



Republic of Serbia
City of Nis
MAYOR

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PROJECT PROPOSAL

Project Title: *Production of Compost*

Prepared By: Nis Incubator Center

Sector: Environment Protection and Production of Healthy Food

Project Duration: 24 months

Introduction

Due to the increasing population growth, industrialization, urbanization and economic wealth, the amounts of waste are building up and increasing. The chemical composition of the waste is more complex and more damaging to human health and the environment. Municipal waste consists of household waste generated in residential buildings, official buildings, stores, etc., and of waste from public areas (mostly stable organic matter known as a "green waste", waste from plants, cardboard boxes, etc., and partly volatile organic substances as food wastes, animal residues). The most important feature of this waste is that it rots easily and degrades quickly especially in summer when temperatures are high.

Emergence and spread of unpleasant odors is the following process of waste decay. Much of the communal waste (40-70) % consists of organic materials. The organic composition of municipal waste is made of paper products, plastics, food waste, yard waste, textiles and rubber. Some of that waste such as old thrown newspapers or office paper or cardboard boxes can be significantly restored by recycling. Other potentially useful materials such as backyard waste, food waste and other types of paper go to the landfill. This part of municipal waste can avoid the decomposition of the landfill it can be and used for compost.

Composting or making compost is a controlled decomposition of organic matter in a warm, moist environment by the activity of bacteria, fungi and other microorganisms. The organic composition can be made of municipal solid waste, sewage sludge, agricultural waste and other yard waste or a combination of these materials with other organic materials.

Short Description of the Current Situation and the Needs for This Project

Creating compost has become an increasingly popular option for waste management as a way to divert the flow of waste and reduce pressure on landfills. Because of the importance of composting in achieving the objectives of waste management the number of plants for creating compost in the world significantly increased in the past 10 years.

For proper treatment of organic waste the composting facility should be built. Re-use of these materials would significantly reduce the total amount of waste on permanent landfills, which would extend their usage.

For this reason and for the sake of the environment preservation certain funds should be invested into collection of this waste, compost making and its use for soil conditioning.

Composting is mainly used for the treatment of:

- yard waste,
- organic components of municipal solid waste
- partially treated and mixed communal waste and
- organic fraction of municipal solid waste with sludge from wastewaters.

Compost as final product has a number of potential applications. The primary use is in agriculture (it provides nutrients to the land, improves the growth of the plants, improves the structure, moisture retention capacity and soil loosening and increases microbial colonization of the country). Compost fertilizer, depending on the original composition of the waste, can be used as a supplement to land in city parks, gardens, public flower beds, wide green surfaces, lawns, and home greenhouses and other. It is also used as the cover protecting the land, while the soil maintains humidity reducing the need for irrigation, reducing weed growth, protecting the soil from the change of temperature. Studies have shown that using compost stops the spreading of plant diseases and pests and it can help farmers to save money, reduce pesticide use and protect natural resources. Compost can be used as the cover while depositing (burying) waste, for re-forestation, wetlands restoration, and habitat revitalization. The advantage is that the compost is the stable product and it can be stored and used when required.

Project Description

The project envisages construction of a facility for the production of compost with all supporting equipment and infrastructure. Selected solution for composting facility will use outdoor composting technology, composting in bunkers, with forced ventilation of the material through the bottom of the bunker and the constant monitoring and management of the processes, thereby minimizing the problems that occur during composting and getting the desired compost quality. Bunkers are high concrete channels with concrete floor where perforated tubes are built in through which air is blown to vent the mass. Air blowing is accomplished by means of fan and system of pipes. There are channels in the floor of the bunkers which collect leachate which are returning to the composting process. The microorganisms decompose the raw material, the temperature of the mass increases due to

the heat released by microbial action, while reducing the volume of the mass. The following parameters are monitored continually: humidity, temperature, pH, oxygen content, airflow.

After two weeks, the decomposition is continued in the building, in the enclosed bunkers, where the material is hermetically sealed (to achieve a process temperature of 65 ° C) and it is held at that temperature for 3 days, in order to kill pathogenic and plant seeds. Due to the high temperatures great evaporation of the mass occurs in this part of this process, while the vapors are collected and bio-filtered before being released into the outside atmosphere. The composting process is complete in about 21 days after which the compost matures. At the end the analysis of the mature or stable compost is carried out: the chemical composition is being determined, as well as the moisture, pH, the content of a pathogen, which it is important to know because of the use of compost. Then the compost is packed and distributed to the customers. Compost is packed into briquettes weighing between 19-21 kg, with standard dimension 56x36x15 cm or 56x36x20 cm.

Potentially useful materials for composting are: yard waste (grass, leaves, parts of shrubs and trees), food waste, paper, organic fractions, agricultural wastes (crop residues, animal manure) and waste from food processing plants.

The composting process usually involves the following three steps:

- pre - treatment (e.g., shredding, sieving, feeding, etc...)
- decomposition and stabilization of organic materials (in a two-stage process),
- finishing (e.g., grinding, filtering, placing into bags and market placement).

Basic environmental factors which regulate the speed and the degree of decomposition are: the ratio of carbon and nitrogen(C, N), the presence of oxygen, moisture, temperature, pH, particle size of the starting material. Total time of the compost creation, including the original waste disposal, is determined by the composition, the used process and the time of exposure of the material. From 3 to 18 weeks may be required for the treatment and stabilization of compost. Key problems in carrying out the process of composting are related to: generating unpleasant odor, presence of pathogens, presence of heavy metals, defining what constitutes acceptable compost fertilizer.

Generating unpleasant odor can be a problem if there is no control of the composting process (especially in the process of creating compost in long types). Therefore, the choice of the location of the plant, process design and management of the unpleasant odor is essential. The planned facility for the production of compost will be located in the industrial zone of MIN Nis.

About 30 workers can be employed in such facility.

Project Objective

General Objective: Improving the system of green waste disposal and management in Nis region

Specific Objectives:

1. Built composting facility with the supporting infrastructure
2. Purchased equipment for the composting facility

3. Production of compost – organic fertilizer

Target Group

Direct Target Group:

- Local self-government
- Company for communal service Medijana
- Producers of organic food
- Companies/factories with organic waste
- Farms and small ranchers

Indirect Target Group:

The citizens of Nis region

Activities

1. Preparing Project Documentation

Before proceeding to the construction of the facility it is necessary to prepare complete project documentation and appropriate communal permits for construction, as well as the permits issued by the competent ministry for waste management.

2. Construction of Facility for Compost Production

The compost producing facility should be closed, with facilities for pasteurization of compost and the space for final compost product storing. The concrete boxes for mixing and maturing compost should be built outside as well as eaves and greenhouses for compost drying, and concrete surfaces for preparation of materials and preparation of compost. The total area of the building should be between 300-500m² while the concrete surfaces should cover the area of 3.000m².

3. Procurement of Necessary Equipment

The following equipment should be procured: a tractor with a trailer and spoons and other small equipment, such as hand carts, forks, shovels, hoses for watering etc... Then, the plant for pasteurization of compost, the plant for sieving and packing, forklift, floor coverings, should be procured as well. A detailed list of required equipment will be provided in the main project.

4. Procurement of Raw Materials for Compost Production

The procurement of biomass in large quantities is possible with the help of Public Utility Company Mediana and with the contracts with the agricultural cooperatives and farms in the region. Organic wastes can be purchased from food producers, butchers and other processing plants. Also, it is very important that constant supplies of the manure are contracted since it is necessary for the compost production.

5. Compost Production and Distribution

The technology of compost production is of the standard type. The quality of the compost depends on raw materials which are used for its production. Rapid biodegradation can be

achieved by adding a " bio-algeen" agents or "BC-1" product for rapid composting, which accelerates the fermentation. In this way plants and organic waste have become refined compost, which has a wide use.

Expected Project Results

- Built facility for compost production with the supporting infrastructure
- Completely equipped facility for compost production
- 30 workers employed
- 15.000 tons produces annually
- Improved organic production in the region

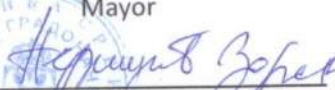
Ecologic Aspect of Organic Production

In agricultural production the compost becomes indispensable due to the economic justification together with the preserving of the environment, which is increasingly becoming the obligation for food producers. The compost improves soil structure, without polluting the environment, reduces the use of mineral fertilizers and reduces the use of herbicides and pesticides because the plants become more resistant. The compost does not have any weed seeds and it impacts indirectly reducing treatments of weeds while preserving the environment. With the longer use of the compost, the land is tilled more easily and the oil is used less which has economic and environmental benefits.

Needed Funds: 100.000.000 RSD

Note:

The project will be implemented through the strategic partnership between the City of Nis and potential investors.

Mayor

Zoran Perisic, MD, PhD

