

## Case Report

# Integrated Approach of Drain Water Management by User Friendly Methods & its Socio- Economic Aspects - Kala Sanghian, Jalandhar (Punjab)

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### Abstract

Water pollution is the major issue in the today's world and mainly in few states in India, water pollution leads to severe health hazards and loss in yield and crop/soil productivity. Selected site Kala Sanghian drain is located in Jalandhar district which is suffered from rigorous pollution and environmental degradation.

Agriculture is the one of the major occupation and bases of the state Punjab, so the irrigation water quality and the first-class water availability for irrigation is also important in context for the crop cultivation. In the proposed project site, the major issue for the stern concern is that, untreated drain water is used for the irrigation purpose by the most of the farmers. Consumption of polluted groundwater has left a large number of people suffering from various diseases, including cancer. Gazipur, Allowal, Badshapur, Mehmuwal Mahla, Kohar Kalan, Athola, Mandala Chana, Gidderpindi, Bahmania, Madala, Isewal and Namajepur villages in Jalandhar district are the worst-hit. Tumor and cancer cases, besides stomach, eye, skin and respiration problems are common among residents of Jalandhar villages that fall in the vicinity of Kala Sanghian Drain. In this project interdisciplinary approach is adopted to solve the constrains, which includes social awareness and active community participation (COMMUNITY CAPSULE), drain splits and sub division is control by sand filling with hyacinth base, aeration to control the eutrophication and manage BOD level, use of innovative and efficient idea of water hyacinth and vativer grass to control the drain constrains without the economical and environment cost, involvement of governmental and nongovernmental organization for the financial and awareness support and water hyacinth and vativer grass are further use to generate income for the rural community and local stake holder ( CREATION OF HEALTHY WEALTH FROM MENACE).

### Objectives

- To degrade the toxic effluents and heavy metals from the source.
- Involve the satellite imaging to check the pollution/polluted area and its consequences.
- To check the air pollutant, hydrogen sulfide gas, ammonia gas, sulfur dioxide and carbon monoxide etc.
- To check the accumulation of heavy metal and other elements (excess) in crops irrigated by the drain

- water, reduce the health hazards (Phytoremediation). To ignite local participation in checking the sewage pollution through "COMMUNITY CAPSULE" and generate income from the noxious weeds (jalkumbi).

### Major Stakeholders

- Local community near by the selected site, who will collect the water hyacinth and make the handlooms and textiles.
- Treated water for the industries and local farmer ( water reuse )
- Industrialist and progressive farmer to control the pollution and reduce the environmental degradation

## Sustainability Plan

It is the main point that if we will going to adopt any technique in a particular region to control the pollution it should be sustain for a long time. Sustainability is the important aspect. In the selected site we have the water treatment plant but still the functioning is not proper and due to which the pollution control efficiency is reduced. So we use and concern more about the integrated/ interdisciplinary approach which maintain the sustainability, such as physical/biological/social and mechanical approach. Local community, non-governmental organizations and governmental organization help us to maintain the project aim and objective so that the sustainability can be maintain. This approachable project is economically/socially and physically feasible.

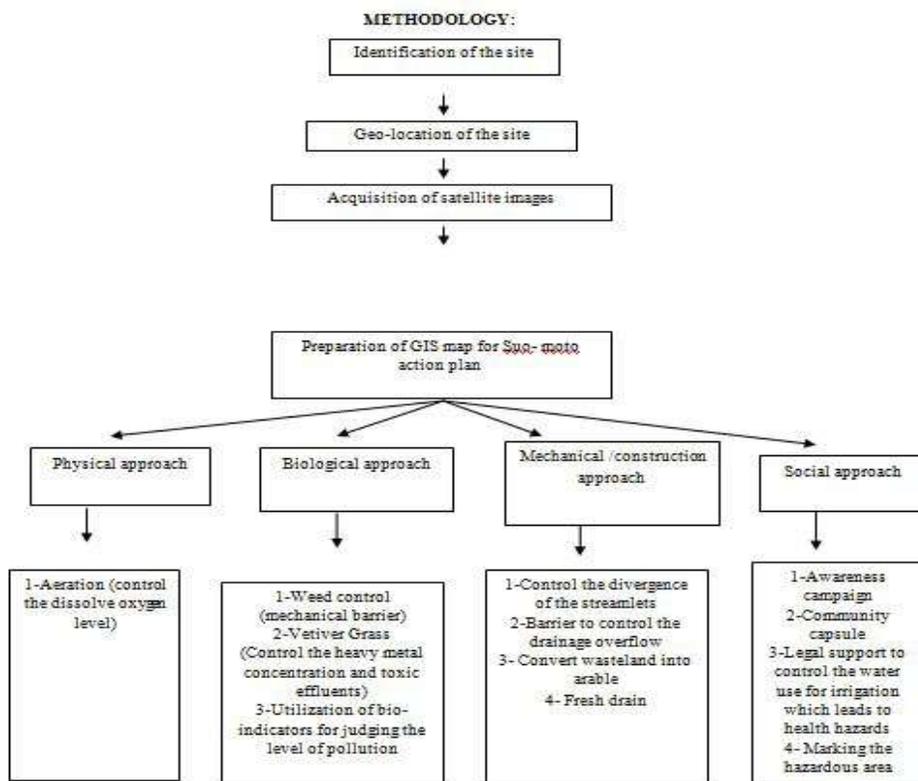
## Innovative Approaches

- Use of biotic components to control the pollution and waste water treatment Control the weeds and reuse them as:
- Water hyacinth as a feeding source for the ruminant

- Water hyacinth use in textiles, fibers and fashion technology
- Water hyacinth use in handloom manufacturing-rural income source
- Water hyacinth as a source of Phytoremediation and biofilter
- Water hyacinth as a source of green and organic manures (WHM) -
- Water hyacinth use in paper industry
- Water hyacinth biogas production

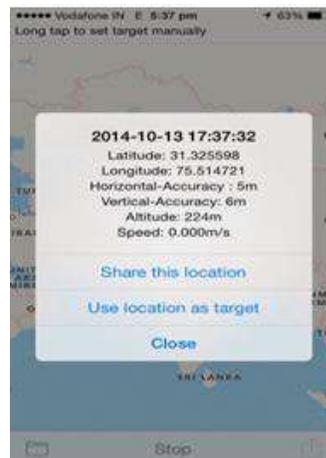
Bring into play of vativer grass to control the soil erosion, soil degradation and air pollutant, it an further reuse as a handloom, house construction and extraction of essential oils. Cost effective and efficient interdisciplinary approach

Use of bio flora and natural bio filter ( plants-water hyacinth and vativer grass ) to control pollution and further reuse it to generate income is cost efficient and having benefit as it generate income. (Phytoremediation)



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**Recent picture of the Kala Sanghian drain in Jalandhar (Punjab) clicked at 13/10.2014 and location is trapped by GPS**



**Satellite images of the selected site of the Kala Sanghian drain in Jalandhar (Punjab) clicked at 13/10.2014 and location is trapped by GPS**





## Present Status

The Kala Sanghian Drain near Jalandhar badly affecting the local community health and the environment. It is the major issue of the water pollution. Sewage treatment plants (STPs) were to be set up in Jalandhar, Kapurthala, Nawanshahr and Hoshiarpur. Industrial units had to send effluents to the CETP, Ludhiana, or had to install their own ETPs. On February 28, 2008, it was announced that Kala Sanghian Drain would be made pollution-free within one month, but there has not been much improvement five years down the line. Out of about 200 electroplating units in Jalandhar, many do not have effluent treatment plants (ETPs). The result: Toxic chrome effluents are discharged into Kala Sanghian Drain.



The pollution board has set up its camp office at the banks of the Kala Sanghian drain. But with local industrialists refusing to cooperate with the authorities in tackling the menace, the issue remains far from resolved.

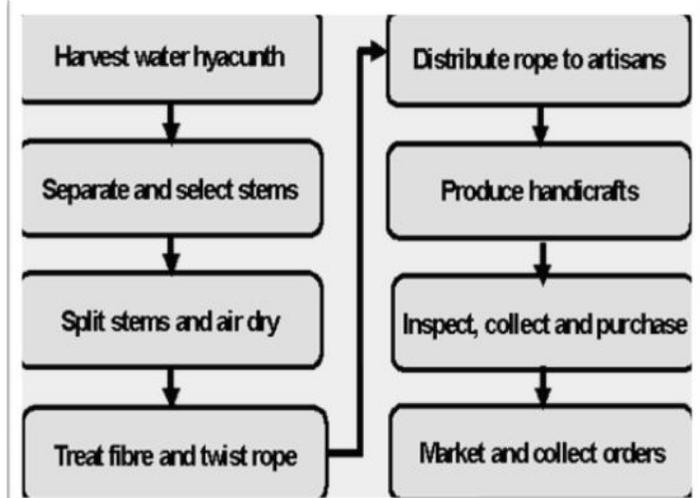
**DRAGONIAN NEGLECT** *Drain issue* **Punjab**

- Worst-affected villages are - Janangir, Essewal, Muldwala, Rupewal, Sidhpur, Badshapur, Sunari Kalan
- With no potable water supply to most of these village, the residents are forced to consume polluted water drawn from hand pumps
- Lifespan of milk cattle affected with cancer afflicting the livestock too

**SAMPLES COLLECTED**  
Members of the committee constituted to check the Kala Sanghian drain, visited the effluent treatment plant at the Leather Complex and have taken drain water samples.

**ON-THE-SPOT TESTS DONE**  
Ajay Sharma, Director, Punjab Effluent Treatment Society, said its own members had conducted on-the-spot tests and found that the TDS level was 800 mg per litre upstream and after discharge from the second module of the treatment plant, the TDS level was calculated at 1600 mg per litre. This TDS levels were within the range of 2,100 mg per litre set by the pollution board.

**LEVEL OF TDS IN DRAIN**  
PPCB Chief Engineer, Brinder Singh claims that the level of the total dissolved solids (TDS) has been found to be 1,800 mg/litre upstream and 2,600 mg downstream.

- The processing of water hyacinth fiber and the subsequent production and marketing of handicrafts by Hyacinth Crafts.



## Interdisciplinary Approach

### Biological Control Aspects and Social Benefits:

The pollution due to aquatic weed is one of the serious aspects of the water pollution. In the list of major polluting aquatic weed, water hyacinth is at the top, it is the exotic weed. The major focusing part of the project is the hyacinth as, common water hyacinth (*Eichhornia crassipes*) is a vigorous grower known to double its population in two weeks. Mainly people seen its one phase which is related to pollutant only, but on the other hand

it is all in one plant. It can act as a Phytoremediation to control the contaminant from the water or the sewage plants as well as it can be transformed into a source of income for communities. Stems can be turned into furniture, paper, fashion (casual wear and long gowns) and handicrafts or used to create fertilizers or biogas (gases derived from the decay of organic matter on the absence of oxygen), also uses as a natural wastewater purifier and an indicator of the level of pollution in the water bodies. Phytoremediation is an economically efficient method of contaminant removal without further damaging the environment. Once removed, the metals can be re-extracted for proper disposal or possibly for reuse. From the conducted experiment we found that there is a reduction of 80% in COD and about 25-45% reduction in metals after 18 days period. In studies where the ability of the water hyacinth to remove lead, cadmium and mercury was tested, the plant removed approximately 65% of lead, 50% of cadmium and 65% of mercury from water polluted with 10 ppm of lead and 1 ppm of mercury and cadmium. One hectare of water hyacinth plants is potentially capable of removing 160 kg of phenol per 72 hectares from polluted water. Combination of microorganism with water hyacinths must be seriously considered in developing filtration system for removing toxic trace chemicals, such as heavy metals and carcinogenic materials.

### **Mechanical and physical control aspects**

Using artificial fountain and handmade simple water sprinkler and fountain system to maintain the aeration to reduce the chance of eutrophication and laid down the BOD level. Soil is use to fill the small drain streamlets, which further affecting the land properties and reduce the barren land. With the help of government, or we suggesting the government to provide a well clean fresh drain so that the treated water can flow over that fresh drain which can further be use for any purpose. Proper bund across the drain with the support of local community , by using soil to prevent the drain overflow and tree or vativer grass plantation on the bund across the drain, which further control the soil erosion and check the pollution.

### **Impact And Expected Outcome**

1. Trim down the water pollution from the selected site.
2. Improve the irrigation water quality.
3. Diminish the leaching and eutrophication risk from the ground water pollution.
4. Check the addition of solid wastes.

5. Enhance the active community participation.
6. Convert the wasteland into arable land.
7. Degrading the heavy metal toxic effluents, to reduce the health hazards

### **Beneficiaries**

This project as already mention in above points having the interdisciplinary approach. This involves the Phytoremediation concept which is cost effective and innovative, in which we are using water hyacinth as a biofilter for the sewage or drain water.

Not only in the scientific context it is proved beneficiaries as per the social point of view also it is helpful because in one hand where we are using the water hyacinth and vativer grass as a Phytoremediation purpose, on the other hand it can also be use for the textile , handloom and household use purpose.

All the methods which we are adopting are cost effective and most important we allow the local community participation.

We do awareness and practical demo classes or working model display to educate the local community about the project, than by the help of community and NGOs we do the project practically to reduce the pollution and health hazards.

After the availability of the clean and fresh drain or the proposed direct reserve water, also help the local community to use such treated water for the irrigation purpose on the agricultural fields.

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