BIOPORE INFILTRATION HOLE: "ONE DAY FOR BIOPORE" AS AN ALTERNATIVE PREVENT FLOOD

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Abstract- Floods are natural disasters caused by the overflow of sea water or river water caused by rainfall. The flood disaster is becoming one of the biggest problems faced in every country because it caused damage, the spread of the disease, and loss of life. In 2012, major floods occurred in five countries: China, Nigeria, Myanmar, Russia, and Italy. Appropriate controlsis a solution to prevent flooding.Kamir R. Brata a researcher of the Institute of Agriculture (IPB), which is the creator Biopore holes technology that use organic waste to cope with stagnant water by increasing the water absorbing power on the ground. Biopore infiltration holes can be used as an alternative for flood control by relying on the principle of water infiltration. Biopore infiltration holes must be applied appropriately, focused and true to the flooding that occurred in various countries can be resolved. Application of biopore technology can be applied by making the policy of "One Day for Biopore". The policy involves all layers of society in every country so that the effect of the biopore infiltration hole can be immediately felt and society becomes more concerned about the environment.

Keywords- Biopore Infiltration Hole, Flooding

I. INTRODUCTION

Many things could be done to prevent any future flooding. One way to prevent flooding or at least reduce it is to make a biopore infiltration hole. Researchers Bogor Agricultural University (IPB), Ir. Kamir R. Brata, M.Sc, Associate Professor Soil Ecology, who also staff the Department of Soil Science and Land Resources, Faculty of Agriculture Biopore successfully developed a technology that is very simple, namely " Biopore Infiltration Hole" to prevent floods and droughts (Ristek 2009).

Biopore is small holes are there in the soil due to the activity of organisms in the soil such as worms, the movement of roots in the soil, termites and other soil fauna. The holes are filled with air and into the path of water flow. Rainwater does not go directly to the sewer, but seep into the ground through the hole. Biopore can be made in the front yard, backyard or garden of the house. biopore hole infiltration with a diameter of 20 cm and the depth 15 cm at intervals of 2 meters proved to be very effective in preventing the occurrence of surface runoff water, erosion and nutrient losses in dry agricultural land.

Flooding caused by high rainfall and lack of water infiltration can be overcome by making a biopore infiltration hole. Biopore application can be done by applying a policy of "One Day for Biopore". The policy is required for all levels of society in each country in a small family.

"One Day for Biopore" can be implemented at the time of Earth Day April 22 at every year. People who violate them will be charged onerous taxes. Biopore infiltration holes that have been created by the community should be documented as evidence has been implementing the "One Day for Biopore".

II. REVIEW OF LITERATUR

A Definition of BioporeInfiltrration Hole
According to Griya (2008), Biopore is small holes in the ground formed by the activity of soil organisms such as worms or movement of roots in the soil. The hole will be filled with air and water become flow paths. So the rain water does not go directly to the sewer, but seep into the ground through the hole.

Ir. Kamir R. Brata, MSc from the Bogor Agriculture University (2008) describes that biopore is "80 cm - 100 cm deep hole with a diameter of 10-30 cm, intended as biopore infiltration pits to collect rain water and seep it back to the land". Biopore enlarge the capacity of the soil to rain water, reducing the pool of water, which further reduces the overflow of rainwater down to the river. Thus, reducing also the flow and volume of river water to a lower level, such as in Jakarta that water capacity is very low because the land is filled by buildings.

According to John Herf (2009), Bioporeinfiltrration hole is made cylindrical holes into the ground with a diameter of 10 cm – 30 cm. In leaflets Biopore described, about a hundred centimeters or depth not exceeding the depth of water table. Holes is filled by organic waste, encourage biopore. Biopore is a pore like canal (small tunnel) which is formed by the activity of soil fauna or plant roots.

Bioporeinfiltrration hole according to Minister of Forestry Regulation No. P.70 / Forestry II 2008 / About the Technical Guidelines for Forest and Land Rehabilitation, is holes in the ground formed by the activities of organisms in it, such as worms, plant roots, termites, and other soil fauna. The holes will be

filled with air and will be a passage of water in the soil. Understanding concluded biopore be made vertical cylindrical holes into the ground and the ground state of the shallow ground water level, not to exceed the depth of ground water. The hole is filled with organic waste that biopore formation. Biopore is shaped hole pores (small tunnel) made by the activity of soil fauna or plant roots, shows a cross section of the holebiopore infiltration.

B How to Make a Bioporeinfiltrration hole

Biopore is one of the water absorption method used to overcome the problem of flooding by increasing the sink in the water in the soil. This method proposed by Dr. Kamir R Brata, one of the researchers from the InstitutPertanian Bogor. How to make Bioporeinfiltrration hole is as follows:

1. Find the right location to make the hole biopore infiltration, namely in the area of rainwater that flows like a garden, parking lot, and so on.
2. The land that would be drilled, must be watered for easy flushing
3. Place the drill perpendicular to the ground to begin drilling.
4. Punch a hole with the drill ground Biopore, (Biopore drill is the drill for mineral soil, with drill presses while playing to right to right to drill into the ground.
5. To facilitate the drilling, do the watering with water during drilling.
6. Each approximately 15cm or as deep as the drill stop, pull the drill bit while still rotated to the right, to clear land located within the drill bit.
7. Clean the land of the drill bit by using a knife or other puncture tool, begin by pressing the ground from the side of the drill bit so that the soil is removed.
8. Do the process of perforating the ground repeatedly until it reaches a depth of approximately 100 cm.
9. If the soil is rocky or gravel, so that inhibition of drilling, the drilling can be stopped to a depth that can be penetrated by the drill bit alone, although only reaching a depth of approximately 50 cm.
10. Then fill with organic waste.

Table 1. Hole Diameter Relationship with the Infiltration and Added Charges

Diameter hole (cm)	Mouth hole (cm^2)	extensive wall ($m^{2)}$	accretion wide (times)	Volume (liter)	load infiltration (liters / m^2)
10	79	0,3143	40	7.857	25
40	1257	1,2571	11	125.714	100
60	2829	1,8857	7	282.857	150
80	5029	2,5143	5	502.857	200
100	7857	3,1429	4	785.714	250

Making biopore infiltration holes in each type of land use can facilitate the utilization of organic waste by putting it into the ground. The location of making holes can be done in the area / location of surface water flows and high sedimentation rate and agricultural land, yard, farm, forest and road edges. Maintenance is done by moving the absorption wells sediment absorption wells to the field of fitness or the plant around as fertilizer. Moving biopore hole on the other side of the organic fertilizer plant as a back up.

C Implications of Application Bioporeinfiltrration hole

Making holes biopore infiltration will increase the ability of the environment to sustain life on it. According Brata and Purwakusuma (2008), that the technology of Bioporeinfiltrration hole, developed based on the principle of maintaining the health of the soil ecosystem to support the existence of biodiversity in the soil by the availability of sufficient water, air, and food sources (organic matter).

Determination of the number of holes biopore infiltration specifically appropriate to a particular area with a certain area and a certain intensity of rain anyway, calculated by equation (Brata 2008):

$n = I \times L\ v$

Remarks:

n: Number of Holes Infiltration Biopore

I: The intensity of the biggest rainfall in 10 years (mm / h)

L: The area of impervious areas (m2)

v: The rate of water infiltration on average per hole (liters / sec)

The main benefits of the hole is its ability to increase the biopore infiltration of rain water infiltration into the soil. Ability biopore infiltration holes in absorb water is affected by the diameter of the hole is made. Relationship with the diameter of the hole infiltration load is shown in Table 1.

Table 1. Hole Diameter Relationship with the Infiltration and Added Charges

Source: Brata and Nelistya 2008.

Table 1 shows that the hole diameter of 10 cm biopore infiltration with a depth of 100 cm using only horizontal surface 79 cm2 produces vertical surface area of 0.314 m2 of wall hole, then expand to 40 times that can absorb water.

The results showed that, in relation to the hole diameter and the load increase surface area of absorption biopore infiltration holes 10 cm in diameter with a depth of 100 cm using only horizontal surface 79 cm 2, resulting in a vertical surface area of 0.314 m2 of wall hole, then expand to 40 times seep water. The volume of water entering the maximum accommodated 7.9 liters will be able to seep through the walls of the hole in any direction, will cause infiltration load a maximum of 25 liters /

m2. Expansion of surface infiltration will decrease and expenses will increase with increased absorption hole diameter. For example, when approaching the hole diameter of 100 cm diameter wells, surface expansion gained only 4 times the load resulted in a decrease in the rate of absorption due to seepage of water-saturated zone is too wide around the walls of the hole, especially when most of the surface catchment will be absorbed as reinforcement wall (Brata and Nelistya 2008). Besides being able to absorb water catchment pit biopore can also compost organic waste.

From the results of falling head permeability tests in soil samples at the sites, the permeability coefficient (k) of 0.000877389 cm / sec. So that kind of soil at a depth of 1 meter in the study site including soil type silt.

No	Length Samples (L) (cm)	Temp. (T) (oC)	Time (t) (dtk)	High Water Front (h) (cm)	Permeability (KToC)	MT°C / M20° C	Permeability (K20)
1	13	28	0	100	0	0.828	0
2	13	28	15	84.3	0.001650163	0.828	0.001366335
3	13	28	15	73.5	0.001591187	0.828	0.001317503
4	13	28	15	61.7	0.001487158	0.828	0.001231367
5	13	28	15	53.5	0.001460556	0.828	0.001209340
6	13	28	15	47.2	0.001440642	0.828	0.001192852
7	13	28	15	40.5	0.001320636	0.828	0.001093487
8	13	28	15	34.0	0.001193079	0.828	0.000987869
9	13	28	15	30.2	0.001141475	0.828	0.000945142
10	13	28	15	26.2	0.001118626	0.828	0.000926223
11	13	28	15	21.7	0.001029631	0.828	0.000852535
12	13	28	15	19.9	0.000936424	0.828	0.000775359
13	13	28	15	17.3	0.000709459	0.828	0.000587432
14	13	28	15	14.8	0.000568519	0.828	0.000470734
15	13	28	15	13.3	0.000247124	0.828	0.000204619
0.000877386							

Source: Haafiz, 2013

According to the Son (2010), that the amount of organic waste that is needed to fill the holes with a depth biopore infiltration of 100 cm and a diameter of 10 cm is 7,2- 7,9 kg over a period of 8 weeks.

This means that within a day of each holebiopore infiltration can accommodate 0.13 kg of waste. Assuming a per capita waste production of 0.8 kg and 60% are organic waste each individual will produce 0.48 kg and holes needed biopore infiltration was 3.7 bioporeinfiltration pit.

In order to function at its optimum Bioporeinfiltrration hole needed ideal amounts. According Brata and Nelistya (2008), that the amount determined by multiplying the ideal LRB extensive impervious areas with rainfall intensity and divided by the rate of water infiltration per hole. Field with an area of 100 m2 impermeable to rain intensity of 50 mm / h and the rate of water infiltration per hole 3 liters / min requires 28 LRB. Assuming that the impervious areas are home and occupied 10 people and made the LRB in accordance with the ideal amount, of 75.67% of organic waste can be accommodated into Bioporeinfiltrration hole.

D Benefits of Technology Biopore

a. Coping with flooding due to increase water infiltration. Rainwater does not have gutters or drains of which are still clean, but the water is mixed with groundwater can be entered.

b. Overcoming the trash because it can convert organic waste into compost. Household waste (organic) can be incorporated into absorption wells, thus reducing the accumulation of household waste.

c. Reducing emissions from organic waste, activities compost. Organic waste that has been inserted into the holes of this infiltration, can be taken after 1-2 months, can be used as green manure (compost). Then the compost that has been taken, the pit can be used again to dispose of organic

d. Fertilize the soil. Leaf litter, rather than burned, it would be great included in this hole, so it will rot and leaf litter can improve the soil. The hole would be even better if made around fruit trees, shade trees, will help fertilize the plants.

e. Troubleshooting the onset of waterlogging causes dengue fever and malaria. Usually in the field, such as the home page, a football field or sports facility is still not in cement, there is hard water spot bebarapa pervasive. Biopore can be made on the spot and help the water soak into the ground. The presence of holes directly biopore infiltration will increase the water catchment areas, at least by broad columns or walls of the hole. For example, if a hole is made with a diameter of 10 cm and 100 cm in the broad field of infiltration will increase by 3.140 cm 2, or almost 1/3 m 2. In other words, a ground circular with diameter of 10 cm, which originally had 78 catchment areas , 5 cm 2 after made a hole biopore infiltration with depth of 100 cm, wide field of seepage into 3218 cm2.

f. Avoid various types of diseases. Piles of rubbish dumped and decomposing open, will invite a wide range of diseases and penyebarnya like flies. When household waste such as leftover food, vegetables or other foliage is inserted into the hole closed, will reduce or prevent disease.

III. METHODOLOGY

Data collection is the most important thing at a research, so that the data is concerned with the study strongly support the completion of this research. The data collection in this research is the Literature form formulas and theoretical concepts of the literature studied and understood in order to be fulfilled in developing the theoretical foundation of the concept of research studies biopore infiltration pit in reducing flood discharge due to storm water runoff in different countries. Literature study includes the collection of data and information from books and journals that have relevant, as well as input from various parties.

DISCUSSION

Results of several studies showed that the more holes biopore infiltration made the more water that can be absorbed by the soil. The width and depth of the hole is proportional to the amount of absorption. Holes

biopore infiltration that more and more, give depth to the water to seep into the soil in large quantities. Implementation of the policy of "One Day for Biopore" can be used as an alternative to effective flood prevention. The policy is very effective because it relies on the quantity of holes biopore infiltration. "One Day for Biopore" can also produce high quality water infiltration. Regularity in implementing these policies will further accelerate a flood disaster unresolved. Flooding problems must be resolved because it can harm in every layer of society. "One Day for Biopore" implemented by requiring all levels of society in each country in a small family. Application of the "One Day for Biopore" can be implemented at the time of Earth Day which falls on April 22 every year. People who violate them will be charged onerous taxes. Biopore infiltration holes that have been created by the community should be documented as evidence has been implementing the "One Day for Biopore" Governments and communities must be work together and keep an eye on each other for overcome in flood disaster. Knowledge about biopore can be done through electronic media (internet, television, radio, etc.), the media (newspapers, magazines, articles, etc.), and the experts biopore have to go in each state to teach manufacturing technology biopore infiltration hole which correct.

CONCLUSION

Biopore infiltration holeis a vertical cylindrical hole made in the ground with the ground state of the shallow ground water table, not to exceed the depth of water table. The hole is filled with organic waste that biopore formation. Biopore hole is shaped pores (small tunnel) made by the activity of soil fauna or plant roots, shows a cross section of biopore infiltration pit.Biopore technology is one of the strategic effort to increase the water absorbing power and minimize the occurrence of floods. One cause of the flood was due to a lack of land for water catchment, when it rains, the excess water can't soak into the soil entirely. To avoid this, the need for new policies to develop holes biopore infiltration in the environment by implementing the "One Day for Biopore".

In the aspect the application of biopore is not too costly and how to make it is quite simple. Simply make a few holes around the neighborhood, then the hole can be filled with organic waste. But in incorporating organic waste not too tight, give the gaps of air to soil organisms can digest the waste. Only after it closes the holebiopore. Therefore, people are encouraged to immediately apply biopore "One Day for Biopore" in each environment. If most people have a lot to implement biopore, then we do not need to worry any more in the rainy season.

ADVICE

This paper discusses all aspects of infiltration holebiopore which include, definitions, benefits, location of manufacture, method of manufacture, the recommended amount, and maintenanceAnd this paper is suitable for all people who want to apply biopore infiltration hole. And can be used as a medium for giving an insight about the holes biopore infiltration. This paper can be an alternative flooding by implementing the "One Day for Biopore" performed at every layer of society various countries.

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