

CHAPTER ONE

Comprehensive Inventory Report on No-dig Farming

No-dig farming is a non-digging farming technique that seeks to improve soil health and promote biodiversity. It is a method of growing plants without disturbing the soil. This is done by adding organic matter, such as compost or manure, to the soil surface and allowing it to break down naturally. The organic matter helps improve the soil structure, aeration, and drainage and provides nutrients for the plants. No-dig farming can be used to grow a variety of crops, including vegetables, fruits, and flowers. It is a sustainable method that can help improve soil health and eliminate reliance on the use of pesticides and synthetic fertilisers since it mainly follows the principles of organic farming.

Charles Dowding is an English horticulturalist and author who has pioneered modern no-dig gardening and organic soil management techniques in farming since 1983. He is the author of several books on gardening, including "No Dig Gardening" and "The No Dig Handbook". Dowding's no-dig method is based on the principle of leaving the soil undisturbed as much as possible so that soil life can continue to help plant roots grow. He recommends adding organic matter to the soil surface once a year, such as compost or manure. Dowding's no dig method has been shown to be effective in producing healthy food and creating productive gardens with minimal effort.

Dowding was born in 1956 in Somerset, England. He studied at the University of Cambridge and worked as a research scientist before becoming a full-time gardener in 1983. He founded the No Dig Gardening website in 2006 and has since become a leading advocate of no dig gardening. Dowding is a passionate advocate for organic gardening and believes that it is the best way to grow healthy food and protect the environment. He is a regular speaker at gardening events and has appeared on television and radio programs. Dowding is a tireless campaigner for no dig gardening and his work has helped to make it a more popular and accepted method of gardening.

Here are some of the benefits of no-dig farming:

- Improves soil health: No-dig farming helps to improve soil structure, aeration, and drainage. This makes the soil more hospitable for the benefit of soil organisms, such as

earthworms and bacteria. These organisms help to break down organic matter and release nutrients into the soil, which can be used by plants.

- Reduces/Eliminate the need for pesticides and fertilizers: No-dig farming can help to reduce the need for pesticides and fertilizers. This is because the healthy soil that is created by no-dig farming is less susceptible to pests and diseases. Additionally, the organic matter that is added to the soil helps to provide nutrients for the plants, which can reduce the need for fertilizer.
- Conserves water: No-dig farming helps to conserve water. This is because the organic matter that is added to the soil helps to improve the soil's ability to hold water. Additionally, the mulch that is often used in no-dig farming helps to prevent evaporation.
- It is more sustainable: No-dig farming is a more sustainable method of farming than conventional methods. In that it does not require the use of heavy machinery, which can damage the soil. It allows for manual or natural pest control and also aids in achieving a robust soil organic matter pool in a cost-effective manner. Thereby ignoring the need for pesticides and fertilizers which can have negative environmental consequences and cause food poisoning.

If you are interested in trying no-dig farming, there are a few things you need to do to get started. First, you need to choose a location for your garden. The location should be sunny and have well-drained soil. Next, you need to prepare the soil by adding organic matter. You can do this by adding compost, manure, or leaf mould. Once the soil is prepared, you can start planting your crops. Be sure to water your plants regularly and add more organic matter as needed.

No-dig farming is a great way to grow healthy, productive plants without harming the environment. If you are looking for a more sustainable way to garden, no-dig farming is a great option.

There are no iron-clad rules on how to setup a no-dig farm; it all depends on the place and the farmer. However, below are the general/common resource materials or items needed for no-dig farming.

- Land space: The first thing to consider is the availability of land space on which no-dig beds would be created. This landscape should ideally not be compacted or sealed (Figure 1).

- Compost: compost is spread on the beds of cardboard that are created on the land. Compost is usually a mixture of decaying green vegetation and manure, used as a fertilizer.
- Ropes and iron rods: iron rods are placed by first measuring distances on the land. Rope strings are then tied to the rods that have been pierced into the ground from one distance to the other to help maintain measurements across the land for which the beds are made.
- Wood chips: the wood chips help to separate or demarcate beds on the field and aid in the soil's water retention capacity. Wood chips can also help improve soil life/microbial activity (Figure 2).



Figure 1: A field being prepared for no-dig farming



Figure 2: Prepared beds separated by rows of wood chips for a no-dig farm

- Seeds: the seeds of the crops that are to be grown are needed to be sown in the compost beds that are created. Although many farmers prefer to first pot seeds at early stage of growth before transplanting on the no-dig beds but this can be ignored if pests like slugs or unfavourable weather condition does not apply in your local context.
- Cardboards: they are made from wood fibers, and as such, they are considered biodegradable materials in that they decompose more rapidly in moist soils (Figure 3).
- Wood beds: Woods are joined together to form beds that are placed on the rope from one side to keep measurement distances of beds across a field (Figure 3).
- Manure: they contain nitrogen, phosphorus, and potassium, all necessary for plant growth, so they are mostly used instead of fertilizers. The main aim of using manure is to support compost for healthy growth of plants. It is in most cases used in areas where soils are a bit more compacted and or degraded.
- Irrigation equipment: irrigation equipment such as a water source and sprinklers or drip irrigation systems are used to keep the garden watered (Figures 5 and 6).

Charles Dowding has comprehensive guides on starting no-dig gardens for different purposes on his website. For more information on starting a no-dig garden visit <https://charlesdowding.co.uk/start-no-dig/>



Figure 3: Cardboard and wood used to form bed spaces



Figure 4: Vegetables grown in a no-dig garden



Figure: A sprinkler irrigation equipment



Figure 6: A sprinkler system in operation

CHAPTER TWO

Investigation of No-dig Farming in the Netherlands

Purpose of the research

The purpose of this research is to investigate the knowledge and practise of the no-dig farming system among farmers in the Netherlands. Our intern (Tajudeen Ganiyu) explored his findings by interviewing local Dutch farmers about their agroecological farm practises and the roles and effects of these on the Dutch food system.

General research topic

The general research topic guiding this internship research is “the contributions of no-dig/regenerative farming practises to food sovereignty.”

The rationale of the study

The Netherlands is a small country with a high population density and a limited amount of agricultural land. As a result, there is a strong focus on sustainable agriculture in the Netherlands. No-dig farming is one of the sustainable agricultural practises that are being promoted in the Netherlands. The country has a long history of agriculture; the growing interest in no-dig farming in the Netherlands in recent years is due to a number of factors, including the increasing awareness of the environmental benefits it portends, the rising cost of energy and inputs, and the need to efficiently manage resources to maximise output and reduce greenhouse gas emissions.

No-dig farming has a number of environmental benefits. It helps to reduce soil erosion, conserve water, and improve air quality. It also helps to sequester carbon in the soil, which helps mitigate climate change. No-dig farming also has a number of economic benefits. It can save farmers time and money, and it can improve crop yields. In addition, no-dig farming can help improve the quality of food by reducing the amount of pesticides and herbicides that are used.

The purpose of this research is to interview farmers in the Netherlands about their knowledge and practise of no-dig farming. The research will explore the following themes: the motivations of farmers who practise no-dig farming; the mode and features of the practise of no-dig farming

by the farmers; the challenges and benefits of no-dig farming; and the prospects for no-dig farming in the Netherlands.

The research is important because it will provide valuable insights into the knowledge and practise of no-dig farming in the Netherlands. The findings of the research will help inform the development of policies and programmes to support the adoption of no-dig farming in the Netherlands and other countries.

The research will also contribute to the body of knowledge on no-dig farming. The findings of the research will be used to improve our understanding of the benefits and challenges of no-dig gardening. This information will be valuable to farmers, policymakers, and other stakeholders interested in sustainable agriculture.

Objectives of the research

The objectives of this research are:

1. To assess the understanding of farmers about no-dig/regenerative farming.
2. To ascertain the level of implementation of the no-dig/regenerative farming practises among farmers.
3. To assess the contributions of the no-dig/regenerative farming practises on productivity and the pillars of food sovereignty.
4. To ascertain the gaps in knowledge and practice of the no-dig/regenerative farming system.

Research questions for the no-dig/regenerative farming practices

The following were the proposed research questions to serve as a guide.

1. What is the no-dig farming system?
2. Why do you practice the no-dig farming system?
3. How are the nutrients in no-dig farming managed? And how does it flow?
4. From your experience, what are the consequences of no-dig to soil biodiversity?
5. What is the size of your no-dig farm?
6. How do you get land space for this farm?
7. How long have you been practicing the no-dig method?

8. How is water gotten? And what is/are the water retention capacity of the soil?
9. Do you apply organic fertilizer or chemical fertilizer to your no-dig farm?
10. How do you deal with pest-management?
11. What do you do with the residue?
12. What type of crops do you cultivate or is ideal to be cultivated in your farm?
13. What are the input and outputs from this farm?
14. What is the average amount spent per growing season?
15. How do you deal with rain and other severe weather conditions?
16. Where do you see the no-dig farming in the future?

Description of activities

The activities of the intern include: working with the no-dig, non-tilling arable farmers, and making inquiries on how natural capitals like land etc., are being managed, combating pests and weeds without chemicals, and how to build soil biodiversity, among other techniques that farmers may mention during interviews; compiling data and writing a report of findings of the research and; organizing a boerenuur (seminar) to present the results and hear what the current peasants think.

Mode of research

The aim of the research was to investigate the knowledge and practise of the no-dig farming system among farmers in the Netherlands. A qualitative research approach was adopted, eliciting responses from farmers regarding their understanding and experience of the no-dig farming system. A semi-structured interview was deployed using the research questions as a guide.

The data collected from interviewees was analysed using Atlas.ti, a computer-assisted qualitative data analysis software (CAQDAS) for coding and analysing data transcripts. The software facilitates the construction of a coding index for identifying keywords, phrases, themes, and patterns that emerge from the discussions for accurate interpretations.

What the intern will learn: At the end of this research, the intern would have learned how to mobilise food system actors, receive information, and give feedback to farmers and relevant authorities, gather data, create a report of findings, and organise a presentation seminar.

CHAPTER THREE

Results and Analysis Report of Findings

FINDINGS

This section is the presentation of findings of the study which is presented based on the objectives of the study.

OBJECTIVE ONE - To assess the understanding of farmers about no-dig/regenerative farming

To assess the understanding of the farmers about no-dig/regenerative farming, questions relating to meaning of no-did farming, reasons for practicing no-dig farming, consequences and challenges of practicing were asked. Findings are presented below with relevant quotations from the transcripts.

Meaning of no-dig/regenerative farming

As presented in figure 1, the farmers understand no-dig farming, this was expressed in various ways.

- **Farming without using machine** - In the words of Respondent 1, *“The no-dig farming is one that does not involve the use of plough and other tilling machinery, in other words its main aim is to protect and build soil biodiversity (RESPONDENT 1).* Respondent 8 affirmed that in no-dig farming,
You don't prepare the soil with machines but only hand work. So, that's for me the no-dig. In combination with giving the soil rest and also the animals and the insects and everything that's into the soil. No-dig helps you to achieve that (RESPONDENT 8).

- **Farming that does not disturb the soil** - Respondent 4 express that *“No-dig farming implies that you don't disturb the soil. You're not ploughing the soil, so you're not turning it upside down” (RESPONDENT 4).* Similarly, Respondent 5 explained that *“It means that you want to leave the soil as much as possible unturned and untouched, every time you touch the soil it's with great concern” (RESPONDENT 5).*

- **Farming that preserves soil life** - Furthermore, Respondent 7 expressed that

It is a way of farming where it is about the soil life instead of putting all the attention in the crops and like how to grow the crops, how to protect the crops, how to... So, it is like more coming from an understanding of, okay, like what is the value of soil life (RESPONDENT 7)

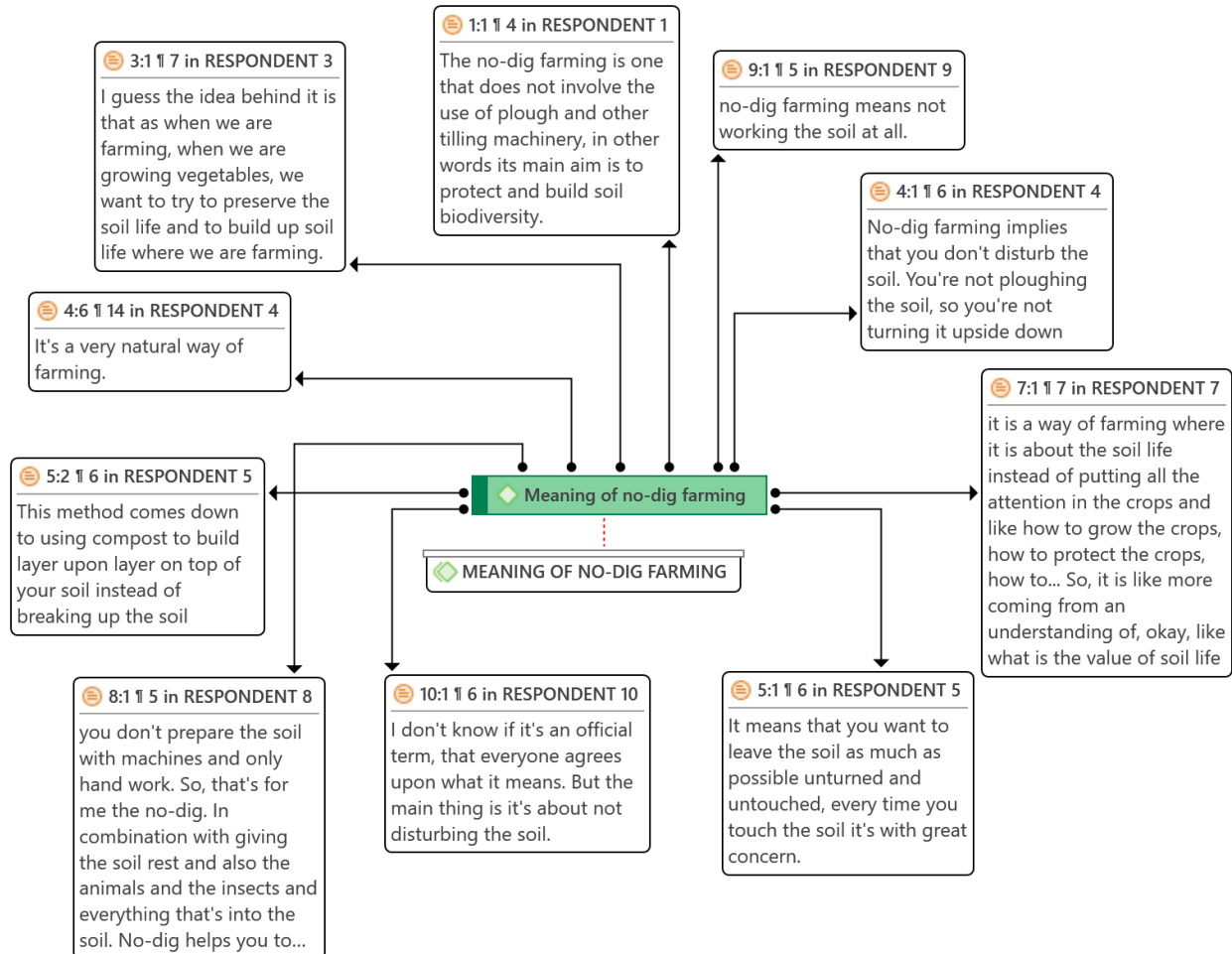


Figure 1: Meaning of no-dig farming

Reasons for practicing no-dig farming

As displayed in figure 2, the farmers enumerated various reasons why they practice no-dig/regenerative farming. These are:

- Aesthetic purpose
- Build soil biodiversity

- Continuity of the system
- Farming diversity
- Knowledge from reading
- Land economization
- Low cost
- Other Farmers' Experience
- Personal Experience
- Soil regeneration

Of all the enumerated reasons, almost all the interviewed farmers mentioned that they practice no-dig farming in order to build the soil life (Figure 3). Respondent 2 explained that the practice of no-dig farming is “...*about building up a system building up biomass under and above ground and with that built up biomass you can capture more and more of the sun's energy and get that into your system*”. The respondent further shared an experience that

It really explodes, it works very well for getting the life into the garden. We checked that ourselves with microscopes last year and we organized an event, we had a cinema screen in the field, and we projected and saw that our soil life was very big, compared to our conventional farmer neighbour who sprays poisons on the fields and also ploughs (RESPONDENT 2).

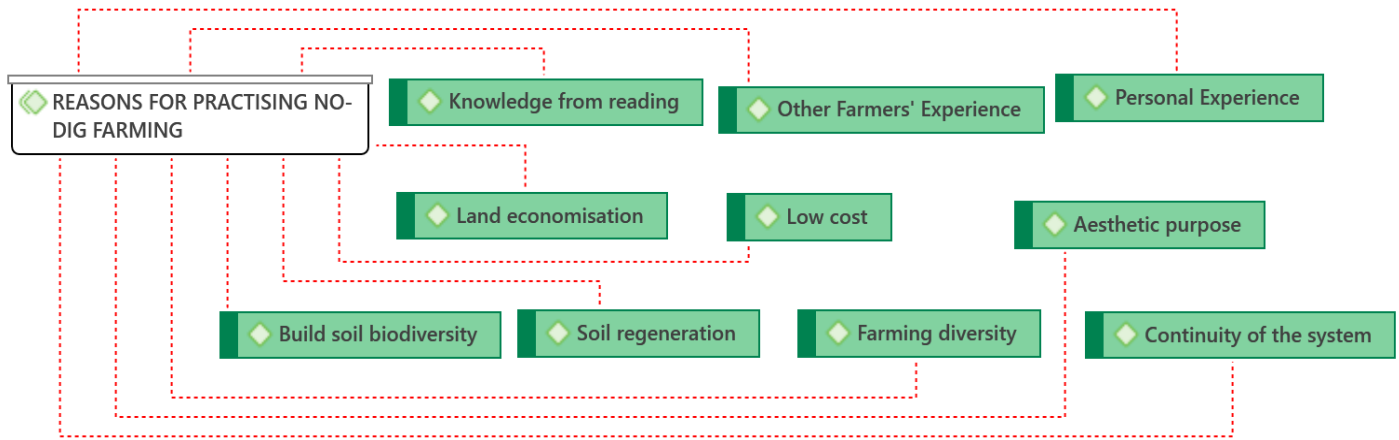


Figure 2: Reasons for practicing no-dig farming

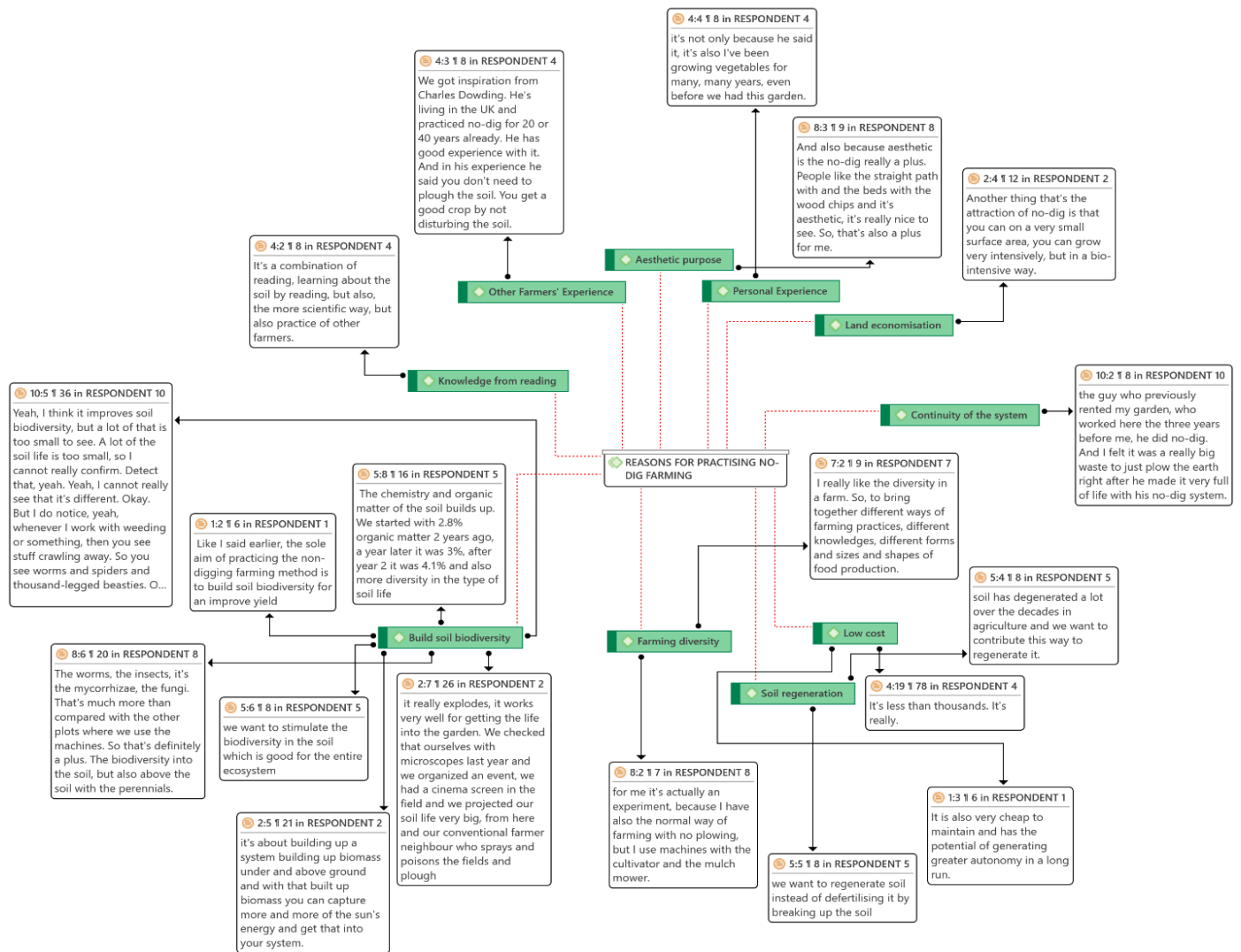


Figure 3: Responses on reasons for practicing no-dig farming

Nutrient management cycle

As presented by the farmers (Figure), the nutrients do not leave the farms, the flow is recycling. They plant, harvest, and keep the residue for animal feed and composting. Majorly, the residue is for compost production. The compost will be used for subsequent farming. In the explanation of Respondent 4, “...everything on the farm except for the crop, all the residues stay on the farm. On the farm. And we reuse it, making our own compost” (RESPONDENT 4). Similarly, Respondent 5 explained that “We use the residue to make compost at the back of our garden” (RESPONDENT 5). Additionally, Respondent 10 asserted that they “... recycle everything that is left” (RESPONDENT 4).

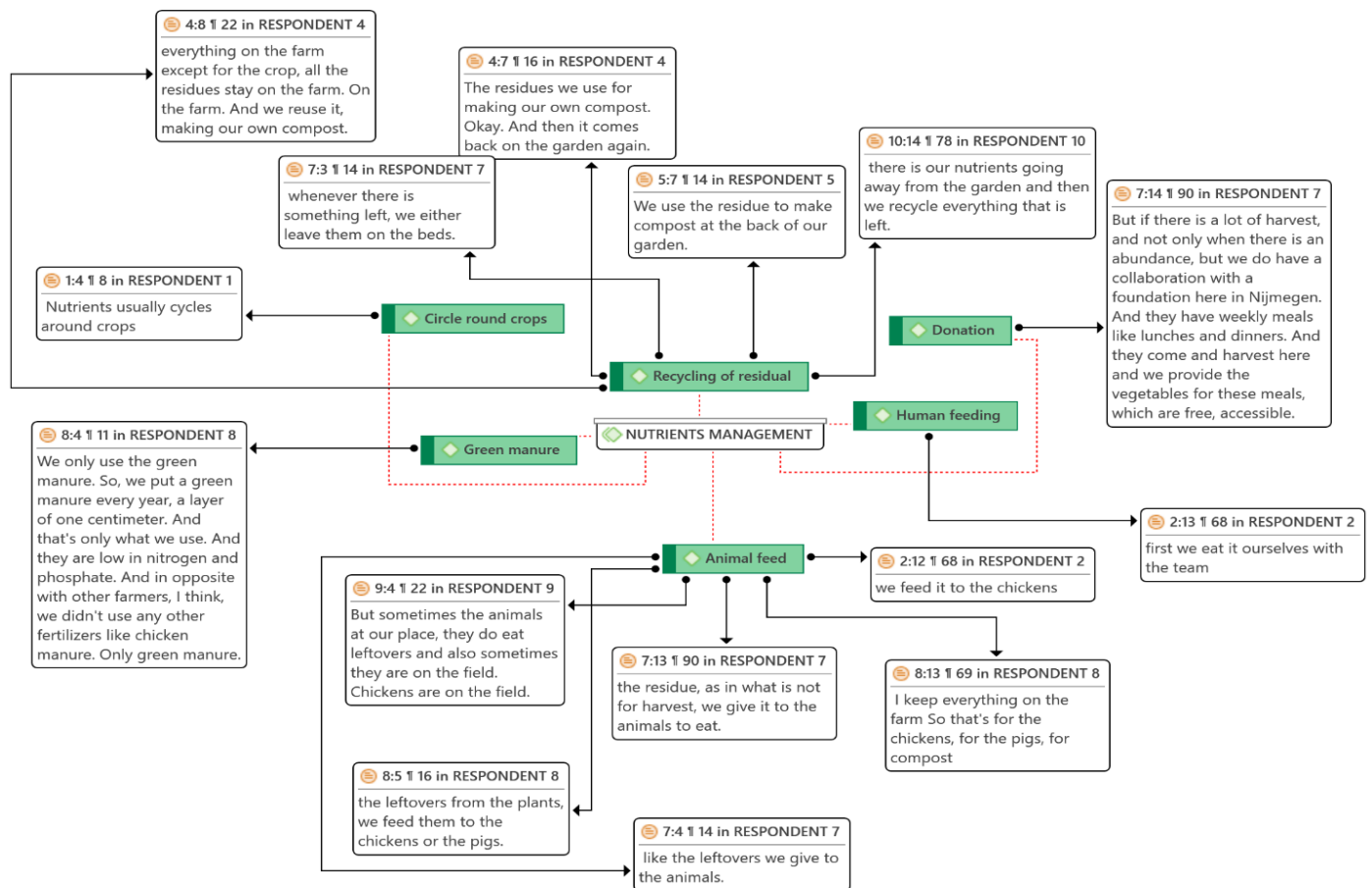


Figure 4: Nutrient management cycle

Consequences of no-dig to soil biodiversity

From the generated responses, the farmers identified the consequences of practicing no-dig farming (Figure 5).

- **Compost production** - All the respondents expressed that the residue from the farm is being used in the production of compost. In the words of Respondent 1, *“oh, the green waste? We are now making our own compost as well, otherwise we have some that we throw away, we have some beds for the herbs, and we can waste some of that waste material for it* (RESPONDENT 1). Similarly Respondent 9 also explained that *“all the bad weeds, the weeds we put on the compost heap ourselves and then we compost it and put it on the soil again* (RESPONDENT 9).
- **Enhances growth of plants** - Respondent 4 explained clearly that

They practice the no-dig farming system because it helps your plants to grow well. And also, it helps because of the soil that you do not disturb...as a consequence, you see bigger plants, healthier plants, and in the crops, it's the taste that improves. We also sell to restaurants and they're really keen of the taste. They really love it. The taste of the fruit (RESPONDENT 4).
- **No fertilizer** - According to the farmers, with the practice of no-dig farming, they have no need for fertilizer because they make use of compost. As expressed by Respondent 2, *“we don't use anything else we just use compost, no animal poo, only plant-based compost and we see that it works as long as there's enough soil life”* (RESPONDENT 2). Likewise, respondent 3 mentioned that they *“...don't apply anything apart from the compost and the wood chip”* (RESPONDENT 1).
- **Soil life improvement** - Another major consequence mentioned by the farmers is the improvement of soil life improvement. Respondent 2 affirmed that *“... the key of a no-dig garden is that you create as much soil life as possible in a place especially a lot of microbes, fungi but also bacteria, name it, everything basically”* (RESPONDENT 2). Respondent 1 also asserted that *“the consequences is that it allows for abundance of microbes in the soil”* (RESPONDENT 1).

- **Weed reduction** - In the words of Respondent 4, “another improvement effect from the No-dig is less weeds in the field” (RESPONDENT 4). Additionally, Respondent 10 also asserted that “...weeding is then less work ...actually so that's fine You don't need to dig So that's great” (RESPONDENT 10)

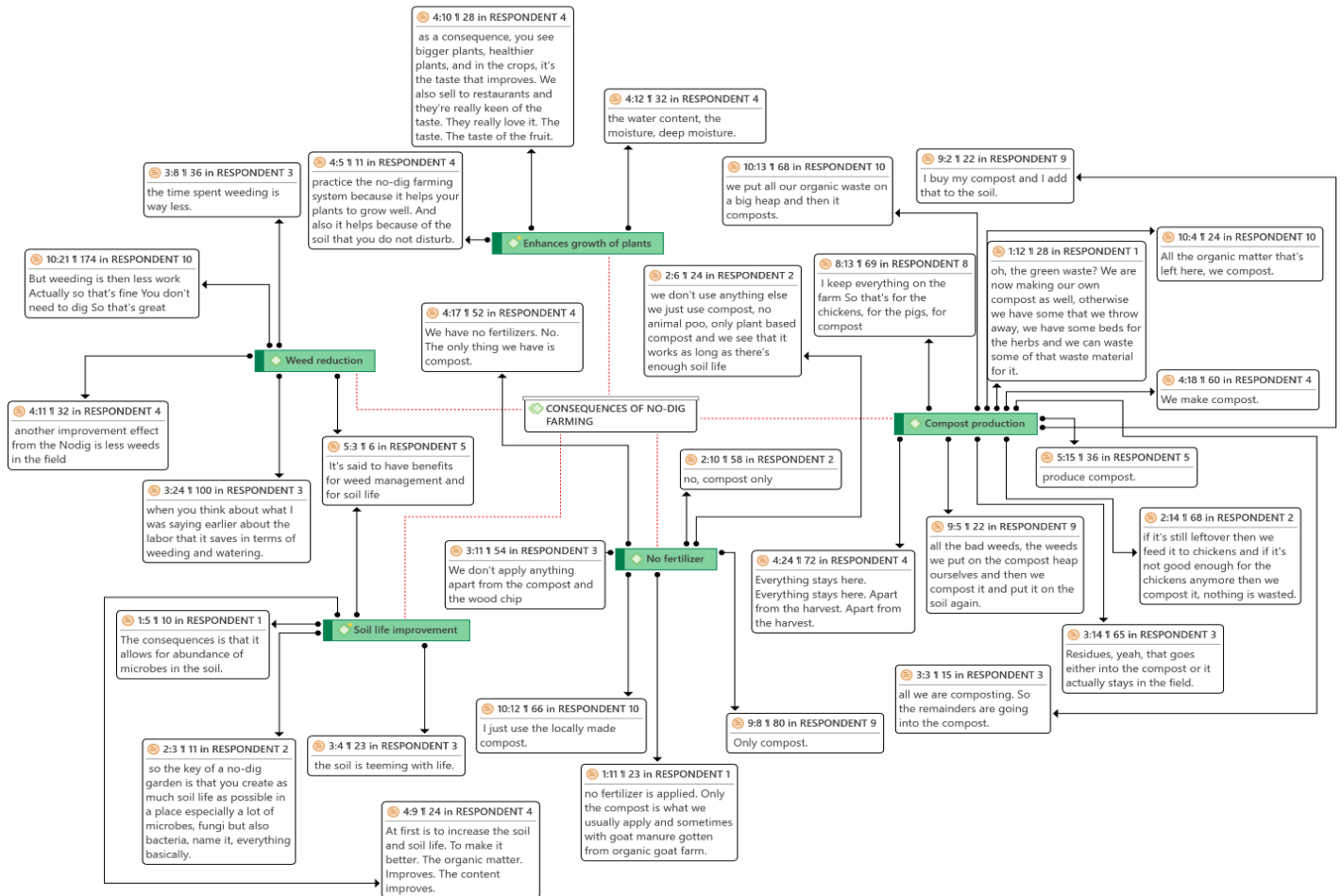


Figure 5: Consequences of practicing no-dig farming

Likely challenges of practicing no-dig farming

The farmers enumerated various challenges that are associated with the practice of no-dig farming (Figure 6), these include:

- Input acquisition
- Issues with slug and snails

- Land acquisition issues
- Large input
- No-dig technical know-how
- Regulation issues
- Weeding

Issues with snail seems to disturb the farmers so much, Respondent 8 shared an experience that, *my neighbor, he has only a no-dig system and he is fighting against the snails this season Because it's huge there It's huge there and it's a paradise for the snails Especially with this weather, Wet spring So that's for me the biggest issue with the no-dig farm system* (RESPONDENT 8)

While Respondent 10 expressed that “...snails are a problem because with no-dig, when you use mulch that's actually a nice place for snails to hide and lay their eggs” (RESPONDENT 10).

Another issue is land, most of the farmers got their farms through rent, and it is essential for no-dig farmers to stay long in a particular place to enjoy the practice. Respondent 6 expressed that

If you can stay for 15 years or 30 years, the investing in organic matter will pay off. But if you can only stay for 3 years or 2, then you will put a lot of chemical fertilizers to ensure your money comes back because you have to pay a lot for land because of competition for the lands...They agree that organic matter and soil life is important, but they lack the next step into implementing for long-term. They are only there for four years, and organic agriculture is not a four-year thing (RESPONDENT 6).

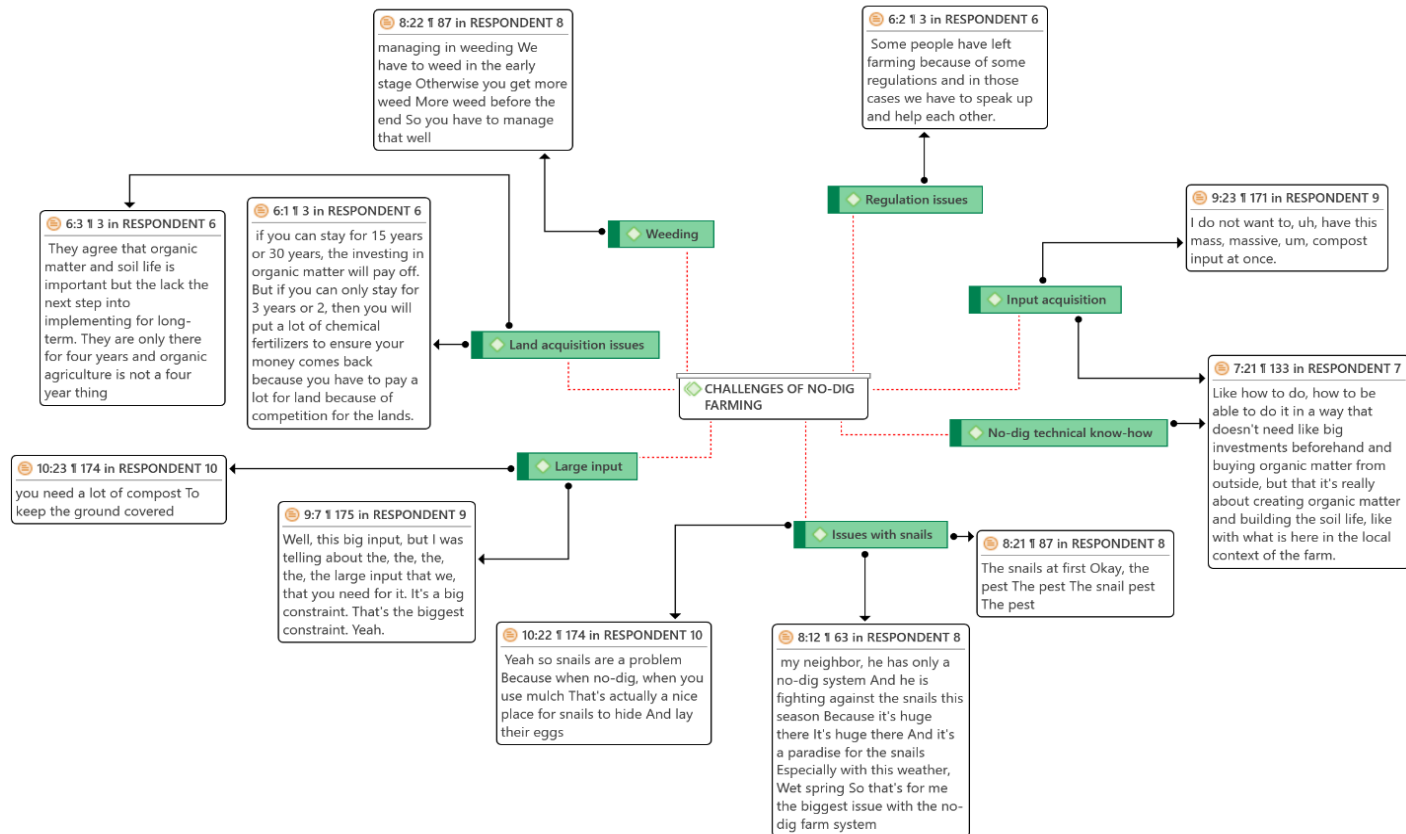


Figure 6: Likely challenges of practicing no-dig farming

OBJECTIVE TWO - To ascertain the level of implementation of the no-dig/regenerative farming practises among farmers

To ascertain the level of implementation of the no-dig/regenerative farming practices among the farmers, the farmers were asked questions relating to size of the farm, mode of land acquisition, estimated amount spent per year and years of farming experience.

Farm size

As presented in figure 7, the farmers have various farm sizes which include one acre, one hectare, almost five hectares etc.

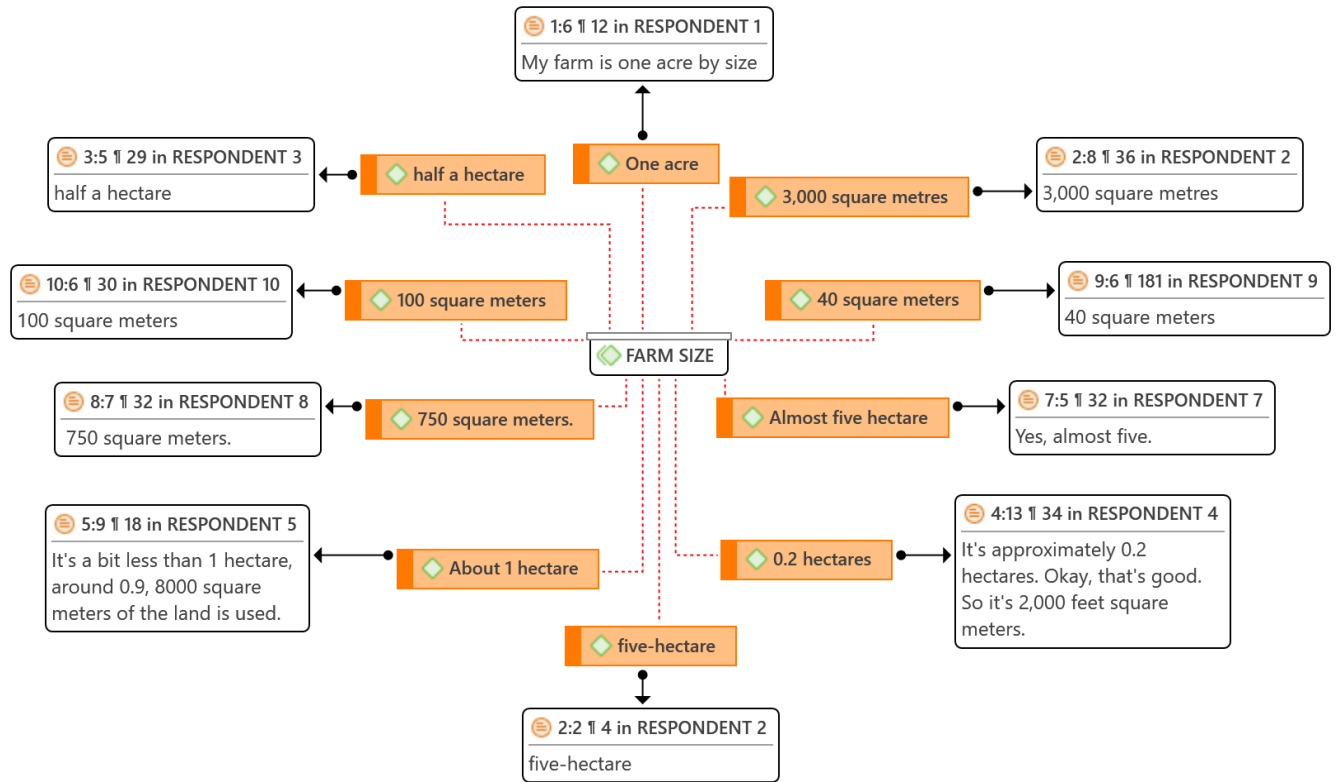


Figure 7: Farm Size

Mode of farm acquisition

As displayed in figure 8, most of the farmers got their land through rent, two respondents got theirs through lease while only one respondent purchased the land.

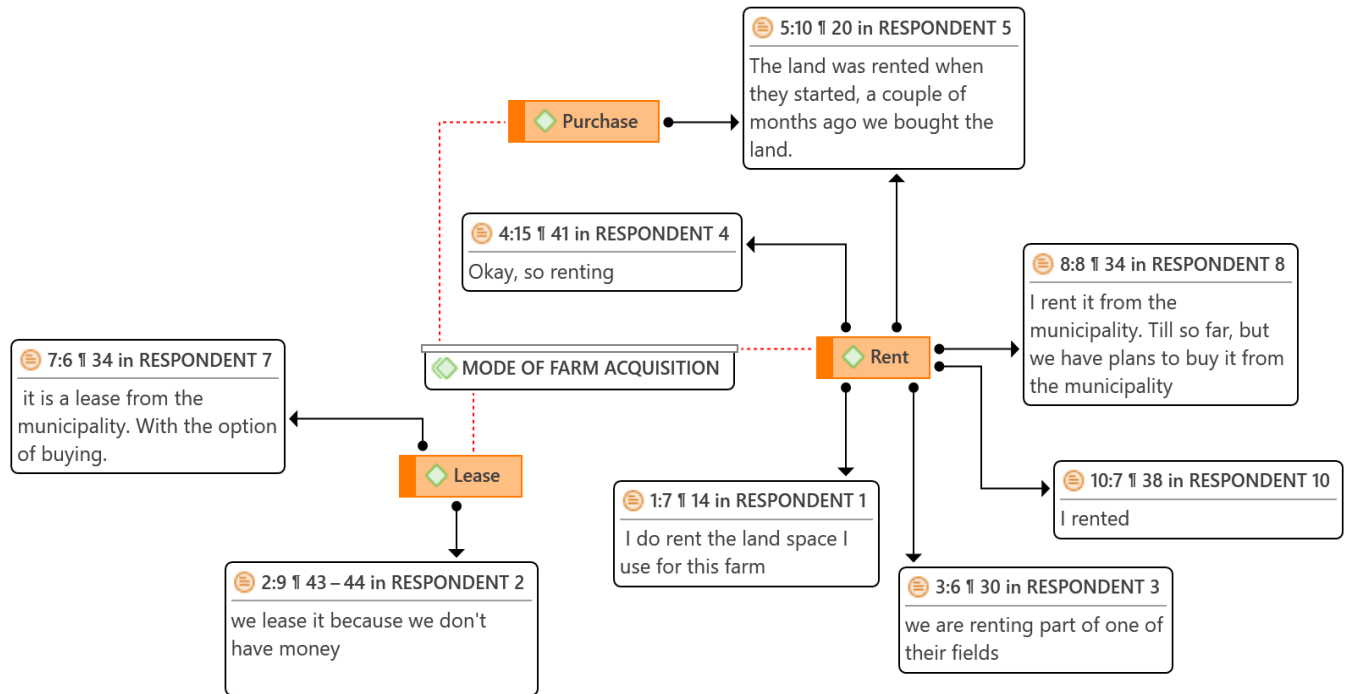


Figure 8: Mode of farm acquisition

Years of experience

As shown in figure 9, the years of practice of the farmers were between three to five years. This implies that the practice is relatively new to the farmers.

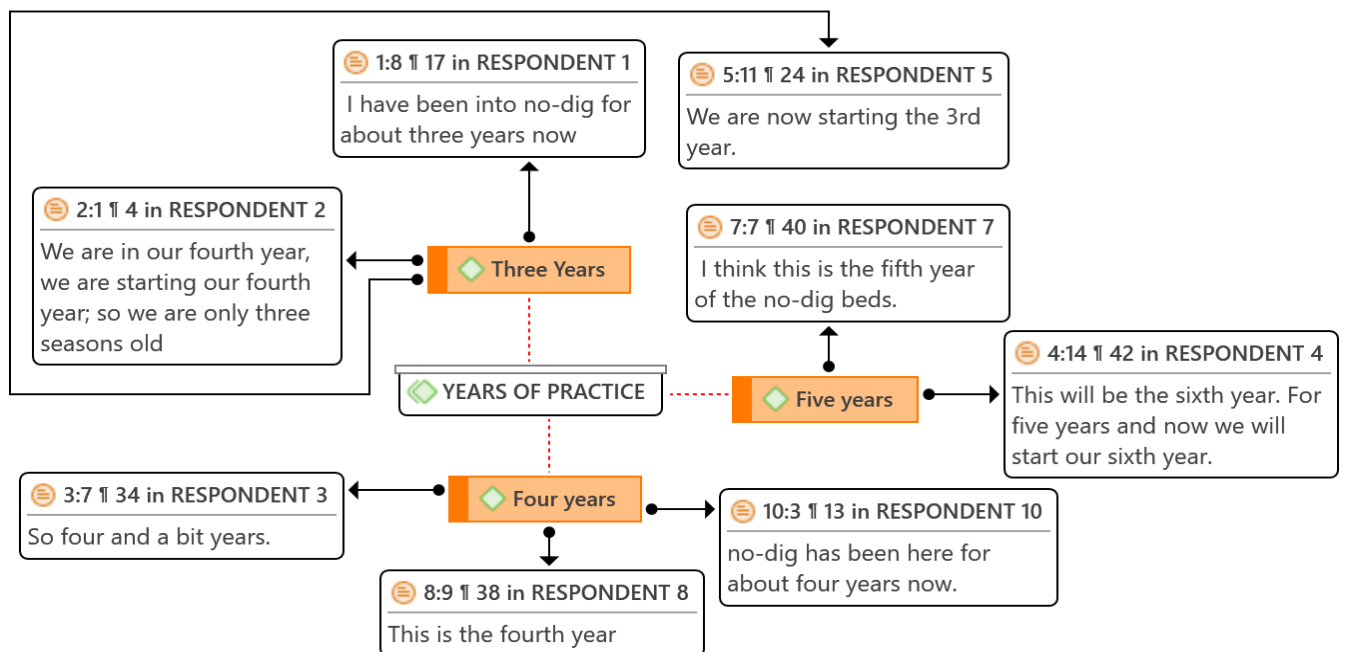


Figure 9: Years of experience

Water source

As presented in figure 10, irrigation is the major source of water to the farms. The respondents also expressed that they got water from rainfall and groundwater pump. Additionally, some of the respondents expressed that the plant also got water from the soil.

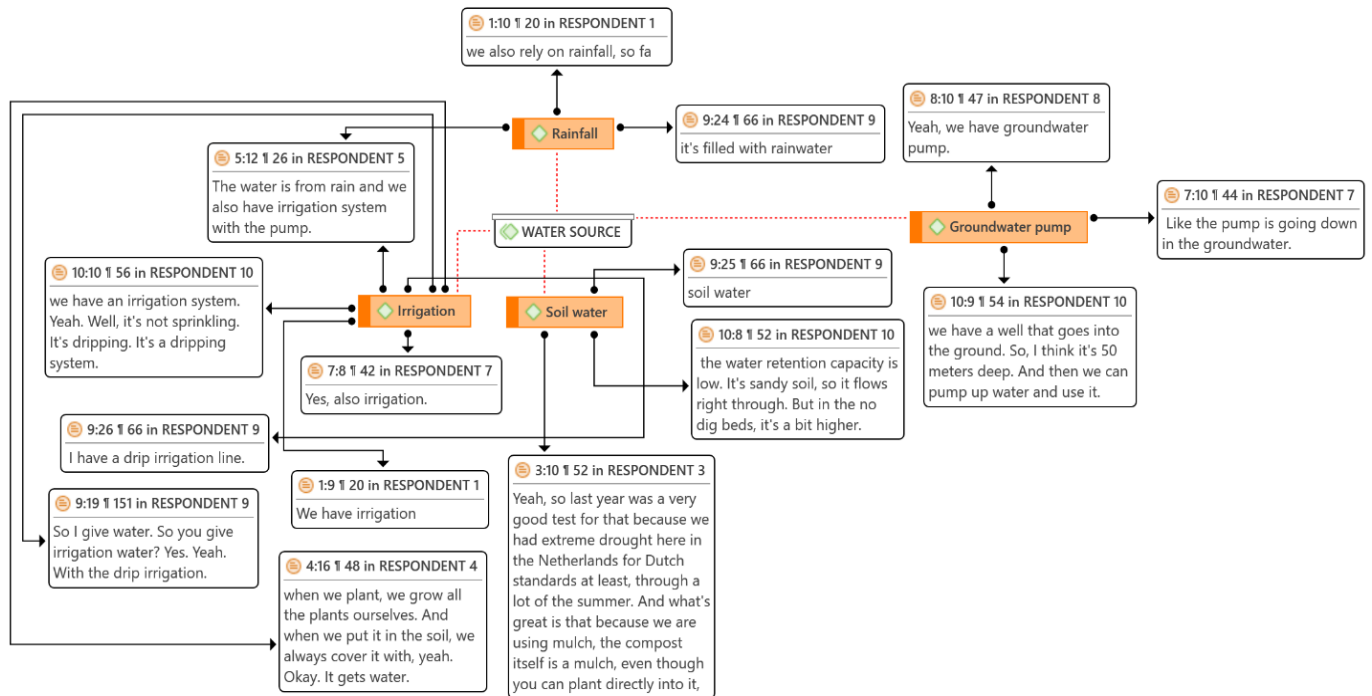


Figure 10: Water source

Average amount spent per growing season

As presented in figure 11, the farmers average among spent per growing season varies. This may be subject to their farmer size. A farmer indicated spending around 1000 euros while another mentioned spending up to 80,000 euros.

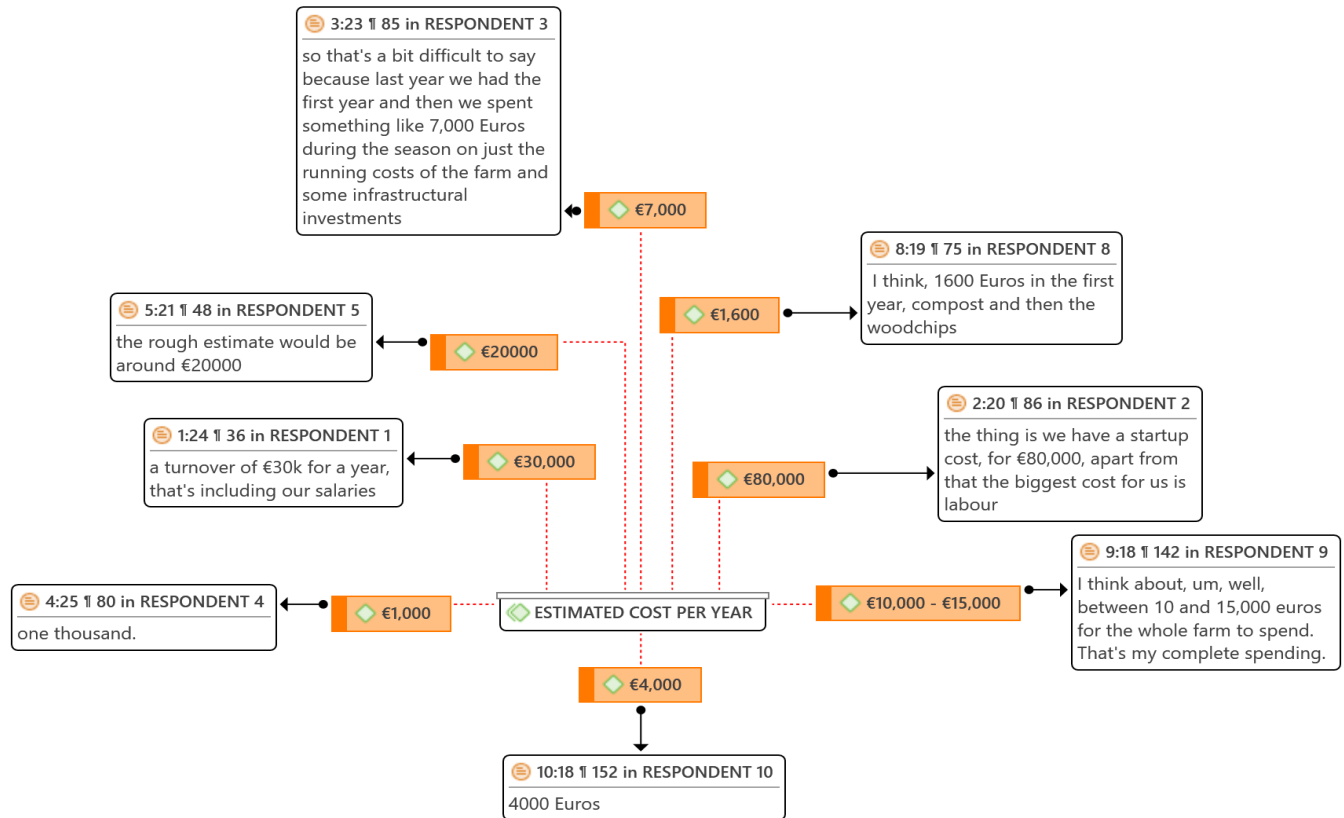


Figure 11: Average amount spent per growing season

OBJECTIVE THREE - To assess the contributions of the no-dig/regenerative farming practises on productivity and the pillars of food sovereignty

This objective assessed the contribution of the no-dig/regenerative farming system on productivity and the pillars of food sovereignty. As expressed by the respondents, they produce compost by themselves and do not need fertilizer. Also, the system aided their pest and weed control in a natural way and has greatly reduced waste as residues are recycled through composting systems.

Application of fertilizer

Responses generated from the farmers revealed that they do not need fertilizer for their crops because they mainly use compost for them. Only two of the respondents indicated that they apply chicken fertilizer to their crops (Figure 12).

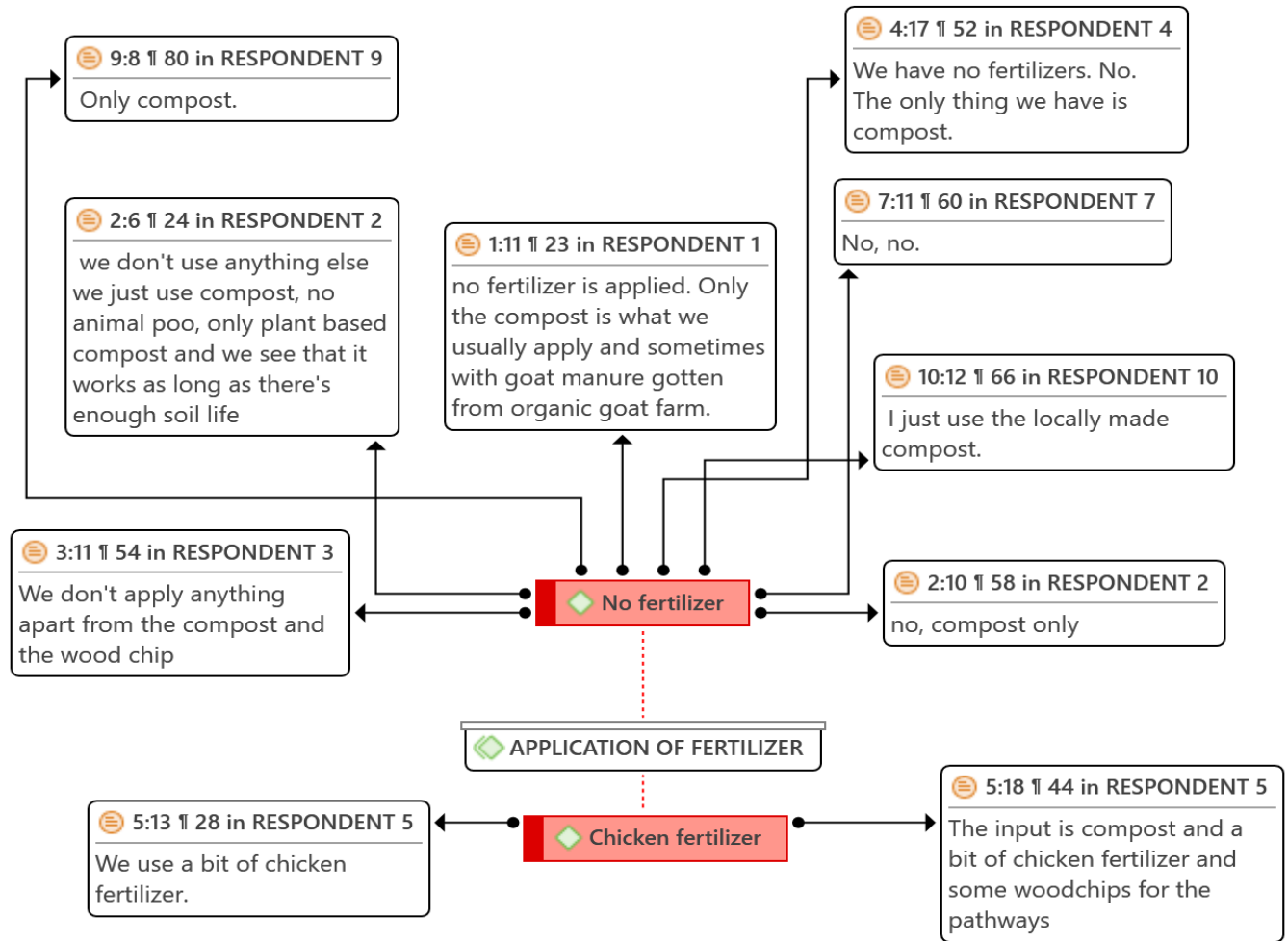


Figure 12: Application of fertilizer

Pest management

During the interview sessions, the respondents identified the various measures they apply in controlling pest. These are:

- Diversifying/Intercropping
- Manual control
- Net coverage
- Use of predator

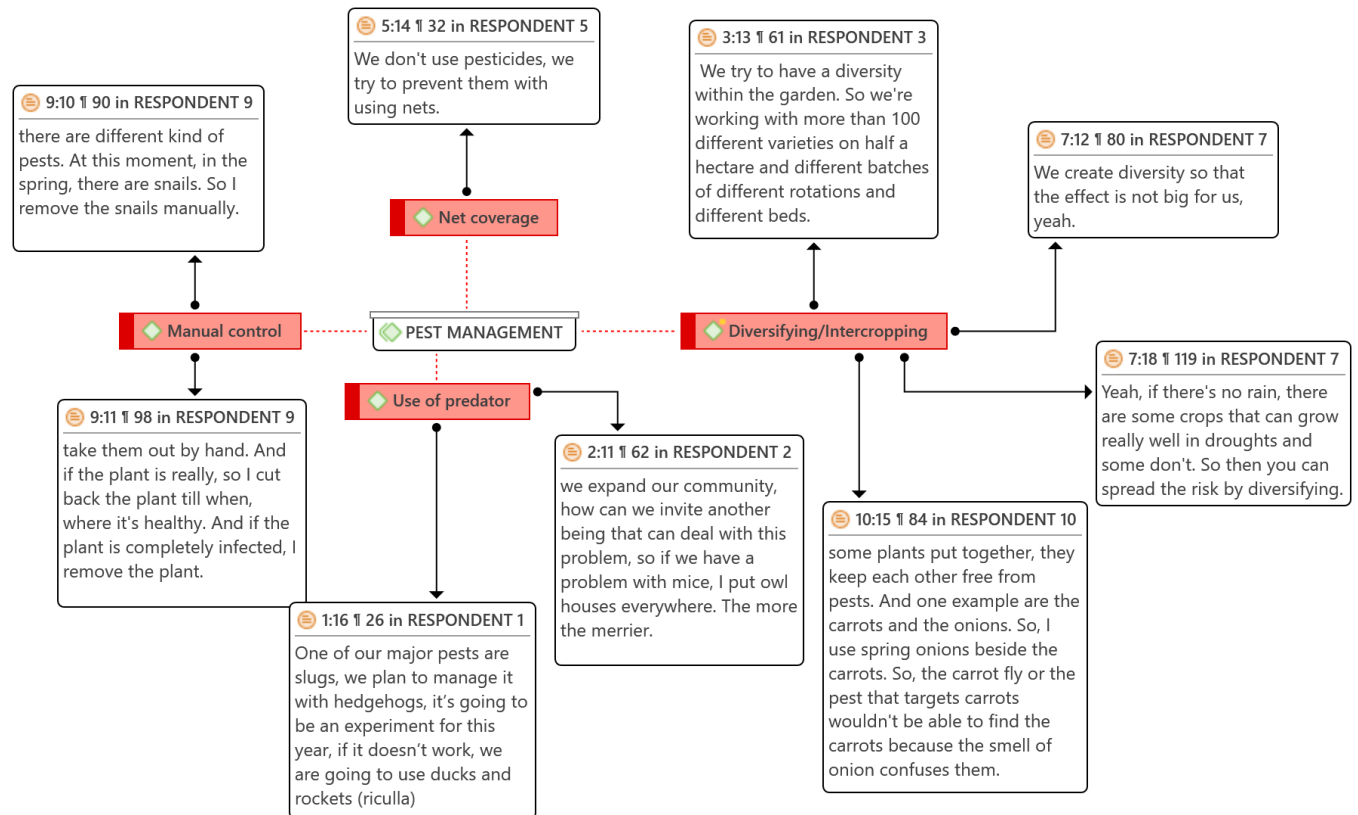


Figure 13: Pest management

Uses of residue

As part of the benefits of no-dig farming system, the respondents expressed that the system has reduced their wastage. This is because the residue from their farm is also recycled in several ways which include:

- Animal feed
- Compost production
- Donation
- Human feeding

However, the most common usage of the residue is compost production. The compost will later be applied to the farm for crop nutrient (Figure 14).

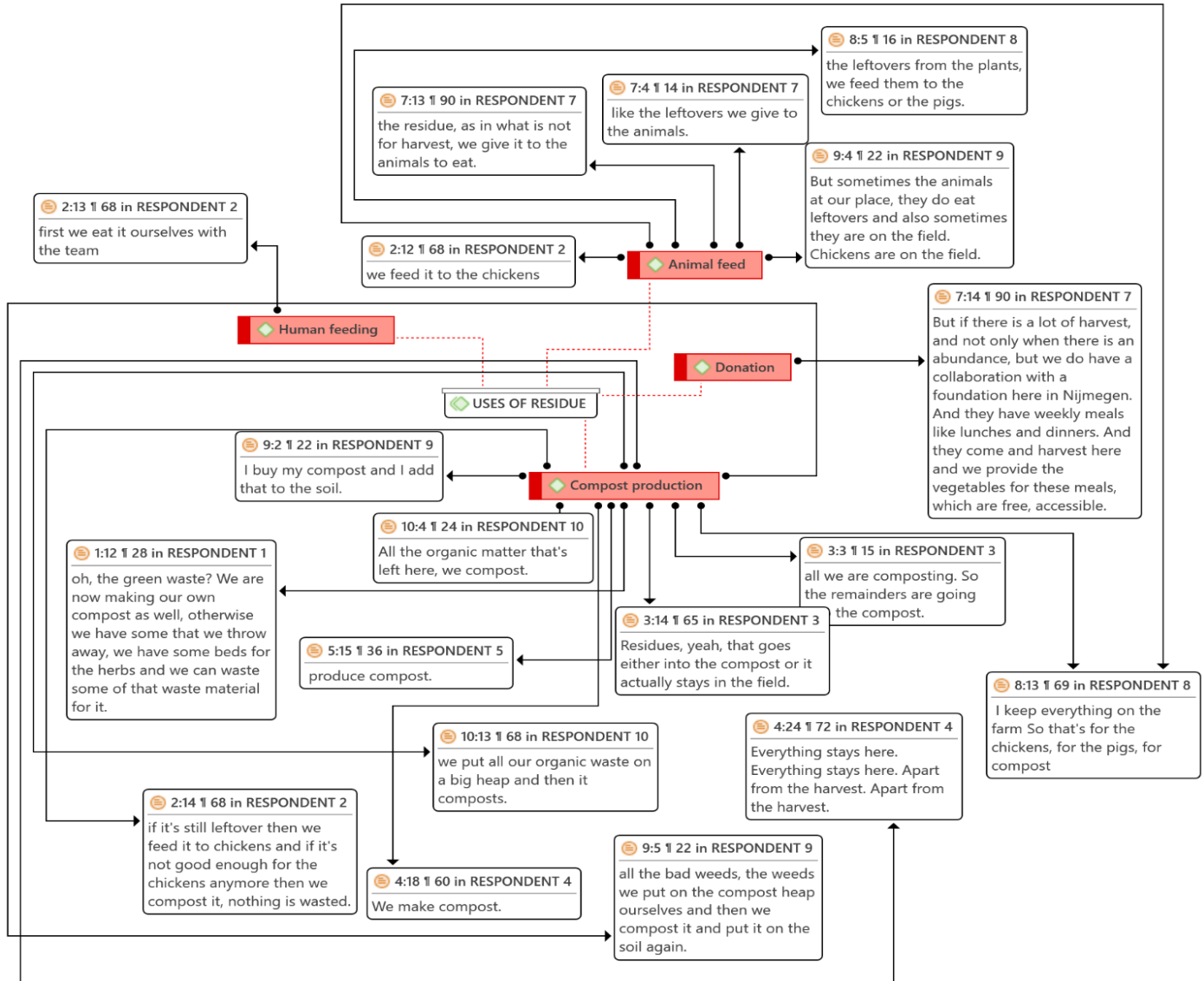


Figure 14: Uses of residue

Type of crops being cultivated

Most of the farmers expressed that they mostly cultivate vegetable. While only one respondent mentioned maize. However, few of the farmers asserted that they cultivate any type of crop.

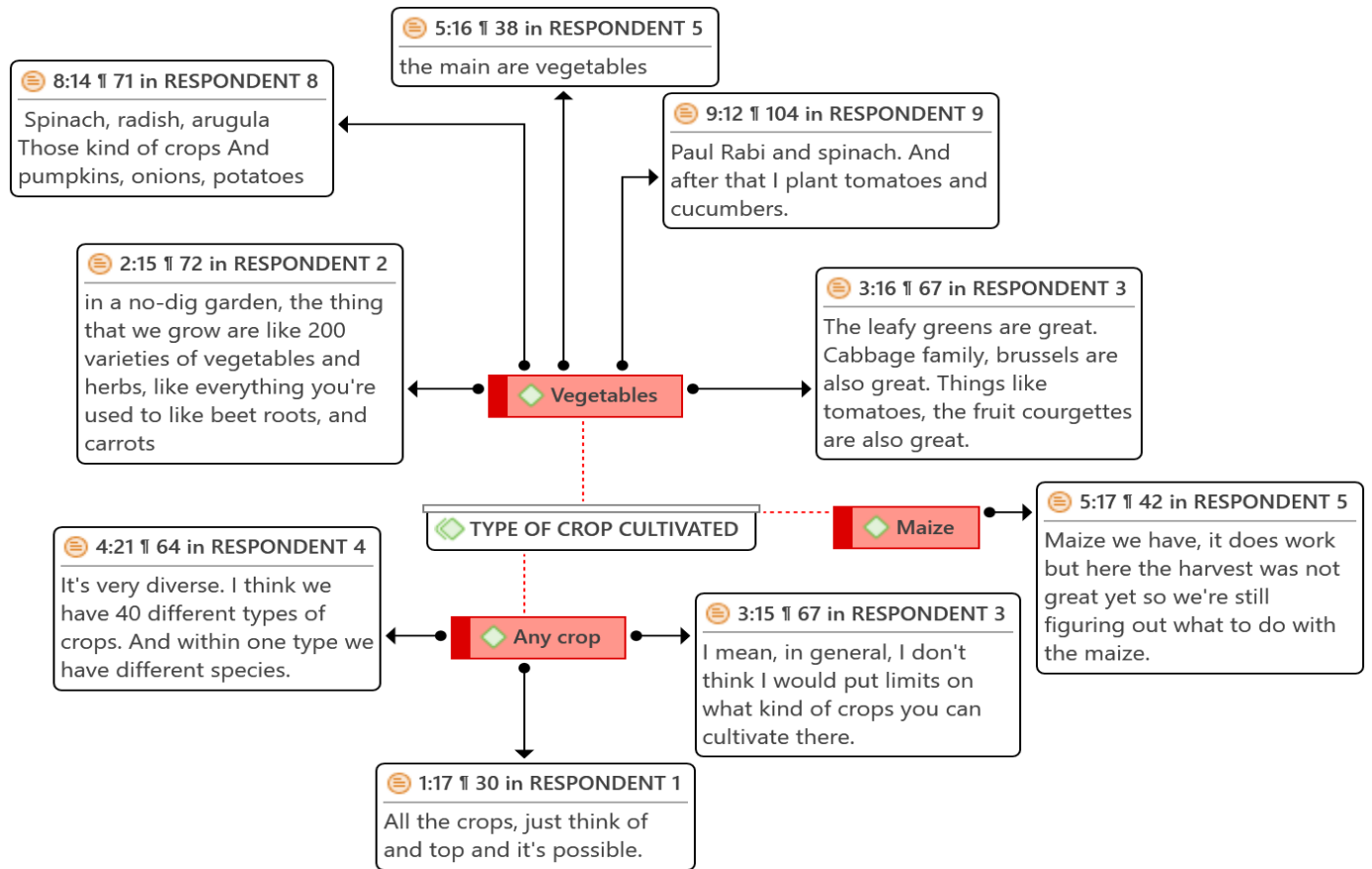


Figure 15: Type of crops being cultivated

Input and outputs from the farm

As presented in figure 16, the farmers' input are Cardboard, Chicken feed, Chicken fertilizer, Compost, Seeds/plants, water, Woodchips. However, compost and seed are the most common input indicated by the farmers. As displayed in figure 17, the respondent expressed that their output is harvest.

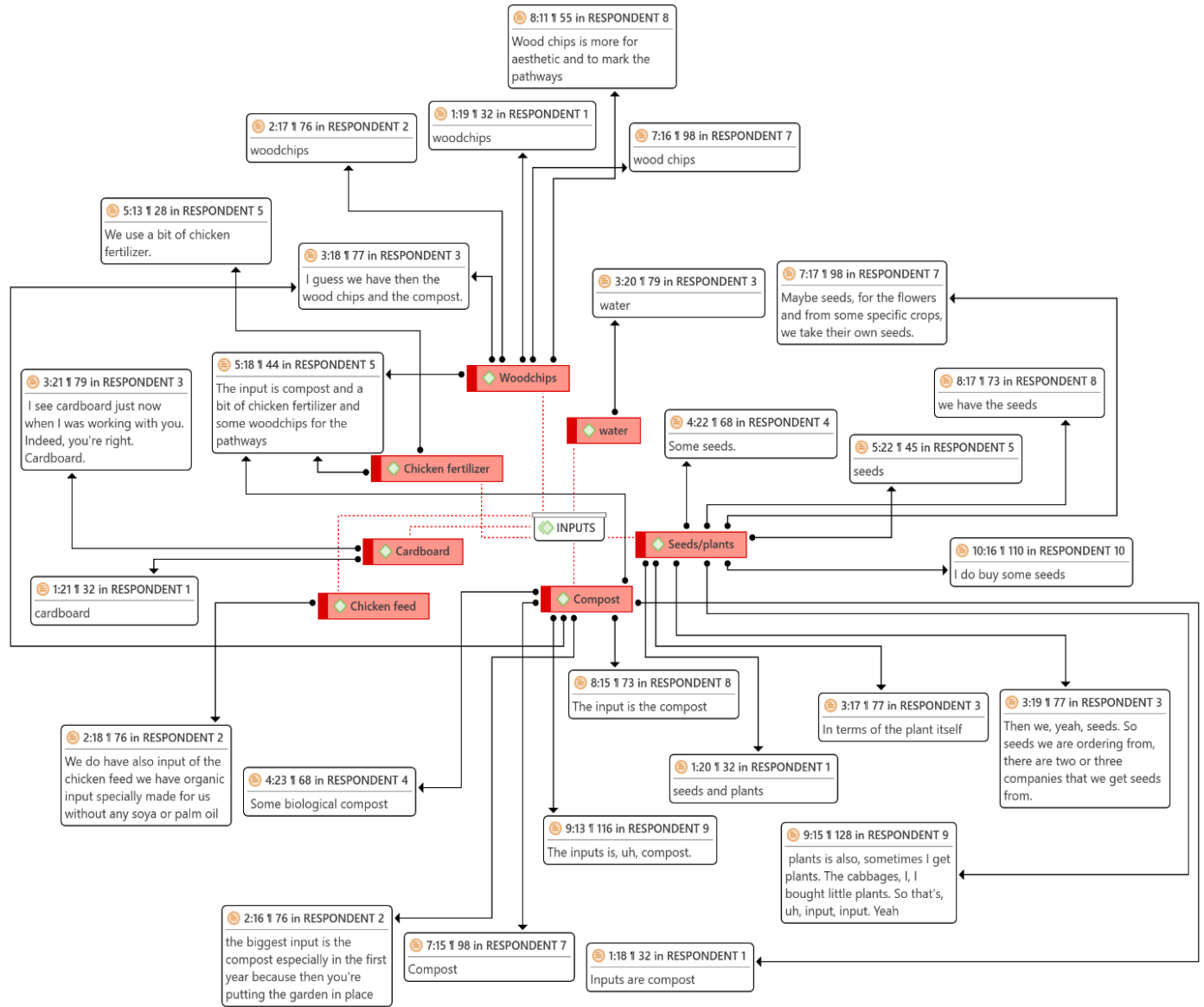


Figure 16: Farmers' inputs

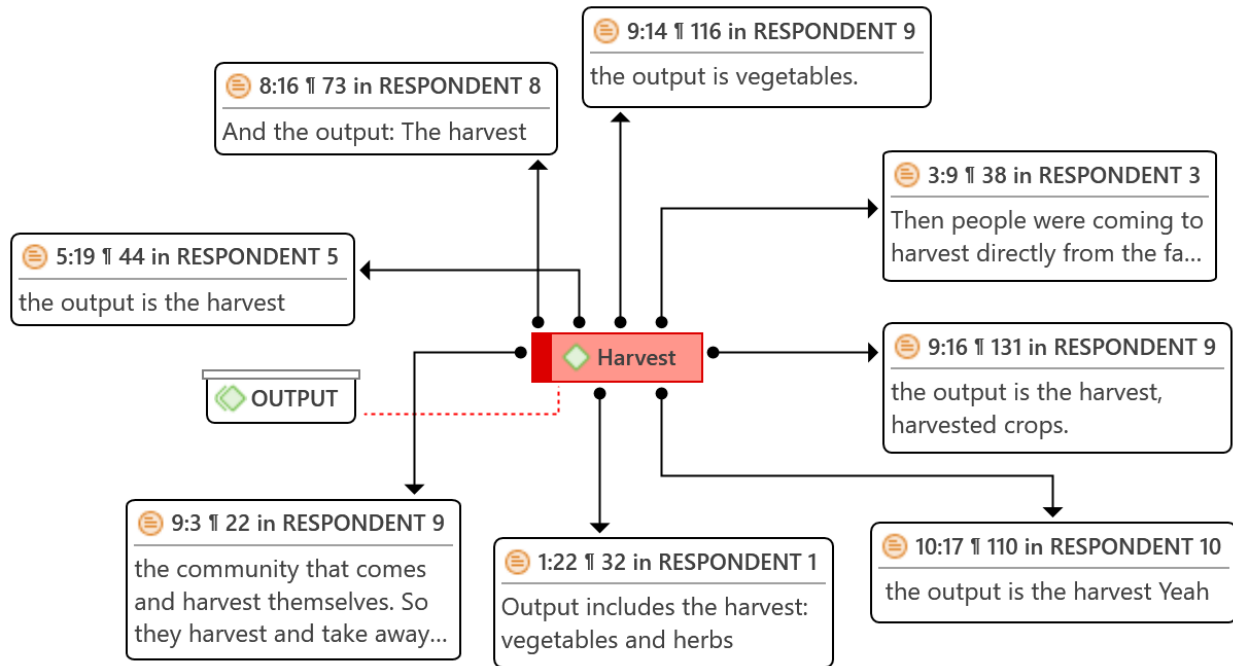


Figure 17: Farmers' output

Weather management

As displayed in figure 18, the respondent mentioned that various measures they put in place to control the weather, viz:

- Climate net
- Cover crop
- Cover fleece
- Diversifying/Intercropping
- Mulch protection
- Not yet experienced
- Winter break

From the generated responses, use of climate net, cover fleece and intercropping are mostly used by the no-dig farmers.

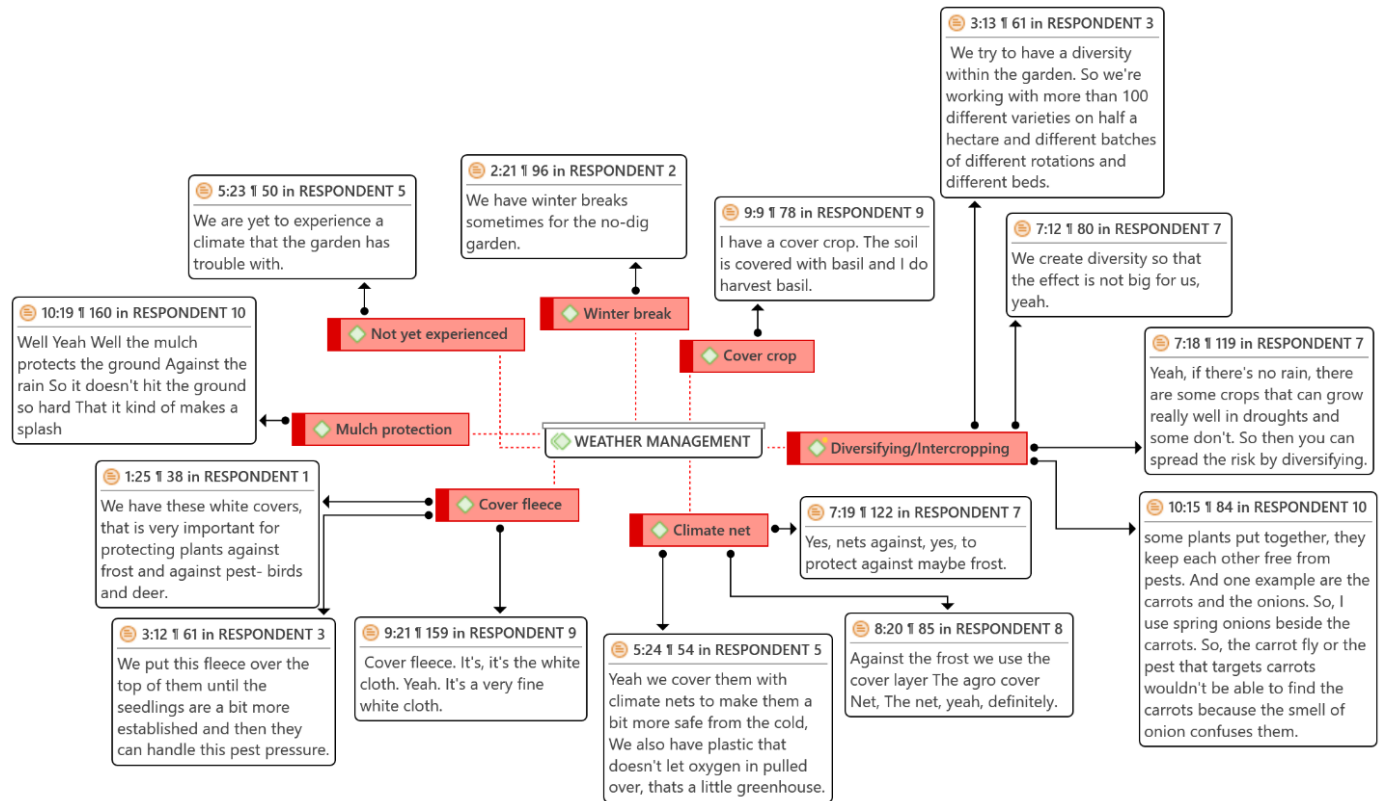


Figure 18: Weather management

OBJECTIVE FOUR - To ascertain the gaps in knowledge and practice of the no-dig/regenerative farming system.

Gaps in knowledge and practice of the no-dig/regenerative farming system.

Most of the farmers expressed their various views about the future of no-dig/regenerative farming systems.

- **Potential future** - Most of the respondents expressed that they foresee a potential future for no-dig farming. This is evident from the generated excerpts

It's obviously quite a new method, to see how it works in the long-term.....(RESPONDENT 1)

I am saying the future of agriculture is that we have a lot of vegetable gardens that are very intensive and then we can feed a lot of people with it around the cities because it's easy and successful and nice (RESPONDENT 2)

Oh, I see potential for it yeah. I think there's a combination. No not a combination. I've seen it's possible. I've seen it on our scale. I've seen it on one hectare. Yes. Maybe I think in this way. I see a future for it (RESPONDENT 4).

There is no other way of growing food. It has to be No-dig, because we had broken down the planet (RESPONDENT 7)

I think it has a good prospect, I think it will be more often because nobody really likes digging (RESPONDENT 10)

Improve revenue - Two of the farmers anticipated a future of low cost and improved revenue for the farmers. Respondent 3 expressed that *“the fact that it retains water, so you need to spray less water on your field, or you need to irrigate less. It also cuts costs”*.

Also, in the words of Respondent 1,

It has to be studied long-term because at the moment we spend quite some money on compost, we hope that in time we'd have to buy less and less compost...It's obviously quite a new method, to see how it works in the long-term will be helpful and it could save time and improve revenue and the soil biodiversity (RESPONDENT 1).

- **Low external inputs** - One of the respondents expected a future of *“lowering external inputs to a great extent”* (RESPONDENT 3) which will invariably increase the revenue of the farmers.
- **More research** - The farmers expressed that there is still need for more research on no-dig farming system. Respondent 1 asserted that no-dig farming still *“...requires more*

research into the extra revenues especially in the long term” (RESPONDENT 1). While Respondent 9 mentioned that he “...would like to experiment with, uh, no, no dig bed, a permanent bed” (RESPONDENT 9).

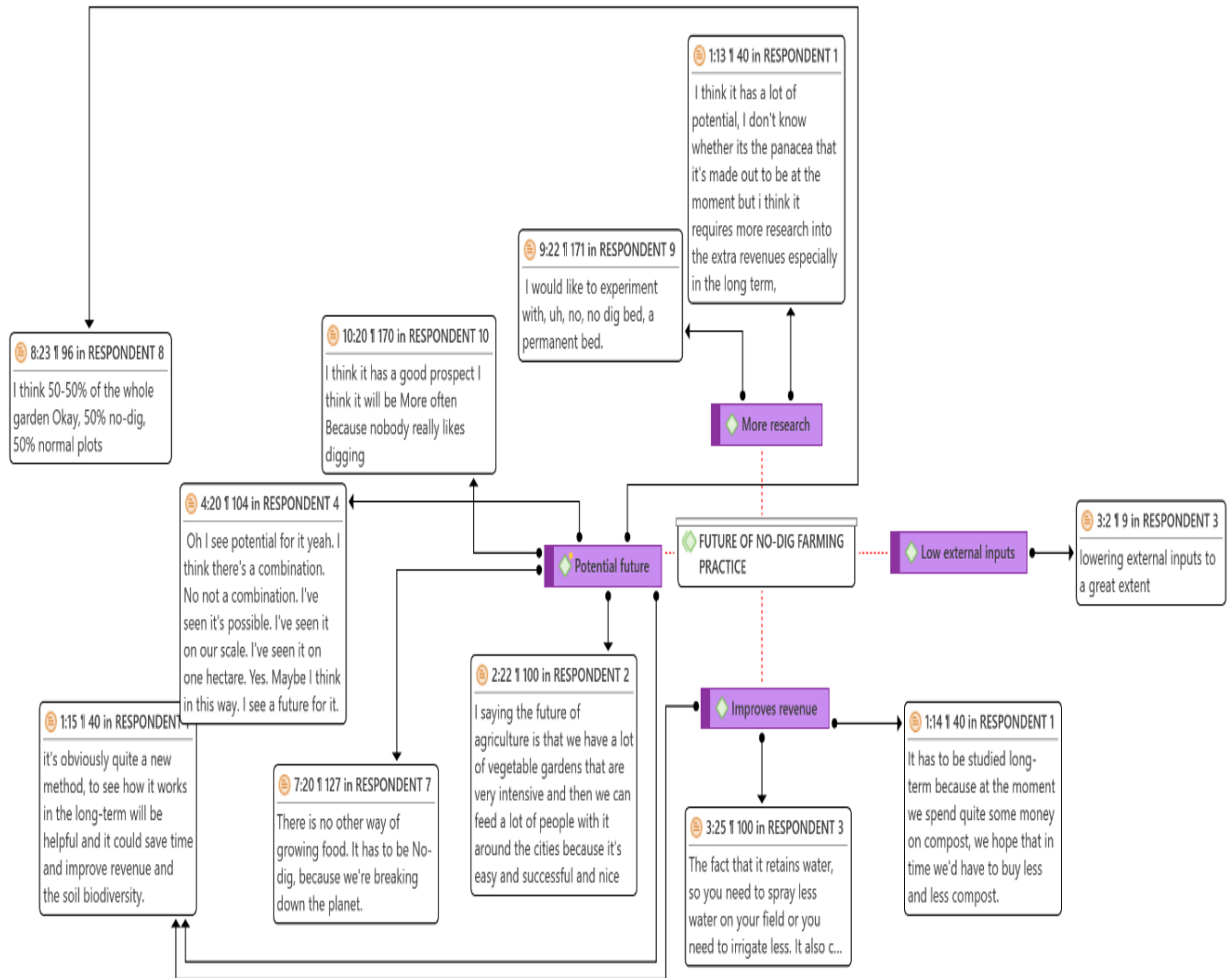


Figure 19: Future of no-dig farming practice