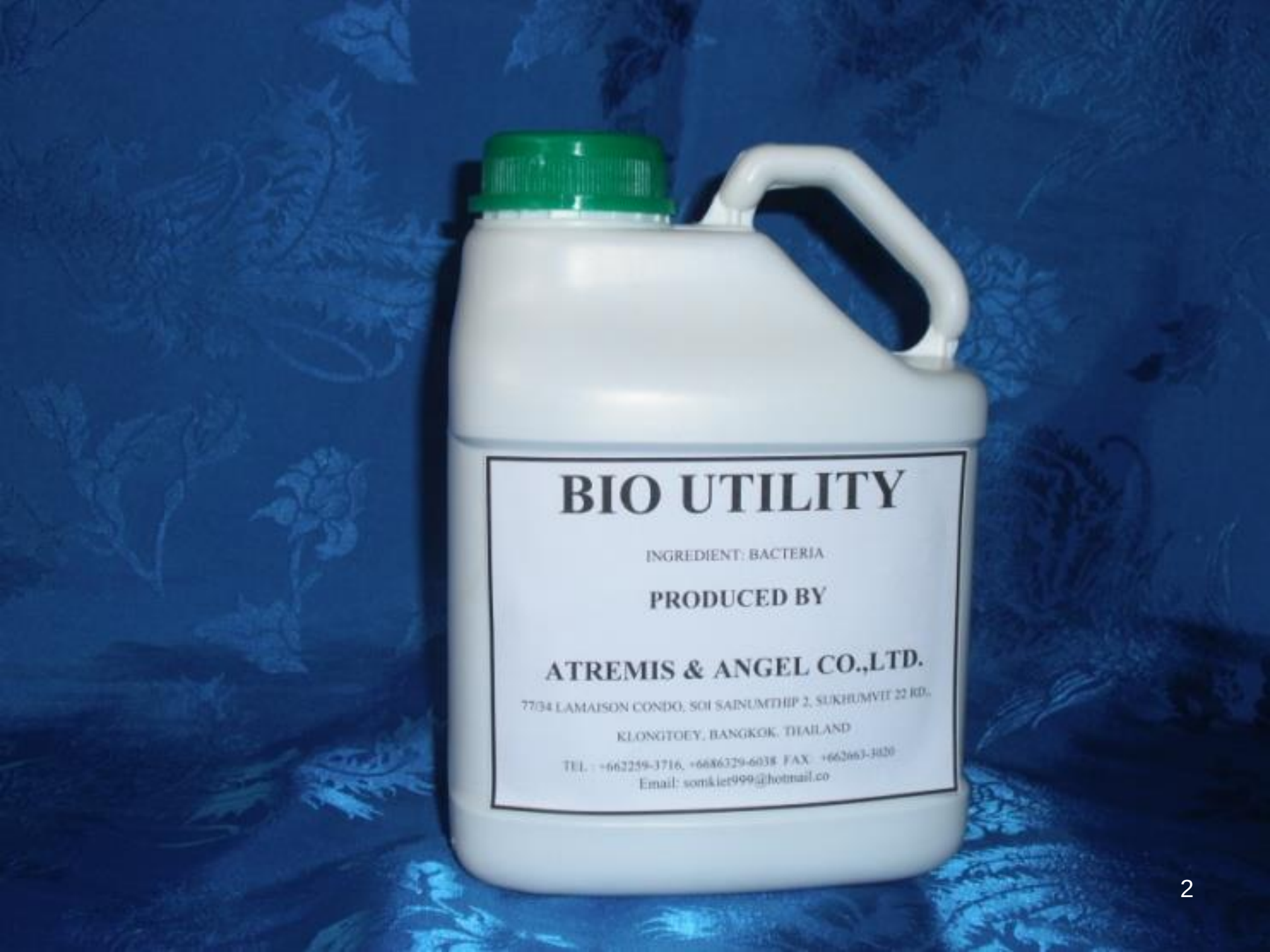
The Benefits of Using Bio-Utility to Treat Wastewater and Rubbish


BIO UTILITY
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1.

What is Bio-Utility and How Does It Work?

What It Does

- Bio-Utility is a 100% natural, environmentally friendly, chemical-free, non-pathogenic, live, microbial product that uses naturally occurring and beneficial bacteria to eat and digest waste and other organic contaminants in a wide array of commercial, industrial, agricultural, aquaculture, and residential applications, including water that has been polluted by distilleries and breweries.
- It provides a very effective biological alternative to chemicals and caustic solvents.

Micro-organism Ingredients

- Bio-Utility is a very concentrated microbial liquid, with a heavy concentration of micro-organisms, such as Bacillus, Nitrobacter, Nitrosomonas, and Pseudomonas. Specific micro-organisms can be added according to the needs of certain problems.

Where It Can Be Used

- Residential wastewater treatment.
- Household and commercial property drains, drain pipes, and septic tanks.
- Municipal wastewater lagoons and treatment plants.
- Fish farms and shrimp farms.
- Lakes and ponds, including on golf courses.
- Distilleries, sugar mills, and breweries.
- Textiles, chemicals, and pharmaceuticals factories.
- Oil industry wastewater treatment plants.
- Portable toilets.
- Hotels and restaurants.

Treating Rubbish

- **Bio-Utility can be used:**
  - To degrade rubbish in landfills and turn it into fertilizer.
  - To remove the foul smell caused by piles of rubbish.

A Typical Smelly Rubbish Dump

Treats Rubbish Biologically

- Bio-Utility provides biological rubbish and wastewater treatment by using micro-organisms which multiply very rapidly to degrade organic waste naturally.
- 1 cc contains 1 billion cells. Each cell multiplies into one million cells per day.
- In wastewater this results in Biochemical Oxygen Demand (BOD) reduction, Chemical Oxygen Demand (COD) reduction, and smell control.
  - *These indicate the amount of organic pollution present in an aquatic ecosystem.*

The Bacteria Produce Enzymes

- Bio-Utility provides a heavy concentration of micro-organisms to treat rubbish, wastewater, and polluted water.
- As the bacteria metabolize, grow, and divide, they produce enzymes. It is these enzymes that break down pollutants.
- The bacteria are literally factories for the production of enzymes.

Here is some research about the effectiveness and benefits of using enzymes to deal with polluted water and wastewater biologically.

https://scielo.conicyt.cl/scielo.php?script=sci_arttext&pid=S0718-95162010000100008

The Enzymes

- The enzymes which are produced by the bacteria are appropriate to the environment in which the enzymes will be working.
- You therefore have automatic production of the right enzymes for the biological reduction of any waste material because Bio-Utility contains the appropriate bacteria to start with.

How the Enzymes Work

- Enzymes create biochemical reactions as organic catalysts. The enzymes create a reaction, and after having caused it, split off and are unchanged.
- After the biochemical reactions are complete and products formed, the enzyme is released to catalyze another reaction.

The Enzymes Break Down the Organic Matter

- The enzymes break down the organic matter into water soluble nutrients, which the bacteria digest. The bacterial digestion process consumes the organic matter.
- Using complex chemical reactions, the organic waste is metabolized down to water and Carbon Dioxide, thereby providing the bacteria with energy for growth and reproduction.

The Action of the Enzymes

- The enzymes decompose the organic waste instantly.
- The micro-organisms in the formula degrade totally the waste decomposed by the enzymes by means of biological oxidation.
- Because the organic waste is consumed by the bacteria, it is then no longer present to produce odours, sludge, pollution, or unsightly mess.

Bio-Utility Removes the Chemicals

- The smell disappears as the chemicals are consumed by the micro-organisms in Bio-Utility.
- The micro-organisms break down the chemicals into different forms, which are then made harmless or are consumed by the micro-organisms.

It Eliminates Foul Smells

- The enzymatic and bacterial action removes the source of the smell problems.
- Removes foul smells from rubbish, drains, ponds, golf course lakes, and waste water lagoons.
- Degrades solid waste (such as in portable toilets and sceptic tanks) and eliminates foul smells.
- Prevents blockings and foul smells in bathroom and kitchen drains.
- Eliminates foul smells from kitchen exhausts.
- Degrades biologically the organic deposits in grease traps.

Ensures Effective Treatment of Organic Matter

- Foul smells arise from a lack of oxygen and by the slow decay of organic matter in the water.
- The strong concentration of aerobic and anaerobic micro-organisms in Bio-Utility is very effective in breaking down organic matter and removing smells.

2.

How to Apply Bio-Utility to Treat Rubbish and Turn It into Compost

The Common Solution:
Rubbish Is Burned

Effect of the Micro-organisms on the Rubbish Piles

- Ideally, the non-degradable rubbish (metal, polystyrene, cans, etc.) should be separated from the degradable, organic rubbish first.
- If this cannot be done, while the rubbish is decomposing, people can separate the non-degradable rubbish from the piles of rubbish.
- After spraying the rubbish, there will be much less smell and danger for the rubbish pickers.

Method for Treating Rubbish and Turning It Into Compost

- ***For municipal rubbish dumps where the organic matter has not been separated from the non-biodegradable rubbish:***
- Spray Bio-Utility on the rubbish. The dosage should be 1 litre of Bio-Utility mixed with 200 litres of water per 5 - 10 MT tonnes of rubbish.
- Leave the rubbish for 35-40 days. Turn over the rubbish every 3-4 days. It will turn into compost.
- 1 litre of Bio-Utility is enough per 400 square metres of land. 10 bottles per 4,000 square metres.

Use Water Cannons to Spray Micro-organisms Onto Rubbish

Spraying Micro-organisms onto Piles of Rubbish

The Micro-organisms Decompose the Rubbish

- Bio-Utility contains anaerobic and aerobic micro-organisms.
- This means that the decomposition can take place both inside the piles of rubbish as well as near and on the surface. This speeds up the speed of decomposition.

Turn Over the Rubbish

- Use bulldozers to turn over the rubbish every 3-4 days so that the rubbish deep down in the piles can receive oxygen.

Turn Over the Rubbish Regularly

Effect of the Micro-organisms on the Rubbish Piles

- The micro-organisms will decompose the organic matter, and after about 35-40 days the rubbish piles will be about 50% lower.
- The organic matter can then be screened and turned into compost, which can be bagged and sold.

The Volume of Rubbish Will Decrease by About 50%

Some of the Benefits

- Significant reduction of:
  - foul smell (No need to spray perfume on the rubbish!)
  - mosquitoes, flies, crows, and pests.
  - gas emissions.
- Reduced BOD and COD levels in water flowing from the rubbish piles.
- The remaining rubbish with be rich in micro-organisms, Nitrogen, Phosphorus, and minerals, and can be used to make excellent compost.
- Some screening of non-degradable rubbish may be necessary before the compost can be sold.

Turning Rubbish into Compost

3.

Composting Biodegradable Rubbish

Prepare the Windrows

- Obtain the bio-degradable materials from the rubbish dump for the compost.
- Grind or cut up the material before composting it.
- Lay out the material in windrows. Mix it with soil and organic matter.
- Turn it regularly with a windrow machine. Spray the windrow with water mixed with Bio-Utility or Bio-Plant as it is turned.

Bio-degradable Rubbish Being Composted

Windrows of Compost Being Made with Bio-degradable Rubbish

Fish & Shellfish Waste Can Be Composted with Bio-Utility

Compost the Rubbish with Organic Matter

Bacteria have reduced the size of the windrow.

The waste is shown in the early stages of being treated.

Create Many Windrows of Compost

Create Many Windrows of Compost

A Windrow Compost-Making Machine

Mix the Compost Materials in Rows

A Windrow Compost-Making Machine in Action

Video of Windrow Composting

- This video shows a windrow composting machine in action. Bio-Plant mixed with water would be sprayed onto the compost, just as you see water being sprayed in the video.

  https://www.youtube.com/watch?v=x71nIMkYvVM

  (Until 2:10 mins.)

4.

Using the Compost Made with Rubbish in Soil Preparation

The compost made with rubbish and organic matter can be used in the same way as ordinary compost. But if no soil and/or organic matter was added, farmers should double the amount they use when preparing the soil.

Some farmers will be mistrustful about using only compost made from rubbish when preparing the soil. Consequently, here are 4 methods in which the rubbish-compost can be used in the soil preparation.

Method 1
Normal Soil Preparation

- The normal ratio is 1 litre of Bio-Plant mixed with 5 MT of organic matter per hectare.
- Spread the organic matter mixture over the hectare and spray 500 litres of water over it before ploughing it into the soil.

Method 1
Normal Soil Preparation

Compost Composition Per 5 Tonnes:

- Chicken Dung: at least 1,500 kgs.
- Cow dung, ground up dried grass, crop debris, etc.: 3,000 kgs.
- Earth (black soil is the best): 500 kgs.

Method 1
Normal Soil Preparation

Rubbish-Compost Composition Per Hectare:

- Rubbish-compost:
  - 10 MT when the soil is good.
  - Up to 20 MT when the soil is poor.
- Adding the following will be very beneficial:
  - Chicken Dung: 1-1.5 MT per hectare (very good!)
  - Cow dung, ground up dried grass and crop debris, etc.: 1-1.5 MT per hectare (if available)
  - Earth (black soil is the best): 500 kgs (if available)

Method 1
Normal Soil Preparation

- Leave the organic matter in the soil for 2 weeks before planting the crop.
- Leaving the soil for about 14 days allows the micro-organisms to multiply adequately before the crop is planted.

Method 2
Preparing the Soil with Bio-compost

- Prepare an area for the compost of 5m long x 1m wide x 1m deep.
- This will be enough to make 5 tonnes of organic fertilizer.

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  - Earth (black soil is the best): 500 kgs (if available)

Method 2
Preparing the Soil with Bio-compost

- Make layers of the organic matter, as follows:
  - A 25 cm layer of the rubbish-compost.
  - Then place on top a 25 cm layer of chicken dung and cow dung.
  - Then a 25 cm layer of dried grass, crop debris, etc.
  - Place on top of that a 25 cm layer of earth.
  - Then keep on placing on top alternating 25 cm layers.

Method 2
Preparing the Soil with Bio-compost

- Spray every layer with the following mixture:
  - For each tonne of compost mix 20 litres of water with Pro-Plant (200 cc) and Bio-Plant (200 cc).
  - Use 1 litre of Bio-Plant and 1 litre of Pro-Plant per 5 tonnes and 2 litres of each for 10 tonnes.
  - Adjust the amount for extra tonnage.

Method 2
Preparing the Soil with Bio-compost

- Then cover the pile with a plastic cover so that no air gets in. Leave it for 6-8 weeks.
- The longer the farmer leaves it, the more time the micro-organisms have to multiply in the fertilizer mixture before the compost is placed on the soil.
- Open the plastic and turn over and mix the compost every week.

How to Increase the Beneficial Effects

There is a special way to increase the growth rate of the micro-organisms and to increase the beneficial effects of the micro-organisms on the rubbish. It requires a little extra work, but it is worth it. This is described to our customers.

Method 3
Special Compost With the Bio-fertilizers

- Divide the special mixture referred to in Slide 49 into 3 parts and mix each 34 litres with 66 litres (or less) of water and pour over 2 MT of organic matter *(see next slide)*. 2 MT is enough for an acre, but using more is beneficial.
  - The more of this organic matter that you use on a hectare, the better, but if the farmer use 5 tonnes per hectare, the soil and crop will benefit a lot.
- If the cost is satisfactory, you could add more Bio-Plant to increase the micro-organisms.

Method 3
Special Compost With the Bio-fertilizers

Rubbish-Compost Composition Per Hectare:

- Rubbish-compost:
  - 10 MT when the soil is good.
  - Up to 20 MT when the soil is poor.
- Adding the following will be very beneficial:
  - Chicken Dung: 1-1.5 MT per hectare (very good!)
  - Cow dung, ground up dried grass and crop debris, etc.: 1-1.5 MT per hectare (if available)
  - Earth (black soil is the best): 500 kgs (if available)

5.

Treating Rubbish with Bio-Utility to Turn Desert & Savannah into Agricultural Soil

How to Turn Desert or Savannah "Dirt" into Agricultural Soil

- There are various ways to apply the compost made with rubbish to change the "dirt" of savannah land into agricultural land.
  - e.g. the "dirt" could be covered with the compost and then lightly ploughed. A mixture of cover crops would then be planted. Before the cover crops go to seed, they would be mowed down and the seeds of the cash crop would be planted through the organic matter. Conservation farming would then follow.

The Volume of Rubbish in Landfills Could Be Reduced

- By treating large amounts of bio-degradable rubbish with the micro-organisms of Bio-Utility in windrows, a huge amount of rubbish could be turned into compost. This is a solution to the constant increase in the amount of rubbish.
- Vast areas of desert and savannah could then be turned into soil that can be used for agriculture.

The Main Effects and Benefits

- As the process is implemented around the country, and the new land is used for crops and for planting forests, there will be fewer and fewer desert soil (sand) storms.
- Towns could be created in current desert-like areas.
- Forests could be created as part of the transformation process.

How to Use Rubbish to Turn Desert into Agricultural Soil

- The following instructions are for making enough soil for an area of 400 square metres and about 1,200 tonnes of rubbish.
- The same model could be used throughout the unused areas of the country to turn desert into agricultural land or oases of inhabitable land.

How to Use Rubbish to Turn Desert into Agricultural Soil

- Use earth-moving machinery to dig a hole 20 metres long x 20 metres wide x 20 metres high.
- Place thick plastic or rubber sheeting at the bottom of the hole to prevent water and moisture seeping down into the ground below the hole.

How to Use Rubbish to Turn Desert into Agricultural Soil

- Place a 2-metre layer of rubbish at the bottom of the hole.
- Spray Bio-Utility on the rubbish.
- The dosage should be at least 1 litre of Bio-Utility mixed with 1,000 litres of water per 100 tonnes of rubbish.
- If you use more than 1 litre the process will be faster as there will be more micro-organisms to dissolve the rubbish.

How to Use Rubbish to Turn Desert into Agricultural Soil

- The rubbish does not have to be ground up, but it would be useful to do so.
- Then cover the 2 metres of rubbish with 1 metre of sand.
- Cover the one metre of sand with 2 metres more of rubbish.
- Spray Bio-Utility on top of the rubbish as before.
- Cover the rubbish with 1 metre of sand.

How to Use Rubbish to Turn Desert into Agricultural Soil

- Cover the earth with 2 metres more of rubbish, and spray Bio-Utility mixed with water on it at the same dosage as before.
- Carry out this process 6 times (6 x 3 metres) until the hole is filled with earth and rubbish up to 2 metres from the surface.

How to Use Rubbish to Turn Desert into Agricultural Soil

- Place thick plastic or rubber sheeting on top of the sixth layer of rubbish and earth to prevent water that is poured onto the soil above and rain water from being lost below the 2 metres where the crop is growing.
- This layer will also ensure that the moisture that the micro-organisms in the 18 metres below need to dissolve the rubbish does not disperse into the atmosphere.
- Cover the hole with 2 metres of good soil and plant a crop as normal.

The Main Effects and Benefits

- This is a solution to the constant increase in the amount of rubbish. The rubbish will be dissolved by the micro-organisms of Bio-Utility. It can therefore be dealt with without polluting the environment as happens in the usual ways in which rubbish is disposed of.
- Vast areas of the desert can be turned into soil that can be used for agriculture.
- The use of the Bio-Utility prevents the landfill area smelling. Rubbish landfills usually smell badly.

The Main Effects and Benefits

- As the rubbish is broken down by the micro-organisms, the level of the soil will sink, probably at the rate of about a metre per year. While the land will become good for agriculture, no buildings should be constructed on the land for about 5 years while the rubbish dissolves and the land sinks.

The Main Effects and Benefits

- If crops are planted on the landfill the plants will absorb much of the Carbon Dioxide that escapes and turn it into Oxygen, sugar, and starch, which plants and trees need for growth.
- The process costs very little, especially when one considers the cost of other means of disposing of rubbish, such as rubbish incinerators.

The Main Effects and Benefits

- To begin with, soil will have to be imported to act as the top soil to cover the holes filled with rubbish and soil.
- But after about 5 years you will be able to take the earth at a depth of 3-5 metres and use it as new top soil elsewhere.
- Each year afterwards you will be able to take soil from a deeper level and use that as top soil somewhere else in the country.

The Main Effects and Benefits

- As the process is implemented around the country, and the new land is used for crops and for planting forests, there will be fewer and fewer desert soil (sand) storms.
- Towns can be created in current desert areas.
- Golf courses can be laid out much more cheaply and easily.
- Soil storms will become a thing of the past.
- Forests can be created.

The Main Effects and Benefits

- By applying Bio-Utility to the top soil, the soil will become rich in micro-organisms, very fertile, and excellent for agriculture.
- With so much new soil created around the country, it would be senseless to ruin it all with chemical fertilizers.

The Main Effects and Benefits

- Chemical farming with all its negative health and environmental aspects can be replaced by 100% organic farming for a much lower cost and with a higher yield.
- The farmers can get higher prices for their 100% organic produce and the country will become a major exporter of 100% organic food.

The End