Federal Democratic Republic of Ethiopia

Ministry of Health

Solid and liquid waste management Extension package

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CONTENT

1. Introduction

The proper management of solid wastes generating from individual houses, institutions such as hospitals, health centers; from public eating and drinking establishments (hotels, restaurants etc); from business and working places is a very important part of environmental health service in a community. If these wastes are not properly disposed of, they create breeding places for insects such as flies, mosquitoes etc; they provide food and harborages for rats. These insects and rats are health risk in that they are potential disease transmitters. Rats are an economic as well as health problem.

Solid wastes indiscriminately thrown about are aesthetic problems and nuisance, they pollute land and water bodies of an area.

Similarly, indiscriminate disposal of liquid waste from individual houses, institutions and working places pollute water sources and land, posing serious health problems, nuisance in a community.

Therefore, the purpose of this package program on safe management and disposal of solid and liquid waste is:-

- to develop awareness of the problems;
- to impart knowledge and skill so that households and the community develop keen interest and habit of disposing properly their own waste and consequently create and maintain on their own initiative a healthy environment which is free from health risks, free from pollution and attractive to live.

2. General Objective

To dispose safely solid and liquid wastes, and thereby prevent land, water, and air pollution and reduce health risks which may arise from the indiscriminate disposal of these wastes.

3. Specific Objectives

3.1. To develop knowledge and skill of the community about safe disposal of solid and liquid wastes.

3.2. To prevent environmental pollution by solid and liquid wastes.

3.3. To develop community and households habit about the safe disposal of solid and liquid wastes.

3.4. To create environmental conditions around the houses where no flies, mosquitoes and rodents breed and live.

4. Implementation Strategies

4.1. Introducing to the community the general package program

4.2. Collecting relevant information

4.3. Drawing up action plan which involves the community

4.4. Carrying out training activity

4.5. Establishing co-ordination mechanism with community members, governmental agencies who could be potential supporters of the package program.

4.6. Involving health institutions and health workers of the area.

4.7. Motivating, educating and organizing the community in order to bring about behavior change.

4.8. Using local resources

4.9. Using demonstration method

4.10. Exchanging experience

4.11. Using incentives

4.12. Applying local and government rules and regulations.

4.13. Carrying out monitoring and evaluation activity

5. Activities to be Carried out with regard to solid and liquid wastes disposal package program

5.1. Introducing the community to the package of safe disposal of solid and liquid wastes

- To administrative officials of the area
- To health workers and community health agents of the area.
- To the influential community members
- To governmental and non governmental agencies in the area.

5.2. Carrying out Preliminary Surveying

- Number of people using garbage pit.
- Whether there are community refuse disposal places.
- Identifying equipment and materials for disposal of solid and liquid wastes.
- Whether there are adequate spaces for solid and liquid waste disposal.
- Why the community was not able to dig refuse disposal pits.
- Knowing the level of education and tradition of the community regarding the safe disposal of wastes.

5.3. Preparing work plan with the involvement of the community.

- Preparing action plan involving the community based on the results of the preliminary survey.
- Drawing up weekly, monthly or yearly program schedule as appropriate.

5.4. Carrying out training activity

- Training of community members, community health workers and influential community members who could be potential supporters of the package program.

5.5. Establishing coordination mechanisms with governmental, and non governmental organizations and civic associations who can be potential supporters for the package.

- Administration: to gain administrative support.
- Agriculture: to gain the support of the development workers.
- Education: to train teachers and students in order to enable them to teach the community about the safe disposal of wastes.
- Associations: women's, youth etc.

5.6. Involving health institutions and health workers of the area.

In order to get direct technical support for the implementation of the package.

5.7. Motivate, educate and organize the community to promote their participation in order to bring about behaviour change

- Giving adequate and continuous education at household level about the safe disposal of solid and liquid wastes and how to do it.
- Teach the need for and how to dispose of solid and liquid wastes at meetings, religious gatherings, at public meetings, in schools etc.

5.7.1. Main topics for Teaching Activity

- Solid and liquid wastes are generated as result of the daily activities of man. If these wastes are not properly disposed of, they pollute land, water and air; and they provide breeding places for insects, rats etc, which are the potential transmitters of different diseases. In addition piled up solid wastes can cause instantaneous fire hazard. The following table gives a better understanding about the possible diseases which may result from indiscriminate disposal; and safe methods of solid and liquid waste disposal.

Table 5.7.1.1. Health problems which may be created as result of indiscriminate and unsafe disposal of solid and liquid waste; and preventive measures.

S. N.	Problems which may arise	**Diseases or health risks which may arise**	Preventing Measures
1	Environmental Pollution ▪ Land ▪ Water ▪ Air ▪ Food	Typhoid and Paratyphoid fever, Cholera, Dysentery, respiratory problems, Schistosomiasis, etc	Proper disposal of solid waste: use of garbage pit: or composting; burning • Inappropriate places • Liquid waste should be • lead into absorption pits. • Special precautions should be taken to prevent instantaneous composition in refuse dumping may attract stray dogs; human scavengers etc
2	Breeding places for fly species, harborage for rodents- rats	Malaria, various fly borne diseases, such as Dysenteries, Typhoid fever, etc	
3	Emission of foul smell create nuisance	Worsening of respiratory problems, may create distress	
4	May cause fire accidents	May cause bodily injuries Property loss	

5.8. Carrying out safe disposal of solid and liquid waste using local resources.

5.8.1. Solid Wastes

If not disposed of properly, it becomes breeding places for flies and mosquitoes; harborage for rodents; pollute the environment; consequently health problems for man and domestic animals may be created.

5.8.1.1. Selection of site for solid waste disposal

At house hold level

- It should be at least 10 meters away from houses, and preferably at the back of houses

- There should be at least 30 meters distance from water wells.

At village or kebele level

The site should be at lower gradient and 100 meters distance

- from living places.
- Individual family or communal refuse disposal site should be 30 meters distance and at lower gradient.
- Precaution should be taken to prevent seepage from the collection site during rainy season.

5.8.1.2. Safe disposal methods for solid waste

5.8.1.2.1. Burying or burning waste at house hold level

- Select site 10 meters away from the house.
- When selecting the site, it should be located on the lee-ward direction from the house in order to avoid bad smell and smoke from coming into the house during composting or burning the waste.
- Dig pit: 1 meter width, 2 meters depth, 1 meter length.
- Sort out combustible materials such as straw, grass, carton, garbage such as leftover food stuff, fruit peeling, dead animals etc.
- Burn the combustible ones; and bury the non-combustible such as broken bottles, bones, etc at safe locations, not used for farming.
- Cover with earth after burying.
- Ashes can be used as fertilizer or it can be used for plastering floors mixed with mud.

5.8.1.2.2. Solid waste disposal at village level

- Solid waste disposal at village or kebele level should incorporate the following points:
- Take into consideration that the site gradient wind direction and nearness to the community, i.e. easy access etc.
- The site chosen for burying or burning should be easily accessible, with adequate space.
- Refuse from individual houses should be collected and transported to the final disposal site by such as sacks, plastic bags, buckets, and any receptacle in sanitary manner.
- The refuse should not be left exposed for fly breeding or as harborage for rats.
- The ashes which result from burning can be sprinkled over farms or around houses in gardens.
- The refuse pits should not be accessible to children and domestic animals.

5.8.1.2.3. Methods of using garbage for animal feed

Organic materials: such as left over food items, peelings of fruit such as oranges, potato, etc can be prepared for animal feed. Such practices do not exist in most parts of rural areas. But it can be encouraged as a useful practice. However, if this is done, it has to be done in a way that it should not create health risk to both human and animals.

5.8.1.2.4. Refuse disposal by composting and using as fertilizer

Composting: is the process of converting biodegradable organic waste into fertilizer. This method has a double advantage: safe disposal of solid and semi-solid waste such as cow-dung and other manure, which the end product is compost, which is useful as soil conditioner.

Composting can be carried out as follow:

- Sort out and select decomposable part of solid waste e.g. left over food, peelings of fruits oranges, potato, green grass and fresh leaves. Animal droppings and other biodegradable materials can be included for compositing.
- Dig compost pit at least 50 meters away from living house.
- When composting, pay attention not to create health risk.
- Throw or pile the selected composting materials into the pit. The compost should be turned over after 30 days and again after 60 days. After 90 days, the compost should be free from pathogenic organisms and can be used as fertilizer. The purpose of turning over is to allow air into the composting material.

5.8.1.2.5. Disposal of plastic bags ("Festal")

Plastic bags, commonly known as "festal", is widely used both in urban and rural areas for carrying materials. The cost of plastic bag varies from ten cents upward. It is very convenient and cheap as container. However it is non-biodegradable, remains for a long time without decomposing.

When it is thrown about indiscriminately, it pollutes land surface; it prevents rain water from percolating into the soil, when swallowed by domestic animals, it blocks their digestive organs and kills them. It is easily scattered by wind all over, creating nuisance-unsightly conditions. It is also likely to be breeding places for mosquitoes. The following are some of the methods to reduce the problem of plastic bags.

1. Plastic bags brought by people from shops as wrapping for various items should be collected in one place:-

- At household level it can be used for making carpet such as mat, floor carpet, bags and the like. It is possible to encourage individuals and enterprises to under take such profitable activity.
- At Kebele level explore ways in which the plastic bags can be collected to be used as indicated above.
- If not segregated from items that can be used as fertilizer, bury the plastic bag component.

2. Instead of buying always in plastic bag, people should use the one already bought for wrapping goods.
3. Advise to use instead of plastic bag, such as paper bag, rag bag etc for holding material.

5.8.2. Disposal of liquid waste

5.8.2.1. Source of generation

The source and type of liquid waste generated/ produced are:-

1. Domestic or liquid waste generated from living quarters; from commercial enterprises. The main contents are human excreta mixed with water = (sullage), wastewater from such sources as kitchen, laundry, bath rooms etc
2. From different institutions, e.g schools, health institutions- hospitals, health centers, clinics, research laboratories.

Faeces and urine

- Different wash water
- Various samples blood products, laboratory samples, which are likely to contain disease causing agents

3. Liquid wastes from factories
   - excreta and urine

- Different chemicals injurious to health etc.

5.8.2.2. Health risks which may be encountered from indiscriminate and unsafe disposal of liquid wastes.

- Offensive smell and other constituents may cause respiratory problems.
- It will create aesthetic problem such as nuisance and unsightly conditions in the environment and around living and working places.
- Provide breeding places for flies and mosquitoes, which can spread diseases.
- It can reach to water sources through flooding, will contaminate the water sources.
- Liquid waste from factories, if dumped into streams and rivers without treatment will cause serious health risk to humans, animals and plant life.
- It will contaminate underground water by biological pathogens and toxic chemicals.

5.8.2.3. Liquid waste disposal methods

Liquid waste treatment and disposal is very complex field and needs special technical know how. Under village and rural places, where this package program is envisaged to be implemented, simple and practicable methods are given.

By building latrine and using

As far as excreta, faeces and urine are concerned, the construction and hygienic use of latrine as treated in different package under human excreta disposal (please refer to it).

Absorption pit

Absorption pit is a method we use to disposal liquid waste from bathroom, waste from washing clothes (laundry waste) without polluting the environment

Selecting site for absorption pit

- Should be dug in such a way to prevent water pollution; at least 30 meters distance from water source, and lower gradient.
- The absorption capacity of the soil must be determined before hand
- Should be located at least 10 meters away from the house.
- Before preparing the absorption pit, care should be taken not to touch the ground water. This can be determined by asking the local people the water table level of the area.

How to build absorption pit for liquid waste generated from living house

1. Dig a pit 1 meter width, 1 meter height and 1 meter deep,
2. Fill with gravel up to the height of 40 cm. From bottom upward.
3. Above the gravel put smaller gravel 30 cm., i.e. over the larger gravel.
4. Over the remaining 30 cm. put perforated pot at the center of the pit. Fill the remaining pit height with gravel and sand. It is better to fill the pot with grass by avoiding solid and fatty matter .
5. Cover the mouth of the pot with perforated tin.
6. Connect by drainage the liquid waste generated from the to the absorption pit, or pouring the liquid by hand into the absorption pit is possible
7. In order to prolong the usage period of the absorption pit, waste water or rain water coming through gutter should be diverted by digging diversion ditch one meter away from the surrounding of the absorption pit.

The picture shows how to construct absorption pit using different material from locally available items

5.9. Using demonstration

- Prepare for demonstration proper and safe disposal method of solid and liquid waste for households and individuals, so that they will be able to replicate the same in their areas.
- At household level let the neighboring households visit the demonstration site to replicate in their areas.

5.10. Exchanging experiences

At household level, households who did not prepare safe disposal means for solid and liquid waste disposal should visit those households who are exemplary in implementing the package program;

For the Health Extension worker

Enable the extension workers to get togetter and exchange their experiences.

5.11. Motivation methods

- Give prizes to those households who have shown good cooperation and progress in implementing the package program.
- Giving certificate of merit.
- Give easily a variable local material.
- Citing in meetings as exemplary.

5.12. Applying local rules and regulations

- Applying the area rules and regulations by synchronizing with that of the government.
- Enabling the community to draw up administrative guidelines which will be approved by themselves.
- Implementing government policies and guidelines.

5.13. Carrying out monitoring and evaluation activity:

- Carrying out monitoring and evaluation activity on the implementation progress of the plan of action on weekly, monthly or yearly basis as appropriate.
- Evaluate the activity implementation rate involving the community.
- Enable the community to be involved on the evaluation of the achieved activities as per plan of action.

6. Expected Outcome

Expected outcome from the implementation of safe solid and liquid waste disposal.

Expected outcome

- Peoples health would be maintained .
- People individually or in group will develop the habit of safe disposal of solid and liquid waste.

- People will implement the package program using locally available materials and as a result pollution of living and working environment will be reduced.
- The implementers will have adequate knowledge about their living and working environment.
- People's knowledge and habit of drawing up safe solid and liquid waste implementation plan will be increased.
- The training which have been given could have created more people who could support the package program implementor.
- People's knowledge and skill will be developed on how to implement the package program.
- Coordinated working pattern will be developed
- Through people to people exchanging of experience, people will accomplish what are expected from them on their own accord.
- The package program will be implemented within the plan period.

7. Short methods of communication

7.1. Places for communicating messages

- House to house visit (at house hold level)
- At village
- At schools
- At health institutions
- At religious places (churches and mosques)
- At social meeting places such as Edir etc
- At market places
- At development offices.

7.2. Methods of communicating messages

- Person to person (one to one) discussion
- By calling meeting (beg one)
- Group meetings

- Using demonstration method
- Using drama, songs, poetry, by story letting telling
- Using exhibition
- Presenting different acts during holidays
- Using tape recorder
- Using newspapers, radio, television and the like mass media available in the locality
- Using educational films.

7.3. Messages to be communicated

Will be accomplished on the basis of the detailed plan of action.

8. Problems which may be encountered in implementing the package program and their solutions

8.1. Problems which may be encountered.

- Lack of adequate space in the kebele or village for solid waste disposal.
- Lack of willingness to carry the waste to the disposal site.
- Lack of knowledge about the wastes being source of disease-causing agents.
- Lack of knowledge and skill on how to compost waste and use.

8.2. Solutions

- At kebele or village level, where solid waste disposal methods cannot be practiced, enable the households to use their own methods for each household to dispose safely.
- Give continuous education to the community on the problems which may be created as result of unsafe disposal of solid and liquid waste; in order to bring about behavior change.

9. Monitoring and Evaluation

9.1. Monitoring

- Number of people given health education on safe disposal of solid and liquid waste.
- Male_____ Female_____ Total_____
- Number of meetings held on safe disposal of solid and liquid waste.
- Type and number of audio-visual materials used for implementing the package program.
- Do the communities have household or community refuse pit?
- Do they use the refuse disposal pits?
- Are the refuse pits and their surroundings kept tidy and clean?
- Has each household prepared temporary solid waste storage container?
- Are the individual household and its surroundings kept clean?
- Is there soakage pit for liquid waste disposal?
- Are flies, rats, mosquitos and dogs present in the compound?

9.2. Evaluation

- The general and specific objectives of the package program.
- Details of the plan of action prepared to implement the package program.
- Resources used for implementing the package program.
  - Manpower: professional and number.
  - Materials: from local and donations.
  - Finance: from the community and external assistance
- Strategies of implementation
  - Field trips
  - By collecting and analyzing reports

- By discussing with the beneficiaries

- Activities accomplished
  - Coverage indicators (numbers, percent or ratio)
  - Strong points identified
  - Weak points detected
  - Impact on the health of the community by the accomplished activities.
  - Problems encountered.
  - Ideas and suggestions given to solve the problems.