has subsequently established the existing gene bank. They began preparing a law concerned with seeds, but until now it had not been issued."*

On the other hand BERC representative added that the absence of a specific and detailed system or policy that clarifies how to work and organize it complicates the situation, he said, *"There is no special strategy, it is possible that it is part of the national strategy for the conservation of biological diversity, but there is nothing special in the local seed sector"*

He also added the necessity of adopting local seed banks, *"The use of the community banking system can be directly and keeping the seeds in place, also keeping them in an external location through a clear decision and fast application by the ministry"*

Result reviewed that the seeds work should be more organized, and that the ministry takes over the management of the work so that is complementary between the institutions and based on clear foundations, not that each party work individually and randomly.

Seed production (multiplication), standardization, certification, and commercialization; variety enhancement, registration, and release procedures; technical assistance to the seed

sector (research and extension services); and farmer organization are all protected by national seed policies and laws. As a result, they have a direct effect on the operations of many local seed companies, especially those that concentrate on seed access and availability.

4.3.2. Technology

When passing on this axis In order to clarify the technological situation in the seed sector, and asking:

What are the tools that used to save and improve local seeds by Ministry of Agriculture?

A representative of the Environmental Quality Authority clarified the problem by, *"The lack of technical, technological support and capacity building, which must be integrated to make clear achievement in the field of local seed sector management"*

A BERC representative confirmed his idea of supporting local seed banks, *"Through local seed banks, which combine the classic seed bank with on-site conservation through the process of cultivating it in farmers' fields"*

The representative of UAWC also explained that its presentation of the purified seeds through modern equipment is the largest example of using technology in the local seed sector, *"By providing local seeds and some agricultural supplies"*.

There is great importance for technology globally and the evidence of technological progress in all areas of life in general and the agricultural sector particularly, hence the importance of agricultural seed technology at several levels of production, preservation, distribution, etc. Therefore, an Agri-technology sector in general and seed technology, in particular, must be governed. The importance of the technological aspects of this sector and, the priority it carries with to reach an integrated strategy for the Palestinian local seed sector.

4.4. Temporal interdependency:

This factor has one topic related to the turning point in the issue of local seeds, where the issue of local seeds has become the focus of attention in the region, which has made funding and projects recurring.

4.4.1. The Turning point

In this factor and when asking the next question

How about the recent interest in local seeds: are things getting better or worse?

The representative of UAWC answered an explanation of the beginning of interest in local seeds in the region 20 years ago, and it came as follows, *"During the twenty years, the threat of local seeds appeared and institutions interest appeared, and this helped to preserve many seeds, but greater effort is required, because the diversity is very high in our country."*

When asking the question to PARC, emphasized that the local seed Banks were important step and a turning point for work, and he contributed in one way or another to preserving many seeds from extinction, as he said, *"that the various seed banks in the country improved the situation of local seeds in general and kept the seeds from being lost, because without their presence and save, more varieties would have been lost and damaged and it will be difficult to obtain and identify them"*

As for the representative of NARC, he explained the importance of the local seed bank, but he indicated that the efforts made were less than the required level, *"There is interest, but the problem is that the efforts are scattered, and depend primarily on the projects not on the basic capabilities of the institution. There are efforts, but not to the level we aspire to, as existing work it is minimal"*

Here, the representative of the Environmental Quality Authority said, as efforts need greater cooperation between local seed institutions and he explained that despite the exerted effort, many varieties were lost, as he said, *"There is greater awareness among the institutions, but the existing interest is less than the ambition that we were looking for, as there are many assets that have been lost and the loss of these assets is not a loss for Palestine but for the whole world."*

Hence, we see that the turning point has started through the institutions' interest in municipal seeds in the past, Unfortunately, however there indicates that part of the projects that have been implemented previously and are currently being implemented are temporary projects, not sustainability projects, and do not support a sustainable solution to the problem of local seed.

However, it cannot be considered that these projects do not work to stabilize local seed state, on the contrary, in the current situation, the implementation of any project related to local seeds contributes to preserving them.

What is being done until this day in terms of provisions related to local seeds are only efforts of the institutions. A law governing local seeds has not been launched to this day, the representative Ministry of Agriculture says: It is still working on this issue and everything that has been implemented is done through external funds without a plan or organization.

Chapter 5: Conclusion and Recommendations

5.1. Conclusion:

In this chapter, the results are presented in the form of a policy brief for improving the management of the local seed sector in the Palestine, this can be investigated through the various relationships and interventions between governmental and non-governmental sectors in local seed sector that will have effect the management of this sector in Palestine based on the CIT theory.

From here we review the following

Policy brief

Overview:

All countries of the world are trying to preserve their pure strains from their local seeds, as they are a source of biodiversity and genetic yield, and it is important to know that developed countries have made great strides in preserving local seeds.

This policy aims to guide and make recommendations to policymakers in Palestine about the roles they can play in designing and implementing methods for controlling and maintaining the local seed sector.

Problems and challenges:

Palestine is famous for its genetic resources and its diverse local seeds, which makes the task of preserving the seeds more difficult. The main challenge will be how to preserve the local seeds and how to collect them, which represent the essence of the agricultural work in the country, as all countries of the world and whatever hybrid seeds are produced still continue to preserve its native seeds are used in the seed improvement process.

Limited access to resources and limited capacity remains one of the major problems that the government must respond to, and the challenges will then be in urging policymakers to establish a policy and adhere it.

They should increase research, innovation and volunteer in this field, making use of the highest efficiency from the available funds in light of the low or almost non-existent government budget to finance research and development projects, especially since this field lacks sufficient data to take advantage of all available resources.

Aims and objectives:

Among the main objectives of this policy is to provide recommendations that help improve the local seed sector in the region on several levels.

So, a number of objectives for the primary policy and legal priorities to promote local seed have been proposed:

- Support smallholder farmers and their families in the restoration and regeneration of local plant species and varieties.
- Recognize and reward farmers' joint efforts to protect agricultural biodiversity, as well as the cultural values and expertise associated with it.
- These local genetic resources, as well as related information, should be respected and preserved.
- Ensure that these services are open and usable in a reasonable manner (through proper access and benefit-sharing arrangements).
- facilitate the link to the local, national, and foreign efforts.
- Assist farmers in organizing themselves and improving their organizational ability on a technical and financial level.
- Disseminate and encourage the outcomes that local seed banks have produced.

Many stakeholders participate in this policy at data collection stage to enhance the researcher background to produce this policy mainly and have a major role in developing and implementing laws and regulations. Other partners can enhance, facilitate and implement this initiative from the private sector, NGOs, farmers' community, and government agencies mainly.

The scope of this policy is to identify the stakeholder and actors in the local seed sector and allocate roles.

To create a sound policy, we need to utilize all kinds of resources, to facilitate the task and provide specific results

The main objective of this research is to shed light on the importance of the local seed sector and to clarify a number of problems faces in the region, and the importance of preserving and protecting local seeds. As a result, the following conclusions can be drawn:

Although working on local seeds requires a very long time and effort, in the long term it will be effective, as preserving and protecting local seeds is a national task.

The process of protecting local seeds requires raising awareness at all levels, and educating all stakeholders about their responsibilities towards this sector

5.2 Recommendations

The researcher recommends some points on different levels to be considered by all local seed relevant stakeholder:

At the Ministry level

1. Development of ministerial institutions specialized in improving and producing local seeds (National Seed Bank)
2. Cooperating with other countries to make national seed banks similar to what they have to gain experience in this sector
3. Organizing training courses for farmers and agricultural engineers continuously according to the seasons and clarifying the importance of local seeds.
4. Gather local information and the experiences available from farmers, verify the information in a thoughtful manner to develop the information and adopt it as sound and reliable information.
5. Preparing more studies on local seeds by preparing studies and issuing brochures and posters on local seeds and their importance
6. Conducting laboratory genetic research studies (genetic maps) for local varieties to name them to make records and lists that distinguish between alien and municipal varieties.
7. Facilitate partnerships with non-governmental actors in the local seed sector
8. Allocate a reasonable budget to cover the activities required to manage the local seed sector
9. Organizing laws and legislations related to local seeds in order to preserve them and protect them from extinction

At the level of civil and non-governmental institutions:

1. Developing existing local seed banks and seeking to open new branches at the governorate level
2. Cooperating in establishing local seed banks with government agencies
3. Supporting farmers in marketing their local varieties and related products at reasonable prices
4. Providing farmers and those in need of local seeds free of charge or at a nominal cost to ensure the continuity of projects
5. Facilitating the establishment of real partnerships between different institutions and also with the government sector
6. Financial support for farmers with expanded reclamation projects that will serve the farms and focus, through these projects, on local agriculture.
7. Focus on financing that ensures project sustainability.

In addition, to facilitate the implementation of this initiative, the following steps should be taken:

1. Establishing local seed banks at the national level
2. Utilization of available funding
3. Enhance the volunteer work in the field of local seed
4. Capacity building and training of professionals needed to exploit technology in seed collection and preservation.
5. To stimulate applied research in all aspects of local seed sector
6. Institutional implementing and organizing framework, the national authority that will have the mandate and legal power to effectively enforce them should be defined by seed laws.

5.3 Limitations of the study:

1. Difficulties in collecting such data and details related to local seed, which resulted in certain figures and statistics being out of date, as the limited number of local seed studies are available.

2. Difficulties in validating such data resulted in repeated interviews within the same organizations with officials and decision-makers at a deferred stage.

References:

- Bressers, H. (2007). Contextual Interaction Theory and the Issue of Boundary Definition: Governance and the Motivation, Cognitions and Resources of Actors.
- Brynard, P. (2005). "Policy Implementation: Lessons for Service Delivery." Pp. 649–64 in *Journal of Public Administration*. Vol. 40.
- Dewi,G, González,V. (2015). Conserving Traditional Seed Crops Diversity. GSDR 2015 Brief
- FAO.(2012). Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture
- FAO. (2015). Voluntary Guide for National Seed Policy Formulation.
- Ingram, H.(2011). "Beyond Universal Remedies for Good Water Governance." Pp. 241–61 in *Water for Food in a Changing World*.
- Garí,J. (2003). "Agrobiodiversity Strategies to Combat Food Insecurity and HIV/AIDS Impact in Rural Africa "." *Development Gateway*.
- Lewis, V., and Mulvany,PM. (1997). A Typology of Community Seed Banks.
- Louwaars,N, Conny J. M. Almekinders. (2002). "Seed Regulatory Frameworks in a Small Farmer Environment." *Journal of New Seeds* 4(1–2):177–93.
- Louwaars, N. (2007). *Seeds of Confusion : The Impact of Policies on Seed Systems*.
- Louwaars, N, Le Coent,P and Osborn,T. (2010). *Seed Systems and Plant Genetic Resources for Food and Agriculture*.
- Louwaars, N. (2005). "Seed Laws: Biases and Bottlenecks."
- Louwaars, N., and Walter Simon De Boef. (2012). "Integrated Seed Sector Development in Africa: A Conceptual Framework for Creating Coherence between Practices, Programs, and Policies." *Journal of Crop Improvement* 26(1):39–59.
- Schillinger, J. (2016). "Adapting to Water Scarcity in the Israeli-Palestinian Conflict."
- Tanentzap, A., Lamb,A, Walker,S, and Farmer,A. (2015). "Resolving Conflicts between Agriculture and the Natural Environment." *PLoS Biology* 13(9):1–13.
- Visser, B. (2017). *The Impact of National Seed Laws on the Functioning of Small-Scale Seed Systems*.

Song, Y. and Vernooy, R.(2010) Seeds and Synergies: Innovating Rural Development in China, Practical Action, Bourton on Dunsmore, UK, and International Development Research Centre, Ottawa, Canada.

Malik, S., Singh, P, Singh, A., Verma, A., Ameta, N. and Bisht, I. (2013) Community Seedbanks: Operations and Scientific Management, National Board for Plant Genetic Resources, New Delhi, India

المراجع باللغة العربية:

- جابر (1999) المحافظة على بذور واصناف الخضار المحلية. رام الله: جمعية التنمية الزراعية (الإغاثة الزراعية) دائرة الارشاد وتطوير الأراضي
- جمعية المهندسين الزراعيين العرب (2012م) مقارنة بين البذور البلدية والمهجنة, البيرة , فلسطين
- الدعاجنة.ح (2006م) أثر المنخفضات الجوية على الزراعة في دولة فلسطين , مؤتمر تحديات التنمية الزراعية في فلسطين رام الله فلسطين
- الرجبي.م (2013) القيمة الاقتصادية والاجتماعية للبذور البلدية من وجهة نظر المزارعين في جنوب الضفة الغربية القدس فلسطين
- السعيد ح(2004) دور المنظمات غير الحكومية في الحفاظ على البذور البلدية نشرة دورية تصدر عن برنامج التوعية الجماهيرية التابع لمشروع التنوع الحيوي الزراعي العدد الثالث الإغاثة الزراعية الفلسطينية فلسطين
- شتية.م.س (2005) انشاء بنك بذور مجتمعي للزراعة شبه الجافة في فلسطين: البنية والإدارة والوظائف. مركز أبحاث التنوع الحيوي والبيئي, تل نابلس فلسطين
- فيرنوي, ر. (2003). البذور المعطاءة التربية التشاركية للنبات. المركز الدولي للبحوث الزراعية في المناطق الجافة ايكارد
- كرزم.ج(2010) نحو استراتيجية زراعية بديلة ومعتمدة على الذات , تقرير مركز العمل التنموي معا, رام الله فلسطين
- كرزم. ج 2011 افتقار الزراعة الفلسطينية الى التخطيط لمواجهة سياسة الاحتلال الهادفة الى تدمير الاقتصاد الفلسطيني , مجلة الافاق (البيئة والتنمية) العدد 40 مجلة الكترونية شهرية مركز العمل التنموي معا رام الله فلسطين
- معهد الأبحاث التطبيقية اريج (1996) التقرير الفني السنوي لنتائج المشاهدات وحدة البحوث والتنوع الحيوي القدس
- هريمات.ن.ش (2001) واقع البذور البلدية في فلسطين وتجربة المعهد الأبحاث التطبيقية- القدس في هذا المجال بيت لحم : معهد الأبحاث التطبيقية - القدس اريج

Appendices

Appendix 1: Interview questions

Appendix 2: Atlas.ti analysis (code group's networks)8.

Appendix 3: Local seed Palestinian legislation

Appendix 1: Interview questions

Here is the main topics that have been discussed at the interview:

1. To find cooperation to save local seeds:

1. In your opinion what is the importance of maintenance of local seeds?
2. In your opinion: is the importance of local seeds take place by save it or by reproducing it?
3. What about the local seeds, how do you produce it, how do you get it, how do save it and
4. How do you give to the farmers?
5. Is there is a strategy to manage local seeds, and if there is a one did you participate in making it?
6. What are the obstacles you face in planning for local seeds field?
7. How about the recent interest in local seeds: are thing getting better or worse?

8. To evaluate how much are the farmers' cooperative to use local seeds.

1. How much are the farmers interested to use local seeds?
2. What is the reason behind famers decrease interest in producing local seeds?
3. What is the probability to replant local seeds and do you have plans for this?

4. Organize the relation between farmers, seedbanks and municipality of agriculture

1. How does the institution work to support the local seeds at the current time?
2. Is it possible to cooperate with municipality of agriculture and other private institution to get the necessarily budget?

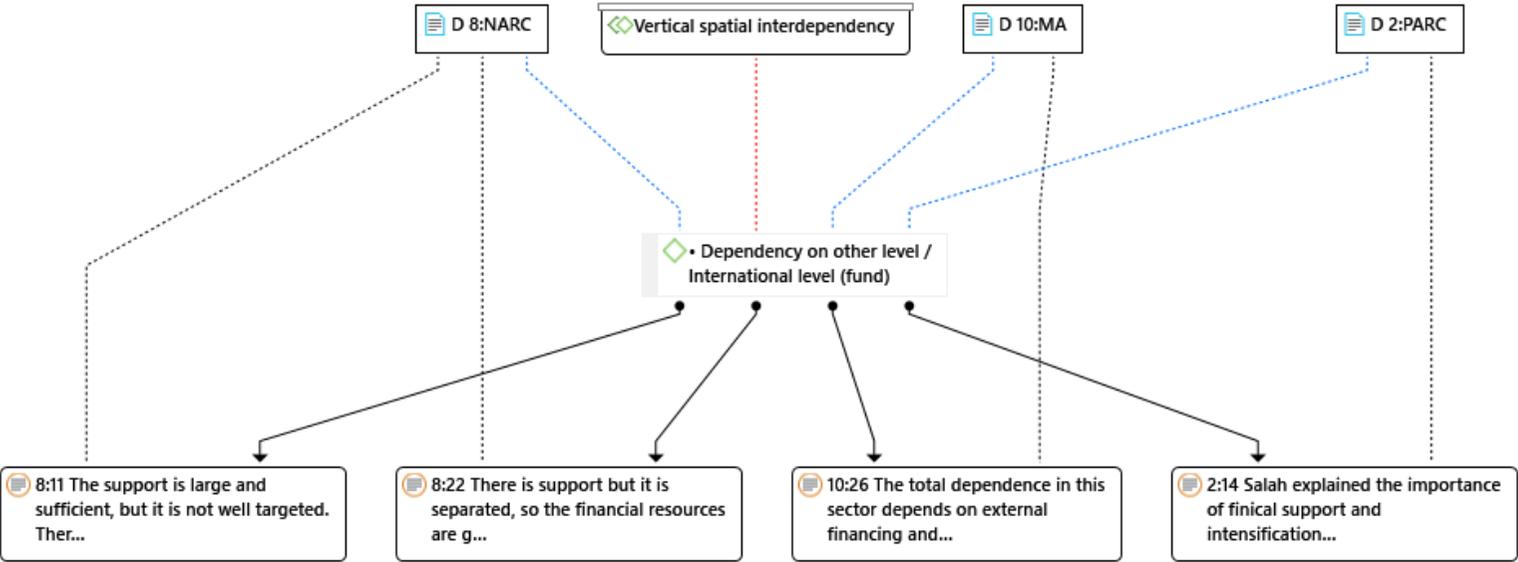
3. To support the development of local seeds manufacture.

1. Does the budget of local seeds and its support is enough? On the other hand, do we need to increase its' budget?
2. What are the tools that used to save and improve local seeds by municipality of agriculture?

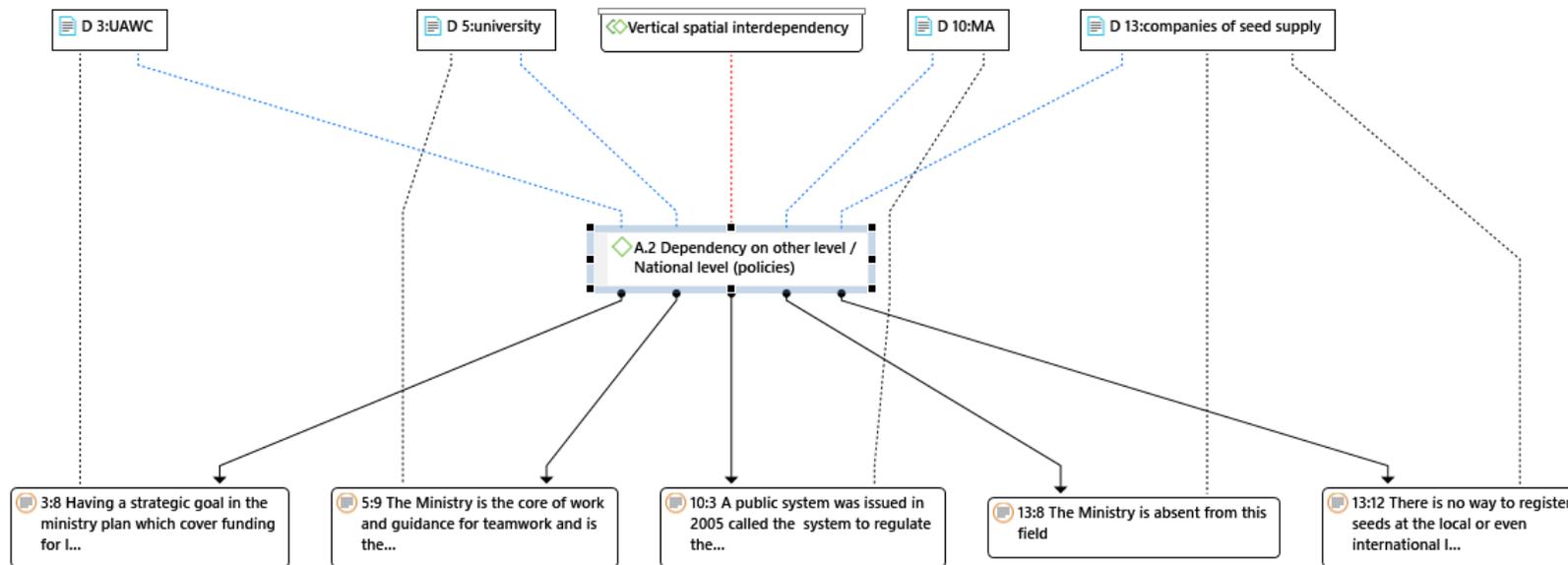
3. In your opinion what are the things that required from municipality of agriculture to facilitate and support local seeds usage?
4. Do you have a recording system for local lands?.

Appendix 2: Atlas.ti analysis (code group's networks)

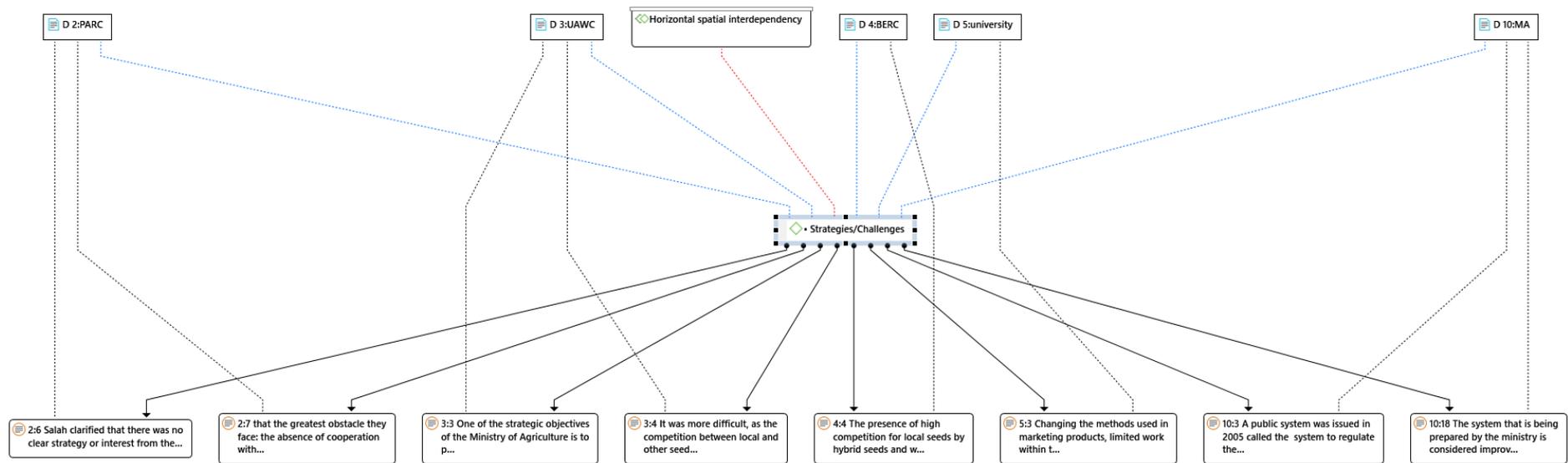
1. The Network of Group Code of Vertical spatial interdependency related to Dependency on international politics (fund)



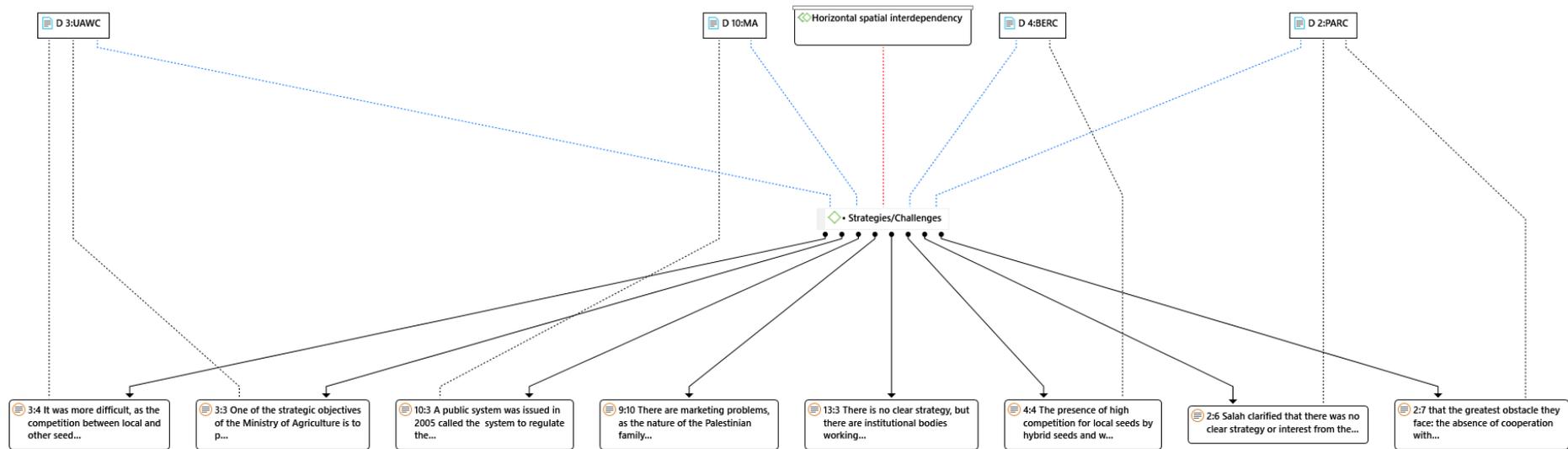
2. The Network of Group Code of Vertical spatial interdependency related to Dependency on National level (policies)



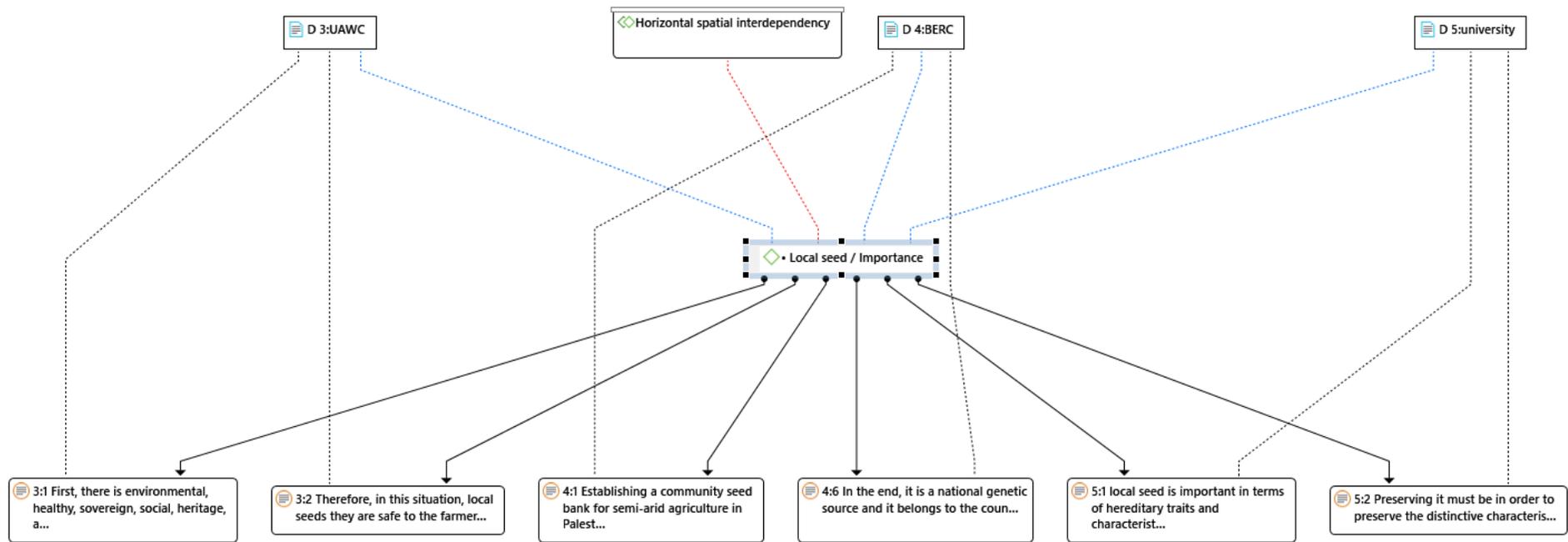
3. The Network of Group Code of Horizontal Spatial Interdependency related to Strategies / Challenges



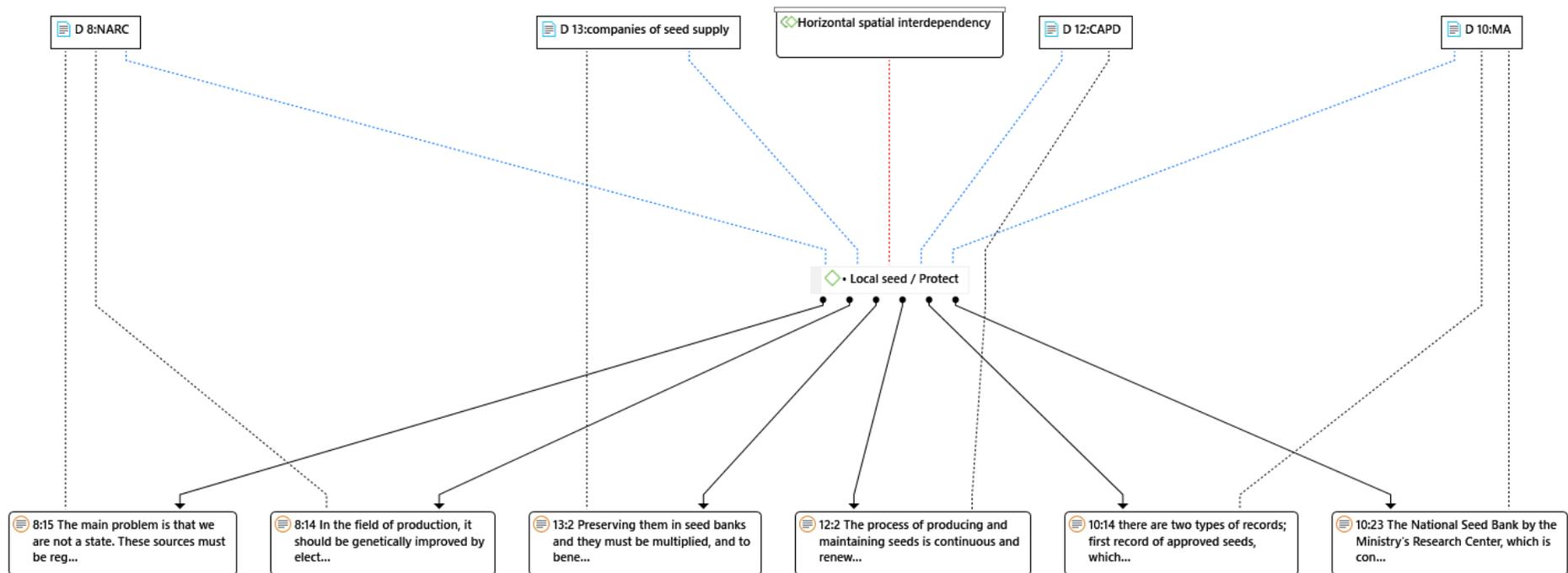
4. The Network of Group Code of Horizontal Spatial Interdependency related to Strategies / Cooperative point



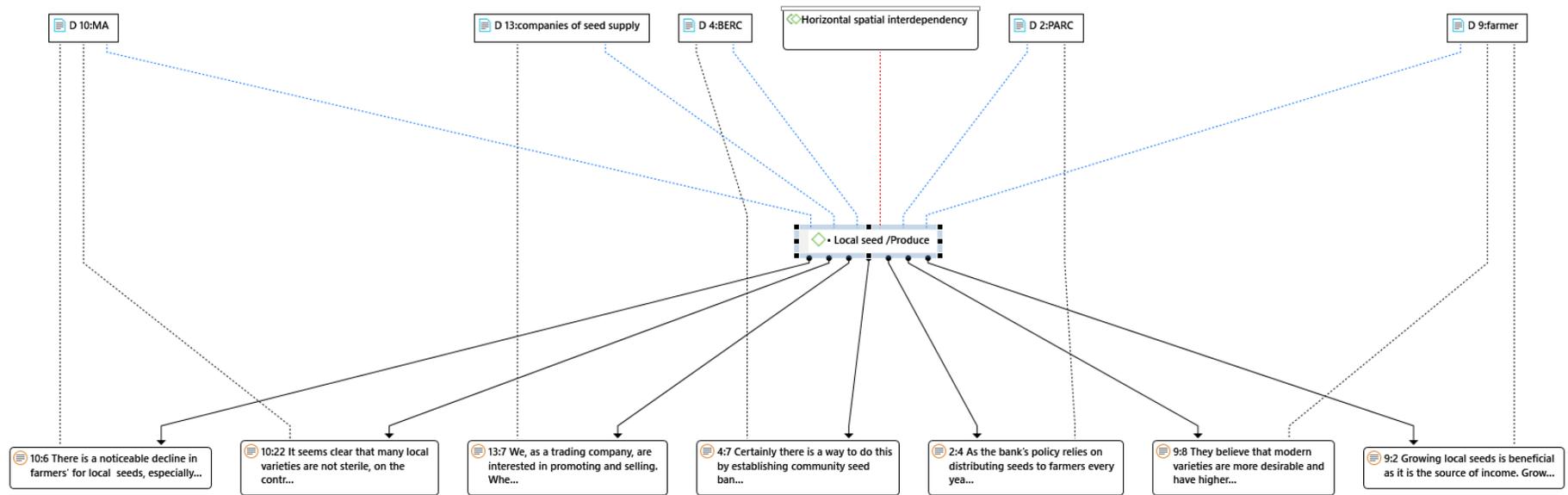
5. The Network of Group Code of Horizontal Spatial Interdependency related to Local seed / Importance



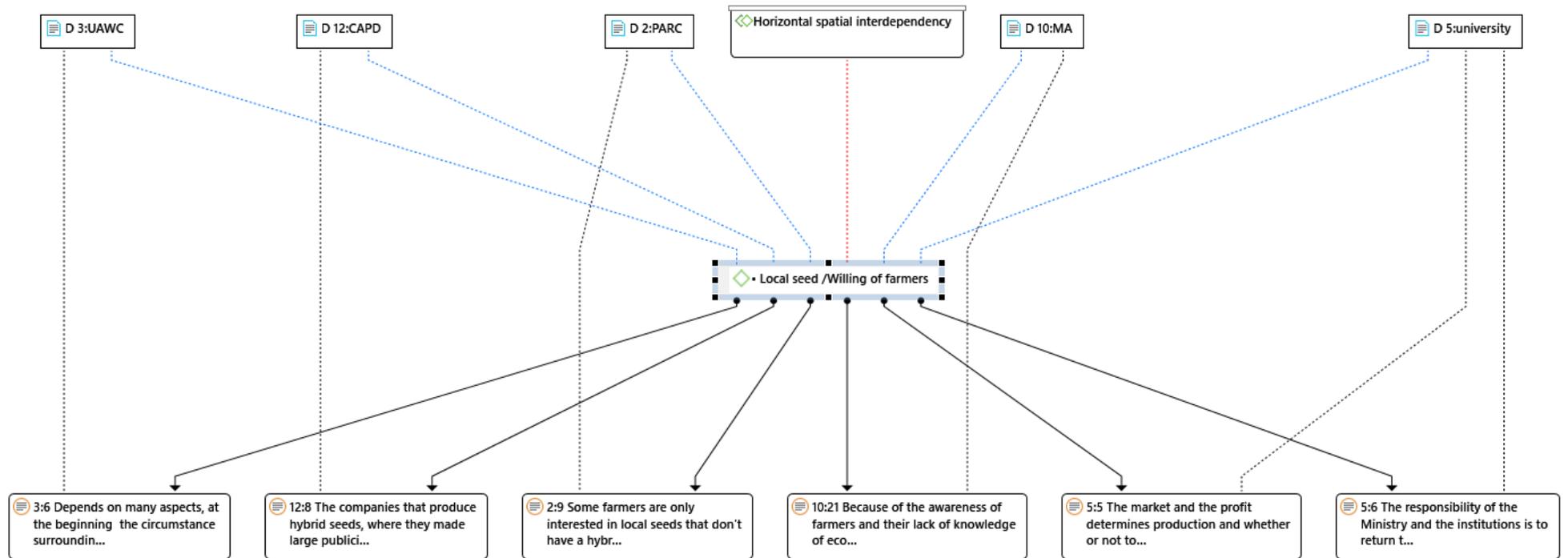
6. The Network of Group Code of Horizontal Spatial Interdependency related to Local seed / Protect



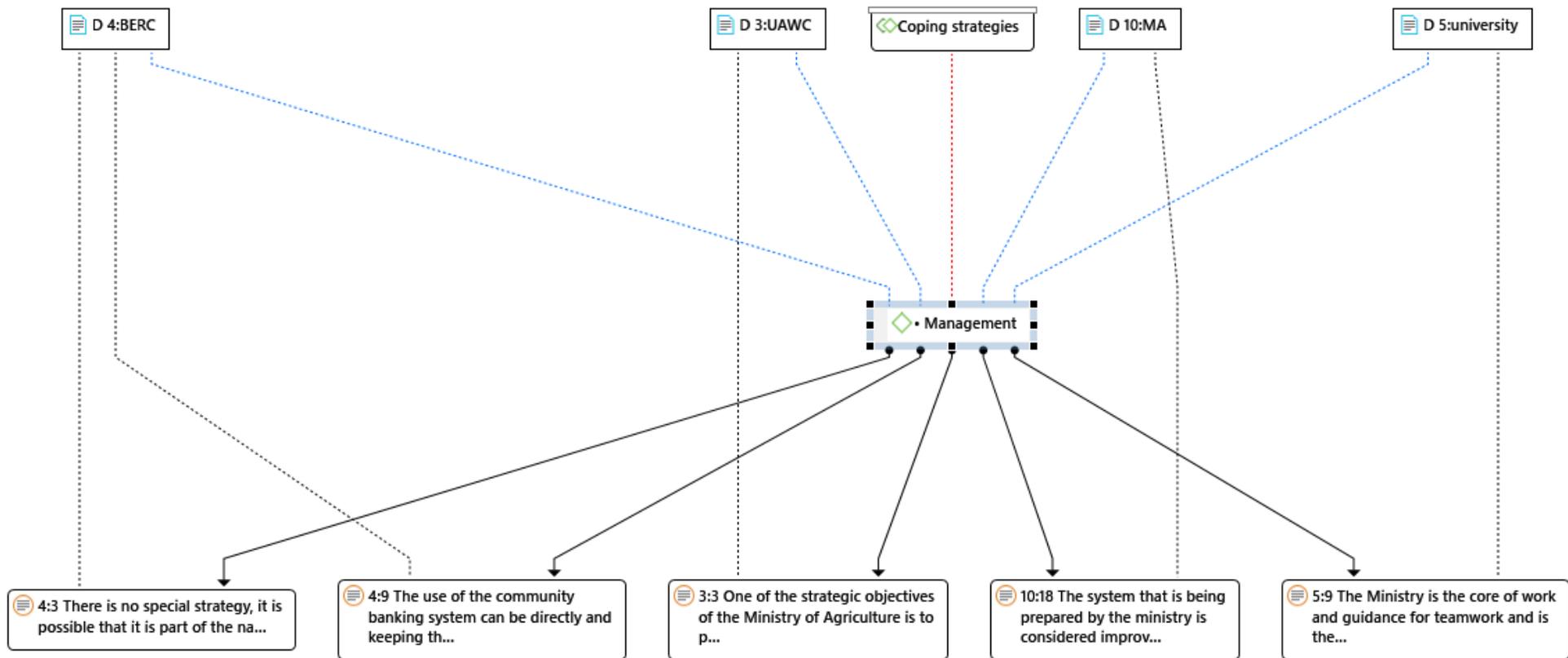
7. The Network of Group Code of Horizontal Spatial Interdependency related to Local seed / Produce



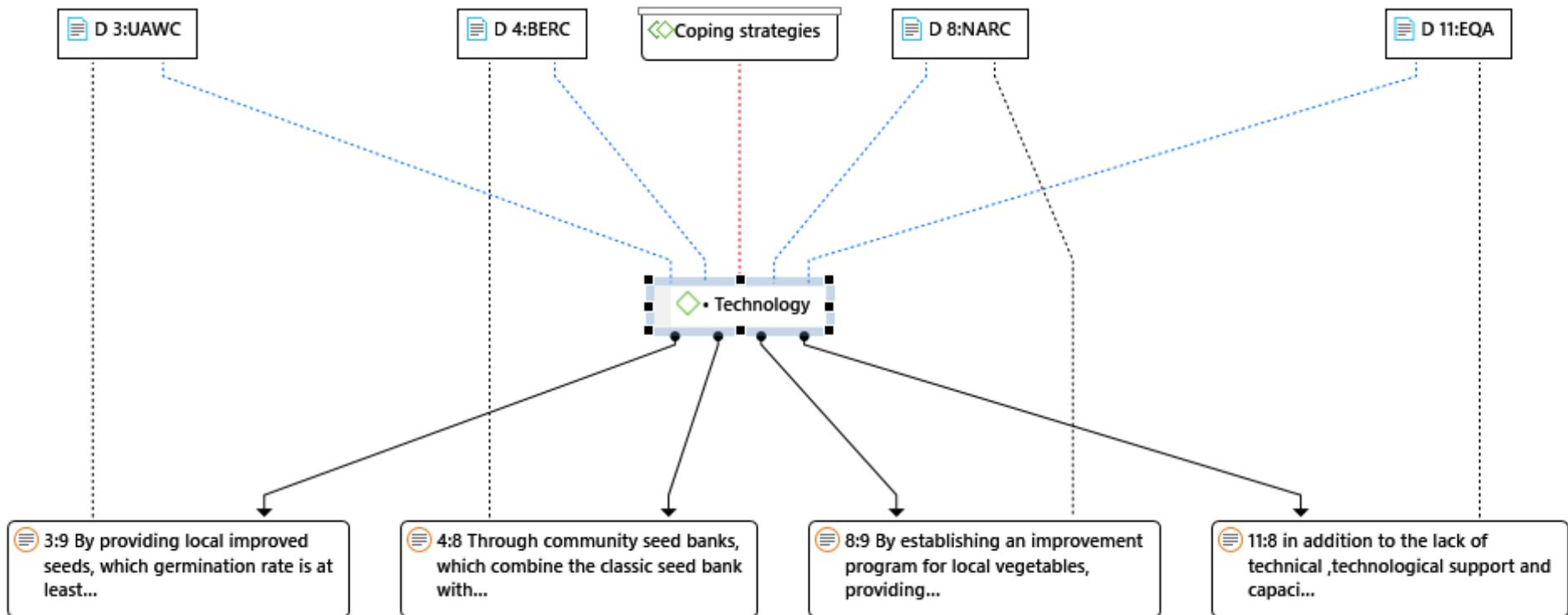
8. The Network of Group Code of Horizontal Spatial Interdependency related to Local seed / Willing of farmers



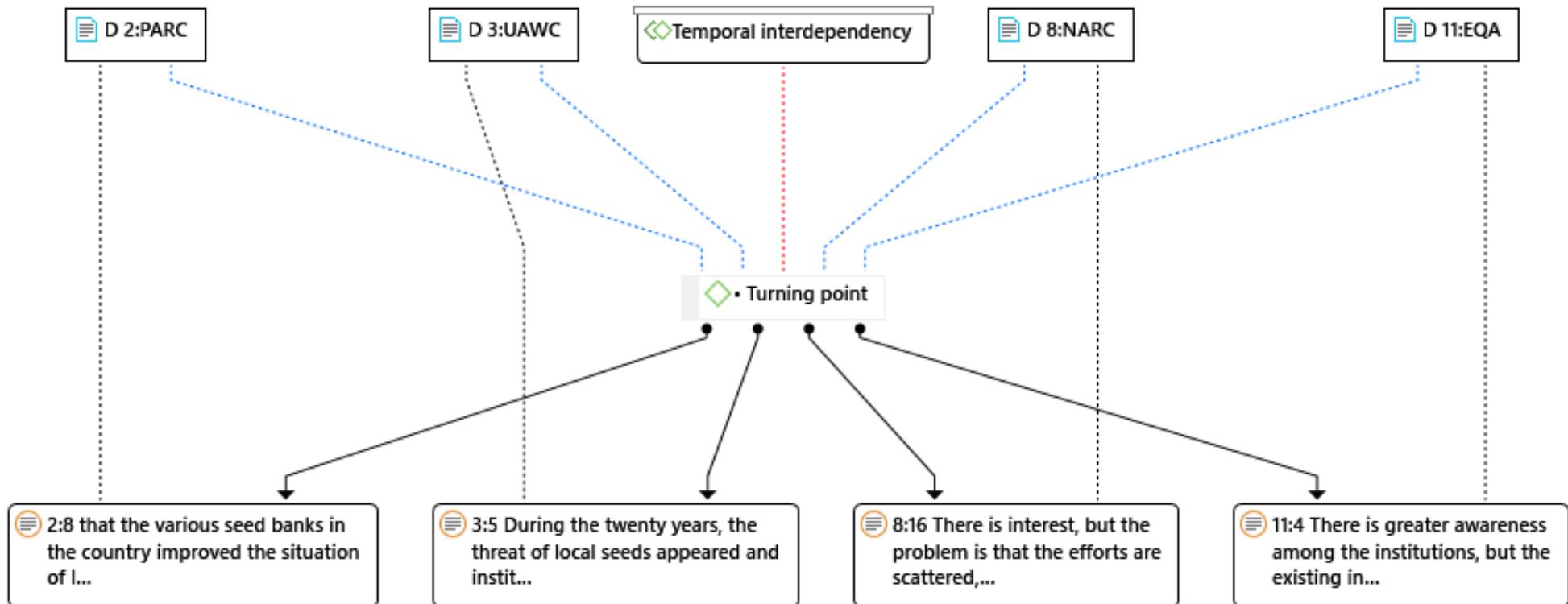
9. The Network of Group code of Coping Strategies related to management



10. The Network of Group code of Coping Strategies related to technology



11. The Network of Group Code of Temporal Interdependency related to turning point



Appendix 3: Local seed Palestinian legislation

TITLE TWO GENETIC RESOURCES AND PRODUCTION OF SEEDS AND CUTTINGS CHAPTER I AGRICULTURAL GENETIC RESOURCES

Article (27)

Agricultural genetic resources shall be deemed to be a property of the state and shall be subject of the principle of national sovereignty. The state shall also respect the individual property rights in the common local strains.

Article (28)

In coordination with other competent authorities, the Ministry shall conserve the agricultural biodiversity and use it in conformity with the public policy in the following manner:

1. List local genetic strains and origins.
2. Preserve and protect genes and genetic origins.
3. Adopt particular sources and mechanisms to reproduce genetic origins and strains.

Article (29)

In coordination with other competent authorities, the Ministry shall define the components of agricultural biodiversity which require urgent protection measures. In this regard, the Minister shall issue forth decisions that regulate the following issues:

1. The mechanism of preserving and regulating the database.
2. Define methods and conditions of the taking of data.
3. Define the appropriate technologies.
4. Define the processes and activities which involve or may lead to negative effects on the conservation of agricultural biodiversity as well as its permanent use.

Article (30)

The launching of living beings which are modified through biotechnologies and which pose a danger to the health of humans or animals or bear a negative impact on the environment or which may threaten the agricultural biodiversity, shall be prohibited.

Article (33)

In accordance with the provisions of the Law, scientific research may not be developed and implemented nor shall the transference of biotechnologies based on genetic resources take place except by permission from the Ministry.

Article (34)

In implementation of the provisions of this Law, the Ministry shall be entitled to conclude agreements and exchange information in regard of genetic resources, agricultural biotechnologies and relevant patents. In addition, the Ministry shall have the right to exchange scientific and technical information with the signatory countries as well as develop and implement joint cooperation programmes in respect of obtaining various resources and assistance thereon in a manner that does not violate the protection of intellectual rights.

Article (35)

The Minister shall issue forth instructions on the regulation of the management of agricultural biological resources in order to preserve, protect and use them in sustainable development; the conditions on obtaining licences for the importing and transportation of genetic resources and biotechnologies; and the form of the licence and payable fees. The Minister shall also be entitled to define the types, varieties and strains which are threatened of extinction.

[http://legal.pipa.ps/files/server/ENG%20Law%20on%20Agriculture%20No_%20\(2\)%20of%202003.pdf](http://legal.pipa.ps/files/server/ENG%20Law%20on%20Agriculture%20No_%20(2)%20of%202003.pdf)

Abstract in Arabic:

دراسة الإطار التشريعي لإضفاء الطابع المؤسسي لإدارة البذور البلدية بين المزارعين

اعداد: انعام يسري حربي عمرو

بإشراف: د. جواد حسن شقير

الملخص:

الزراعة هي المصدر الأساسي لتوفير الغذاء على وجه الأرض وستظل كذلك مع الازدياد الكبير في عدد السكان في العالم. ويوجد العديد من المدخلات الزراعية، واحد اهم هذه المدخلات البذور، وتعد البذور عنصرا أساسيا في تحديد العملية الزراعية.

وتوافر البذور بشكل مستدام من اهم العوامل المؤثرة على العملية الزراعية، وتعتبر البذور البلدية هي الحل المستدام لتوفير البذور بشكل دائم لدى المزارعين، ويتم تعريف الصنف المحلي على انه الصنف النباتي لمحصول معين يتم انتاجه من قبل المزارعين التقليديين من خلال زراعته في منطقة معينة على مر العصور ويتم اختيار النباتات المتفوقة، ويتم تكيف الصنف مع الظروف البيئية المحيطة والذوق العام واستخدامات المجتمع

أصبحت البذور المحلية مهددة بسبب إيجاد بدائل من قبل الشركات التجارية ببذور هجينة لها القدرة على ان تقاوم الظروف البيئية الصعبة والفيروسات والامراض ولكن لا يمكن اكاثرها من قبل المزارعين بشكل طبيعي الا ان انتاجها العالي ومقاومتها أدى الى تراجع استخدام البذور البلدية وانقراضها.

وتكمن مشكلة الدراسة في عدم وجود استراتيجية او خطة وطنية لدعم البذور البلدية وتشجيع المزارعين على استخدامها، وبالتالي ستنم مناقشة أسباب الابتعاد عن استخدام البذور البلدية وتقديم توصيات لإدارة قطاع البذور البلدية وتقديمها للجهات المعنية من اجل المساعدة في تحسين أوضاع قطاع البذور البلدية

ومن اجل هذا الهدف تمت مراجعة القوانين المشروعة المتعلقة بالبذور البلدية في القانون الفلسطيني وكل ما يتعلق بها من أوامر ومن ثم تم تجهيز محاور رئيسية لمناقشة الجهات ذات العلاقة ومقابلتهم للوصول الى توصيات تزيد من فعالية المشاريع المتعلقة بالبذور البلدية وتم تطوير منهجية كاملة من انشاء أسئلة المقابلات وجمع بيانات البحث

تم تحليل البيانات التي تم الحصول عليها من المقابلات ومراجعة المستندات باستخدام طريقة التحليل الخاصة بالنظام للترابط السياقية وترميز المعلومات من خلال برنامج الاطلس، الغرض من تحليل البيانات هو إيجاد الترابط بين جميع العوامل ذات الصلة واستراتيجيات المواجهة في فلسطين لدارة البذور البلدية.

وفي النهاية نلاحظ ان جميع دول العالم تحاول الحفاظ على سلالاتها النقية من بذورها المحلية، فهي مصدر للتنوع البيولوجي والمحصول الوراثي، ومن المهم معرفة أن الدول المتقدمة قد قطعت أشواطاً كبيرة في الحفاظ على البذور المحلية. ونتيجة لذلك، تم تطوير سياسة تهدف إلى توجيه وتقديم التوصيات لصانعي السياسات في فلسطين حول الدور الذي يمكنهم لعبها في تصميم وتنفيذ أساليب للتحكم في قطاع البذور المحلي تطويره. حيث يجب زيادة البحث والابتكار في هذا المجال، والاستفادة من الأموال المتاحة للمشاريع المتعلقة في البذور البلدية في ظل انخفاض الميزانية الحكومية أو شبه انعدامها لتمويل مشاريع البحث والتطوير، خاصة وأن هذا المجال يفتقر إلى البيانات الكافية للاستفادة منها.

كما تمت التوصية ببعض النقاط على مستويات مختلفة للنظر فيها من قبل جميع أصحاب المصلحة المحليين المعنيين بالبذور، على مستوى الوزارة مثل تطوير المؤسسات الوزارية المتخصصة في تحسين وإنتاج البذور المحلية (بنك البذور الوطني)، والتعاون مع البلدان الأخرى لجعل بنوك البذور الوطنية مماثلة. إلى ما لديهم من خبرة في هذا القطاع، تنظيم دورات تدريبية للمزارعين والمهندسين الزراعيين بشكل مستمر حسب المواسم وتوضيح أهمية البذور المحلية بالإضافة إلى جمع المعلومات المحلية والخبرات المتاحة من المزارعين، والتحقق من المعلومات بطريقة مدروسة لتطوير المعلومات واعتمادها كمعلومات سليمة وموثوقة.

أيضاً، بعض النقاط على مستوى المؤسسات الأهلية وغير الحكومية مثل

تطوير بنوك البذور المحلية القائمة والسعي لفتح فروع جديدة على مستوى المحافظات، والتعاون في إنشاء بنوك بذور محلية مع الجهات الحكومية، ودعم المزارعين في تسويق أصنافهم المحلية والمنتجات ذات الصلة بأسعار مناسبة، وتوفير المزارعين والمحتاجين إلى بذور محلية خالية من البذور. تهمة أو بتكلفة رمزية لضمان استمرارية المشاريع. تسهيل إقامة شراكات حقيقية بين المؤسسات المختلفة وكذلك مع القطاع الحكومي، بالإضافة إلى الدعم المالي للمزارعين بمشاريع استصلاح موسعة تخدم المزارع وتركز من خلال هذه المشاريع على الزراعة المحلية والتركيز على التمويل الذي يضمن المشروع الاستفادة.