



**NATURAL RESOURCES CONSERVATION AND  
DEVELOPMENT**

**NTQF Level -II**

# **Learning Guide #9**

**Unit of Competence: - Participate in Indigenous Soil  
and Water Conservation Practices**

**Module Title: - Participating in Indigenous Soil and  
Water Conservation Practices**

**LG Code:- AGR NRC2 M09 LO1-LG#38**

**TTLM Code: AGR NRC2 TTLM 0919v1**



# LO 1: - Explore contemporary Indigenous soil and water management practices

Instruction Sheet

Learning Guide #38

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics –

- Identifying, accessing and utilizing information
- Outlining contemporary indigenous SW management practices
- Defining issues connected with the practices
- Consulting people
- Issues related to contemporary Indigenous land and water management practice
- Documenting details of consultation /research

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, **you will be able to –**

- Identify, access and utilize information
- Outline contemporary indigenous SW management practices
- Define issues connected with the practices
- Consult people
- Issues related to contemporary Indigenous land and water management practice
- Document details of consultation /research

## **Learning Instructions:**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 3 to 20.
3. Read the information written in the “Information Sheets 1”. Try to understand what are being discussed. Ask your teacher for assistance if you have a hard time understanding them.
4. Accomplish the “Self-check 1” in page 5.
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).



6. If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
7. Submit your accomplished Self-check in page 5. This will form part of your training portfolio.
8. Read the information written in the “Information Sheet 2”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
9. Accomplish the “Self-check 2” in page 8.
10. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 2).
11. Read the information written in the “Information Sheets 3 . Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
12. Accomplish the “Self-check 3,4,5 & 6” in page 11,13,15 &17.
13. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 3).
14. If you earned a satisfactory evaluation proceed to “Operation Sheet 1” in page 12. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
15. Read the “Operation Sheet 1” and try to understand the procedures discussed.
16. If you earned a satisfactory evaluation proceed to “Operation Sheet 2” in page 13. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
17. Read the “Operation Sheet 2” and try to understand the procedures discussed.
18. If you earned a satisfactory evaluation proceed to “Operation Sheet 3” in page 14. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
19. Read the “Operation Sheet 3” and try to understand the procedures discussed.
20. Do the “LAP test” in page 15 (if you are ready). Request your teacher to evaluate your performance and outputs. Your teacher will give you feedback and the evaluation will be either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work.



<b>Information Sheet-1</b>	<b>Identifying, accessing and utilizing information</b>
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## 1.0. Identifying, accessing and utilizing information

### Identifying information

Identifying, accessing and utilizing relevant information sources for Indigenous soil and water management practices are important. Sources of Information may be organizational rules, regulation and guidelines; Internet, related books and related materials; Technical manuals, Work place guidelines.

Information can be gathered from many sources depending on the organization and the types of information being dealt with:

- \_ A supervisor
- \_ Co-workers
- \_ Customers
- \_ Telephone messages
- \_ E-mail messages
- \_ Diaries
- \_ Calendars
- \_ Databases
- \_ Record systems
- \_ Policy and procedure manuals
- \_ Electronic and paper files
- \_ Journals and newspapers
- \_ Newsletters and magazines
- \_ The internet

### Accessing information

In your workplace environment, you will be presented and will have access to a substantial amount of information. This information will be communicated to you from numerous sources. As the receiver of information, you will be required to interpret information or messages and comprehend it in the way that the sender has intended. You have learnt that there is several ways in which the communication process can break down. If you can avoid these situations, then you will be able to effectively and clearly interpret and comprehend any information being communicated to you.

### Utilizing information

How can you ensure that workplace information is only used for authorized purposes?



Utilizing information for authorized purposes as follows: Once the required information is gathered, it needs to be prepared or processed before it is passed on. The way it is prepared will relate to the method used to relay the information, and the equipment you use. For example, perhaps you are answering the telephone, writing down message details and e-mailing messages to staff. Alternatively, you could be preparing a letter to send to a customer, based on information your supervisor has given you verbally.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Short Answer Questions

<b>Self-Check -1</b>	<b>Written Test</b>
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are the sources of information?(5points)

**Note: Satisfactory rating >2.5 points**

**Unsatisfactory - below 2.5 points**

### Answer Sheet

Score = \_\_\_\_\_

Rating: \_\_\_\_\_



<b>Information Sheet-2</b>	<b>Outlining contemporary indigenous soil and water management practices</b>
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**Indigenous soil and water conservation** is used to describe a practice or an idea which has either been generated locally or which has been introduced and then transformed and incorporated by the local people into their system to improve their livelihood.

**Indigenous knowledge** refers to the perception that farmers have about their natural and social environment, which they use to adopt, adapt and develop technologies to their local context. The rationale for undertaking certain traditional practices among others is recognition of problems by the local people. Indigenous practices are aimed at arresting the local priority problems. Although they survived the challenges of changing bio-physical and socio-economic environments through a continuous responsive changes and adaptations, indigenous practices are not perfect. But, in general it is possible to provide this indigenous knowledge's that clearly portray the active role that rural communities in Africa (Ethiopia) and other parts of the world which have played a tremendous role.

Traditional agriculture in the past was compatible with the level of population, ecological environment and intensity of cropping. Long bush fallow periods restored soil fertility effectively while tillage practices such as pit cultivation; mounding, ridging, mulching and earth bunding successfully conserved the soil. The indigenous soil conservation systems evolved over the course of time to suit certain environments. They are usually location specific and have designs that reflect their multiple functions such as fertility management, erosion control, drainage and water harvesting. Moreover, most indigenous soil conservation tillage systems are labor intensive and are difficult to mechanize, thus severely limiting the cropped land.

In some areas they have been replaced with conventional flat cultivation. Conventional flat cultivation whether done by the hand hoe, draft animals or tractors, needs to be accompanied by appropriate soil conservation measures, or it will encourage soil degradation. The adoption of the ox-plough is usually associated with extension of cultivated land which may need clearing. Plough pans may form with continuous cultivation and the extensive use of sledges increases risks of soil erosion. Therefore in order to protect the soil for sustainable agricultural production, land conservation should be integrated in the normal crop and livestock husbandry practices.



Smallholder farmers can relate to the land husbandry concept, which should be emphasized. In areas where animal traction is on the increase, minimum tillage using animal drawn ripper tines and wheeled cart transportation should be encouraged to reduce risks of soil erosion. Participatory community based approaches should be used to create a more ownership attitude and the “free for all” livestock range management system should be revisited to increase personal responsibility on the land and increased investment on soil conservation activities.

**Indigenous practices** are aimed at arresting the local priority problems. Although they survived the challenges of changing bio- physical and socio-economic environments through a continuous responsive changes and adaptations, indigenous practices are **not perfect**.

#### **School of thought 1: View against indigenous practices**

- There are some who still argue that indigenous practices deserve little emphasis since “they cannot any longer go with the dynamics of the environments”. They further suggest that modernization rather than the ‘**backward**’ local practices need to be pushed further.

#### **School of thought 2: View in favour of indigenous practices**

- It is, however, believed that indigenous practices certainly **fit into** the local socio-economic situations and might be easily handled by farmers’ knowledge and the resources at their disposal.

The important issue should thus be **the integration of indigenous practices and the western scientific technologies** in such a way that the positives sum produces optimum outputs. Soil and water conservation practices in Ethiopia are very old as evidenced by the existence of traditional measures in some parts of the country. The following are the most common examples of indigenous conservation technologies in Ethiopia:

- Agro-forestry
- Fallowing
- Manuring (integrated soil fertility management)
- Crop residue application (mulching), stone mulching of tigray
- Stone bunds, soil bunds and check dams (daldal)
- Terraces like bench terrace



- Crop rotation
- Contour farming
- Ridging and tie ridging.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Short Answer Questions

<b>Self-Check -2</b>	<b>Written Test</b>
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Define indigenous knowledge?(3points)
2. Describe the two school of thoughts about indigenous SWC practices.(10points)
3. List the most common examples of indigenous conservation technologies in Ethiopia you know. (7points)

**Note: Satisfactory rating >10 points**

**Unsatisfactory - below 10 points**

### Answer Sheet

Score = \_\_\_\_\_

Rating: \_\_\_\_\_





### Information Sheet-3

### Defining issues connected with the practices

Indigenous knowledge has a wide range of roles in a society, which ensures the achievement of livelihoods, including not only technical knowledge in production but also knowledge with respect to institutions, health and security.

**The identified relevant issues and concerns may include the following:**

- The nature of ISWM practices
- Public opinion, environmental interest groups
- Contact with public agencies
- Proximity of sensitive receiving waters
- Regulatory environment

**Why Indigenous and Formal Knowledge's are concerned in soil erosion?**

**Scientists and farmers address** the soil erosion problem in different ways, even though they have the same goal. This difference has far-reaching consequences for finding the method to achieve the solution. Scientists perceive soil erosion as a process of three steps: the detachment of particles of soil by wind and water from the surface, the transportation of the particles and the deposition of these particles in another place. But others point out that farmers see the movement of soil from place to place as a result of deposition, and could see small rills. They observe the development of gullies merely by water erosion. The question is whether they credit this process as one of the top production problems and how they minimize erosion. However, like scientists, farmers also know and are concerned about plant nutrients even though they cannot give them chemical names, like scientists whose knowledge systems allow for that level of sophistication. Unlike outsiders who often maintain a single objective, farmers are faced with multiple objectives in their livelihood.

In addition, farmers' indigenous SWC does not aim at merely protecting the soil or improving the moisture level. They make compromises with their multiple objectives, resources, level of the erosion problem, urgency of the household needs, profitability, etc. Therefore, 'the best soil conservation practice from the farmers' perspective is not necessarily that which conserves the most soil'. In view of this, farmers often favour SWC practices that give them a quick benefit, while minimizing soil erosion. For instance, supplementary fodder, income, and food that is commensurate to the household objectives instead of the off-site benefits that are perceived by the state or its agents, who base their calculation on a public interest point of



view rather than on individual households. Farmers' efforts in soil and water conservation are responsive to economic factors.

Indigenous SWC methods are often constructed with local labor exchange groups that shift the direct immediate cost to the community. When the practices have to be undertaken individually, they always tend to space the financial and physical burdens over time.

Generally, farmers' responses to externally imposed SWC methods are highly shaped by their indigenous practices that are embedded in their local institutions and culture.

**Indigenous technologies:** Technologies evolved as a result of a gradual learning process and emerge from a knowledge base accumulated by rural people by observation, experimentation and a process of handing down across generations' peoples' experiences and wisdom. Apparently the technology is dynamic and not static in nature, frozen in time or stuck in history.

An **indigenous SWC technology** clearly indicates that **farmers** are aware of soil erosion and have developed effective means to control it. However, the fact remains that most farmers do not undertake sufficient measures to control erosion effectively. In order to become effective:-

1. **Farmer clearly perceives soil erosion and believes that it reduces yields.** They are more concerned about the loss of water and nutrients associated with soil erosion than reduced depth of the soil itself.
2. **Farmers' investments fall as the opportunity cost of their time and other resources rise:** other activities may have a higher return than conservation investments. This is commonly the case for farmers with substantial off-farm income.
3. **Farmers invest more if they have more resources at their disposal, other things being equal:** those with bullocks and healthy family labor are more likely to invest than those without.
4. **The tenure arrangements under which farmers operate affect investment levels:** those who cultivate their own land are much more likely to invest in soil conservation than those renting or sharecropping someone else's land. Likewise, landlords leasing out their land do not appear to invest much in soil conservation.
5. **Land quality also determines investment levels.** Most farmers have more than one plot, and they invest in their most productive plot first. Those who have irrigated land invest less on their dry land plots than those without irrigated land.



6. Where it is **technically feasible**, farmers invest in soil conservation in a stepwise manner, strengthening structures annually as needed. This reduces the initial investment and postpones costs to the future.
7. **Farmers prefer** to invest in soil conservation individually or in cooperation with an adjacent farmer rather than in large, cooperative groups.

<b>Self-Check -3</b>	<b>Written Test</b>
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. An **indigenous SWC technology** clearly indicates that **farmers** are aware of soil erosion and have developed effective means to control it. However, the fact remains that most farmers do not undertake sufficient measures to control erosion effectively. In order to become technology effectively control erosion what are the parameters farmers do understand? (20points)

**Note: Satisfactory rating >10 points**

**Unsatisfactory - below 10 points**

**Answer Sheet**

Score = \_\_\_\_\_

Rating: \_\_\_\_\_



<b>Information Sheet-4</b>	<b>Consulting people</b>
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Consulting relevant and appropriate people according to community guidelines and cultural protocols helps to towards conserving their natural resources. Each community has its own guidelines and protocols towards conserving their natural resources by indigenous knowledge. These guidelines and protocols **may not** be put in **a written form**. They know that what they are going to do, where they are going to do and when they are going to do. In some community, there are some **influential elders** that lead their community. Farmers who think that soil and water conservation increases crop production and who think that soil and water conservation is the farmers' responsibility hold a more favourable attitude towards soil and water conservation than those who think that farmers should be paid for such work or that it is the responsibility of some other agency.

Each community has its own knowledge which needs to be transferred and implemented. Thus, **accessing those knowledge requires** identification and consultation of authorized person (relevant and appropriate people) or individuals to whom certain information or knowledge can be disclosed without disregarding cultural code of conduct (rules of correct or appropriate behavior of a community) and rights to that knowledge according to community guidelines and cultural protocols.

Therefore, a better understanding of the **farming system** in the area and the farmers' opinion on tackling **agricultural constraints** should be considered. Moreover, further evaluations and improvement work need to be done. Thus, integrating the traditional with modern developments may lead towards **a sustainable management** of the ever-increasing problem leading to a **comprehensive advancement of the production** system.



<b>Self-Check -4</b>	<b>Written Test</b>
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. How do you access those indigenous knowledge requires?(10 points)

**Note: Satisfactory rating - 5 points**

**Unsatisfactory - below 5 points**

**Answer Sheet**

Score = \_\_\_\_\_

Rating: \_\_\_\_\_



<b>Information Sheet-5</b>	<b>Issues related to contemporary Indigenous land and water management practice</b>
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Contemporary Indigenous land and water management practices refers to existing practices characterized by distinctively modern in style. **External factors** could enhance or inhibit farmers' decisions on land and water management. **These factors** include: land tenure, access to credit, subsidy, extension services and infrastructure. While there was no significant impact of the official classification whereby land was under different public categories, tenancy was found to be the main tenure issue that affected adoption of SWC practices. Farmers make decisions within a broader environment or context. One of the elements in the environment consists of institutions. These can be seen at the local and national levels. The national institutions in agriculture are often linked to **research and extension services**. They are typical routes for **external intervention** in rural communities. Extension in particular provides farmers with information on soil erosion and methods to combat it. In collaboration with other organizations, it could channel credits and other incentives to the farming community to improve its production through proper land management techniques. The type of information provided by research and extension institutions affects farmers' knowledge and their attitude towards soil and water conservation. External organizations can also exert pressure on local people through persuasive incentives such as food-for-work. In addition, land-tenure patterns play their role in the farmers' land-management decisions.

Farmers' risk perception on the options for soil and water conservation depends on their perception of the institutional environment, i.e., the degree to which it may support or the practice. With respect to indigenous knowledge-dominated farming systems, the local institutions, labour organizations and the moral economy are very important to their decision-making processes and to the livelihood of the family. Among farming systems that are integrated within the modern institutions, extension services, financial organizations, markets, input supply, and transportation companies are very essential for its decision-making and success. Nowadays, both institutions are accessed by farmers as deemed necessary. In konso, Ethiopia for instance stone terraces have been built from internal motivation and institutions, and from the personal experience of the Konso people without any external influences or forced labour programmes.



<b>Self-Check -5</b>	<b>Written Test</b>
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are external factors could enhance or inhibit farmers' decisions on land and water management? (5points)
2. Who are those institutions typical routes for external intervention (through research and extension services) in rural communities in SWC in Ethiopia? (10 points)

**Note: Satisfactory rating >7.5 points**

**Unsatisfactory - below 7.5 points**

**Answer Sheet**

Score = \_\_\_\_\_

Rating: \_\_\_\_\_



<b>Information Sheet-6</b>	<b>Documenting details of consultation /research</b>
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Documenting details of consultation/ research refers to collecting relevant research/ consultation details together as evidence or as reference material. Documentation will facilitate the process of providing written details or information about Indigenous land and water management practices.

The decision-maker does not close his/her mind from all the processes gone through to arrive at the decision. The original situation is always re-visited by comparing it with the new situation by referring the documented evidences. Social learning plays its role by showing what others do in similar situations. What have they gained or lost? Such questions run through the decision-maker's mind with repercussions to the ongoing practices depending on his or her attitude and through references. When the decision maker's evaluation is consistent with previous evaluative frames of reference, s/he will choose to continue with the new practice or idea. Otherwise, it may be modified to suit his/her needs, or rejected altogether, going back to the original practice. Similar action is taken for emerging issues that are related to this decision-making.

The Konso people live in south-western Ethiopia, in the former Gomu Gofa province. They are well known for their stone terraces that are believed to have existed for over four hundred years. In spite of external interventions, the system has maintained its characteristics, albeit, with its own pace of dynamism. Documentation of research and consultation about the system will also help in keeping the system for the future generation. In appreciation of their contribution to natural resources conservation, the United Nations extended an award to the Konso people. In addition, Ethiopian Scientists (mainly, Anthropologist/Sociologists) and their associates registered as are World Cultural Heritage centre.





<b>Self-Check -6</b>	<b>Written Test</b>
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Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Short Answer Questions

**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Why documentation? (5points)
2. Why the United Nations extended an award to the Konso people?(5points)

**Note: Satisfactory rating - 5 points**

**Unsatisfactory - below 5 points**

### Answer Sheet

Score = \_\_\_\_\_

Rating: \_\_\_\_\_



## List of Reference Materials

### 1- BOOKS

Mitiku, H., Herweg, K., Stillhardt, B., 2006 *Sustainable Land Management – A New Approach to Soil and Water Conservation in Ethiopia*. Mekelle, Ethiopia: Land Resources Management and Environmental Protection Department, Mekelle University; Bern, Switzerland: Centre for Development and Environment (CDE), University of Bern, and Swiss National Centre of Competence in Research (NCCR) North-South. 269 pp.

LAND DEGRADATION ASSESSMENT IN DRYLANDS (LADA) PROJECT.\_\_\_\_. Manual for local level assessment of land degradation, sustainable land management and Livelihoods: part2 – Field methodology and tools.

Liniger, H.P., R. Mekdaschi Studer, C. Hauert and M. Gurtner. 2011. *Sustainable Land Management in Practice – Guidelines and best Practices for Sub-Saharan Africa*. TerrAfrica, World Overview of Conservation Approaches and Technologies (WOCAT) and Food and Agriculture Organization of the United Nations (FAO).

Humberto Blanco and Rattan Lal.2008. *Principles of Soil Conservation and Management*. Current address:Kansas State University Western Agricultural Research Center-Hays 1232 240<sup>th</sup> Avenue Hays, KS 67 601 USA; The Ohio State University 2021 Coffey Road Columbus OH 43210 422B Kottman Hall USA.

R. P. C. Morgan. 2005. *SOIL EROSION AND CONSERVATION* .3rd ed. published by Blackwell Publishing Ltd. ISBN 1-4051-1781-8 (pbk. : alk. paper): A catalogue record 2004009787.

### 2- Manuals

-Workplace communication teaching manuals used

### 3- WEB ADDRESSES (PUTTING LINKS)