Sustainable Wastewater Management from Paper Producing Activities in Vietnam

Case Study in Phong Khe Craft Village, Bac Ninh province

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CONTENTS

1. Study Area
   1.1. Introduction
   1.2. Waste Paper making process
   1.3. Wastewater Management Status

2. Research Objectives

3. Data and Methods

4. Expected Results

5. Future works
A craft village

- A residential community in suburb and rural area;
- More than a half of households in the village working in non-agricultural production activity;
- Produce of handicraft products;
- Bring economic value and maintain traditional cultural value;
Phong Khe craft village: 1 of 6 communes and 13 wards of Bac Ninh city, Bac Ninh Province.

- Area: 5.49 km²,
- Pop density: 1,348 people/km²
- Convenient transportation to 2 national highways, far from Hanoi 26 km.
- Weather: Northern East wind (Oct-Mar), Southern East wind (Apr-Sep)
Phong Khe craft village

- Long history - 1450
- In the past, paper was made by hand 100% - family know hows - father to son
- Nowadays, in line with changing in paper using demands, waste paper are collected and used as input for paper recycling activities: better technologies, extension of production scale, bring more incomes for residents.
Paper making Workshops in PK village

Ngo Khe Hamlet
1 production HH/162 HH (1 machines)
Industry cluster (70 machines)

Cham Khe Hamlet
8 production HH/620 HH (10 machines)

Dao Xa Hamlet
34 production HH/322 HH (36 machines)

Duong O Hamlet
75 production HH/847 HH (93 machines)
The Paper Making Process

Study Area
- Input Materials
  - Hydraulic Crusher
  - Tank

Objectives
- Fiber Separation (Vibrating screen)

Data & Methods
- Underwater Tank
- Dry paper by hot steam
- Boiler

Expected Results
- Tissue paper
- Kraft paper
- Pupil paper
- Toilet paper
- Votive paper
The Paper Making Process

Input materials (waste papers)

1. Wastewater (high SS, BOD, COD)
2. Losted fiber
3. Chemicals cover

Chemicals
Water

Hydraulic Crusher
Tank
Fiber Separation (Vibrating screen)

Grinding Disc
Mixing flour
Dry
Product

1. Wastewater (high SS, BOD, COD)
2. Losted fiber

Scattered Chemicals

Water
Steam
Water Environment Status
Mix Wastewater from production and daily life

Water pollution
But

No water separated drainage system

No wastewater treatment plants

Non effective environmental policies

No monitoring system
(i) Provide an overview of the waste paper recycling activities in Phong Khe Village;
(ii) Identify environmental consequences;
(iii) Assess the cost-effectiveness of wastewater pollution control;
(iv) Draw policy implications for pollution control activities.
A cost-effectiveness assessment (CEA) to evaluate three options of pollution control including:
(1) a small treatment plant for every household;
(2) a treatment plant for a group of processing households;
(3) a treatment plant for the whole village.

- Group discussion
- Consultation with technical experts
- **Secondary data:** related and available reports of various agencies, current total population, number of households and labours engage in paper recycling activities, wastewater amount, total productions.

- **Primary data:**
  1. Survey at workshops
  2. Group discussion
  3. Technical expert consultant
Determine the most cost effective and environmentally friendly option;

Policy recommendations for an effective wastewater management system in Vietnam on planning, management, environmental education and raising awareness, etc.
Future Works

1. Summary and Analysis the primary and secondary data;
2. Study more on CEA methods and technologies of wastewater treatment;
3. Calculate different options and decide the most appropriate one;
4. Provide policy implications for improvements.
Thank you for your attention!