

# Environment Security for Traditional Craft Villages in Bac Ninh Province (Vietnam)

A.P Dr. Le Van Thang<sup>a\*</sup>, Dr. Nguyen Hai Thanh<sup>b</sup>, Dr. Nguyen Van Tuan<sup>c</sup>

<sup>a,b,c</sup>People's Security Academy, Van Quan Ward, Ha Dong Distreet, Ha Noi 100000, Vietnam

<sup>a</sup>Email: [luongminhhung1983@gmail.com](mailto:luongminhhung1983@gmail.com)

<sup>b</sup>Email: [nguyentuan.xhmv@gmail.com](mailto:nguyentuan.xhmv@gmail.com)

## Abstract

Production and business activities in traditional craft villages leave a great impact on the security of their living environment. This study focuses on analysing environmental security of traditional craft villages in Bac Ninh province (Vietnam) to identify the environmental reality of this area, assess the environment impact on people and their attitudes on this issue. Data were collected from 350 households surveyed in 7 communes having wellknown traditional handicraft villages of Bac Ninh province, from local authorities and observation results of Bac Ninh People's Committee from 2011 to 2016. Based on surveyed reaility, the author has made some recommendations to local authorities in ensuring environmental security for traditional craft villages in Bac Ninh (Vietnam) for the near future.

**Keywords:** environmental security; traditional craft villages; Bac Ninh; Vietnam.

## 1. Introduction

Vietnam presents a great difference in workforce proportion with 68.1% labour engaging in rural area. Vietnam economic development is associated with the formation and development of various occupational groups in local traditional craft villages, such as: lacquer, ceramics, embroidery, rattan, rush, weaving, paper, folklore paintings, etc. Currently, about 3000 traditional craft villages, with over 400 traditional ones, are in operation in Vietnam [8], contributing significantly to promotion of local socio-economic development in the process of integration and development. In the context of national industrialization and modernization speeding up, modern machinery and technology has been applied in many production and business activities. But at the same time, old producing method abusing agricultural chemicals and out-of-date technology without focusing on waste treatment have been maintained among Vietnam traditional craft villages exposing many negative impacts on environment.

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\* Corresponding author.

Therefore, studying and assessing environment security, finding impacts of traditional craft villages on environment, and analyzing causes to suggest solution are the significant issues requiring involvement of the government and scientists.

Through the world we have seen many studies environment impact on social life addressed in various scientific fields. All confirm that living environment degradation is the cause and catalyst of conflicts in all kinds, even armed ones. Geoffrey D. Dabelko [19] also agreed on the armed conflict cause coming from environment pressure and degradation together with other social, political and ethnic reasons. However, literature on environment impact for traditional craft villages is still limited.

Bac Ninh province [20] has, even if engaging agriculture, created a quick economic development linking with rapid industrialization and modernization. The number of traditional craft villages in Bac Ninh takes the second rank over the country. Traditional craft villages operate by utilizing preservation chemicals and semi-automatic machines to improve economic efficiency. However, these villages have a lot of recycling activities of aluminum, lead, heavy industry waste, using lignite dust directly into the environment, using waste materials such as acid, sulfur, etc. so the environment in Bac Ninh is threatened, even some villages are classified as “cancer villages” [17] (“Cancer Village”: Vietnam’s term for villages with many people suffering from cancer by environmental pollution. In 2015, the Ministry of Health of Vietnam has recorded 51 “cancer villages” scattered throughout the country, which identified 10 villages with serious levels of pollution). However, there has been no study on environmental security in traditional craft villages in recent years. The study aims at assessing the environmental impacts of traditional craft villages on people’s livelihoods, analyzing the attitude and responsibility of the people on environmental pollution here, and then recommending on economic development policies for the local government.

## **2. Research methods**

To study this issue, the author conducted a survey of 7 communes (Phong Khe, Dong Nguyen, Phu Chan, Ngoc Xa, Viet Hung, Van Mon, Dai Bai) between 2011 and 2016. The localities have the most traditional craft villages in 4 districts of Bac Ninh. Data were also collected based on the results of the survey of 350 people living in the above areas. Research and assessment of environmental reality in these craft villages was conducted by analysis of observation data on water environment, air environment and soil environment. From that, the author analyzes and assesses the environmental impacts on the health of people living in these villages through reports from local health authorities about the health reality of affected people, such as cancer, eye disease, cardiovascular disease; assesses the environmental impacts causing disputes or conflicts between people or with authorities through local cases; at the same time, considers the environmental impacts of traditional craft villages that affect the agricultural production of other households.

## **3. Research results**

The assessment of the environmental reality of traditional craft villages in Bac Ninh was carried out through collected indicators assessing the water environment, air environment and soil environment.

**3.1. About the water environment**

Observation results of water environment in 2015 of the Bac Ninh Department of Natural Resources and Environment in 6 traditional craft villages of Bac Ninh showed that the parameters of environmental pollution in domestic water are too many times over the allowed level. In which, BOD5 measured against the permitted norms is very high (the lowest is 10.5 times, there are villages exceeding 23.7 times) (Table 1).

**Table 1:** Parameters of water pollution measured in traditional craft villages in Bac Ninh

Pollution parameter	Standard: QCVN 08-MT:2015/BTN MT	Phong Khe Village		Khac Niem Village		Man Xa Village		Dai Bai Village		Da Hoi Village		Quang Bo Village	
		Observation results	Percentage of permitted norms (%)	Observation results	Percentage of permitted norms (%)	Observation results	Percentage of permitted norms (%)	Observation results	Percentage of permitted norms (%)	Observation results	Percentage of permitted norms (%)	Observation results	Percentage of permitted norms (%)
BOD5	15	356	23.7	375	25	278	18.5	181	12.1	157	10.5	178	11.9
CO D	30	750	25	767	25.6	556	18.5	370	12.3	325	10.8	356	11.9
Am oni	0.9	2.71	3	5.25	5.8	3.17	3.5	1.92	2.1	1.75	1.9	1.58	1.8
TSS	50	615	12.3	579	11.6	537	10.7	438	8.8	477	9.5	450	9
Fe	1.5	2.72	1.8	1.75	1.2	7.22	4.8	6.17	4.1	9.58	6.4	5.97	4
Pb	0.05	0.12	2.4	0.07	1.4	0.41	8.2	0.32	6.4	0.51	10.2	0.29	5.8

(Source: Bac Ninh Department of Natural Resources and Environment, 2015)

The observation study showed that solid wastes such as coal slag and aluminum residue are not recovered but are discharged into the environment. Waste collection sites are not collected and preserved properly. The process of industrial waste disposal is also carried out in the public area. Wastewater in the production process uses a lot of acidic chemicals, sodium hydroxide and it also pours directly into the ponds, lakes and ditches of the villages. Interview with Mr. Nguyen Duc Phuc (Chairman of People’s Committee of Van Mon Commune) said that the commune has more than 20 large scale workshops of aluminum, lead, bronze, zinc (each workshop has 15-20 furnaces), the most households also own a furnace, the production process does not go through any waste process, the smoke from the furnace is directly discharged into the environment. As a result, Man Xa always has a higher level of waste than the permitted level. This is in line with the observation results of the Bac Ninh Department of Natural Resources and Environment that the content of CO<sub>2</sub>, SO<sub>2</sub> here exceeds the permitted level of 6-35 times, the CO content exceeds the permitted level of 7-32 times. In addition, during the period from 2011 to 2013, due to high oil prices, households in the traditional craft villages in Bac Ninh use scrap fabric for burning instead of coal and oil. The use of this material has seriously affected the living environment of people in the area and the surrounding area. Therefore, in this period, the Bac Ninh Public Security Force handled 16 cases [3].

**About the air environment:** The result of the inspection by the Bac Ninh Department of Natural Resources and Environment for 5 years (2011-2016) on air environment in traditional craft villages shows that the dust concentration is 1.1 – 1.8 times higher; the concentration of SO<sub>2</sub>, NO<sub>2</sub> is 5 – 16 times higher [10]. In particular, high concentrations of SO<sub>2</sub> and NO<sub>2</sub> are measured mainly in traditional craft villages specializing in food production and processing, livestock and poultry raising and slaughtering; traditional handicraft villages; bamboo and rattan production villages; villages specializing in recycling industrial scraps. Craft villages specializing in food production and processing, livestock and poultry raising and slaughtering produce odors due to the decomposition of organic matters in wastewater and organic matters in waste processing, which creates gases such as SO<sub>2</sub>, NO<sub>2</sub>, H<sub>2</sub>S, etc. Handicraft villages are often heavily polluted by SO<sub>2</sub> arising from mold treatment for products, by dusts arising from the scrubbing and smoothing process for products. For villages producing rattan, bamboo, pollution was caused by the use of sulfur when drying materials. Annual observation results in the Van Mon craft village showed that the SO<sub>2</sub> concentration was 3.1 times higher than the standard, the NO<sub>2</sub> concentration was 2.2 – 2.6 times higher than the standard [2]. By the method of observation and data collection from the local government, these traditional craft villages use raw materials and production technology that do not ensure the safety of the environment. In the case study in Man Xa village, there are 205/253 households doing aluminum smelting with the large output (4000 to 5000 tons/year). These households use anthracite coal at smelters with output of 1200 to 1500 tons per year. It is also the largest recycling village for Aluminum, lead and waste in the province. These households do not have waste and gas emission treatment systems; there is no chimney design or just temporary, substandard chimneys. As a result, the gas emissions generated during the casting of the metal are deposited around. **About the land environment:** Land in the traditional craft villages of Bac Ninh is also heavily polluted (Table 3). The level of soil contamination that exceeds the permitted level causes the ecosystem of the land to lose its ability to self-regulate, then it makes the soil barren and unable to plant trees, severely affects other ecosystems. At the same time, contaminated soil accumulates toxic substances, heavy metals. Accordingly, food crops, livestock, poultry and humans are also seriously affected. This is explained by the fact that the waste from the households here is not collected and treated in accordance with the regulations but it is still littered in ponds, lakes, canals, ditches; roadside.

**Table 3:** Parameters of some chemicals in air concentrations measured in Bac Ninh traditional craft villages

Pollution statistics	Standard by QC VN 03:2008/BTNMT	Phong village		Khe village		Khac village		Niem xa village		Dai Bai village		Da Hoi village		Quang Bo village	
		Monitoring result	Exceeding percentage (%)												
Cu	100	127	127	-	-	832	832	1257	1257	356	356	1061	1061		
Pb	300	501	167	-	-	1021	340.3	1853	617.7	407	135.7	1589	529.7		
Zn	300	457	152.3	-	-	1982	660.7	1475	491.7	572	190.7	1115	371.7		

(Source: Bac Ninh Department of Natural Resources and Environment, 2015)

The impact of the current environment on the local people is examined and assessed in terms of impacts on water, air and soil pollution in these villages and in view of: the impact on health, the conflict in arising relations.

**About health:** According to reports of the local health authorities, the number of people suffering from respiratory diseases, skin diseases and intestinal diseases in these villages is increasing rapidly. The figures for the three-year period (2013-2016) have doubled, compared with 1.1-1.3 times each year before 2013. It is worth mentioning that the number of people diagnosed with these diseases mainly lives or work in the traditional craft villages of the province, while the number of people with these diseases living in other areas of the province only accounted for less than 15%. According to Nguyen Van Duy, Head of the Van Mon Commune Medical Station said that every year, in the whole commune, more than a dozen of people die of cancer and the number of 5 past years is increasing.

In addition to the health impact, in these villages, people always suffer from smoke, stench, waste pollution, water pollution, so there are conflicts in the relationship between villages or between handicraft households and non-handicraft households. These relationships have increased the level of internal conflicts, and there have been controversy, but at low levels and in small numbers. This is explained by the fact that the number of handicraft households accounts for a large proportion of the village, sharing economic interests, so they protect each other, putting pressure on the rest.

Conflicts among people in the village initially appeared, but due to the pressure from the majority of people working, the urge also subsided, gradually leading to psychological tolerance “acceptance of living together.” Moreover, traditional craft villages have a strong association among craft households in order to maintain their occupation and economic development. This association also creates the collective strength of the craft village. In addition, due to village characteristics in the Vietnamese tradition, the villagers have a blood relation, a very deep village relationship between those who pollute the village and others. This is also a barrier to the conflicts between the polluters and the victims of environmental pollution. This “acceptance” mentality not only appears in the people but also appears in the local government when it has to both promote the economy to ensure life for the people and maintain the habitat.

*“Pollution can be seen with the naked eye, water of ponds and lake is polluted, fish died, the land is so barren that we cannot grow rice anymore; every year dozens of people die of cancer; children, older people suffering from respiratory diseases, eye diseases. We know the situation of pollution but we cannot do anything. “*

(In-depth interview with Mr. Nguyen Van Hau (Vice Chairman of the People’s Committee of Van Mon)

Environmental pollution in traditional trade villages not only affects the health and relationships among the people but also badly affects their agricultural production environment. Land for agricultural production is being narrowed rapidly. Land in many places is not able to grow agricultural crops, leading to force people to desert.

Studying the land degradation of 7 communes with the most traditional trade villages shows that the rate of fallow land increased dramatically (Table 4). In particular, there were communes that had high increase rate of the uncultivated land area (from 0.04% to 0.55% as in Phong Khe, from 10.72% to 18.58% as in Van Mon). These were also the regions with the most traditional villages in the province and the level of pollution reflected here is also very high. This is also one of ten “cancer villages” in Vietnam due to environmental pollution.

**Table 4:** Comparison of the area of fallow land in 7 communes with trade villages in two phases (period of 2002 and 2010 with period of 2011 and 2016)

Observed areas	Original area	Period 2002-2010		Period 2011-2016	
		Deserted area (ha)	%	Deserted area (ha)	%
Phong Khê	36152	13	0.04	200	0.55
Đông Nguyên	452.24	3	0.66	17	3.76
Phù Chấn	39.51	1.2	3.04	1.9	4.81
Ngọc Xá	61.76	4.1	6.64	6.7	10.85
Việt Hùng	54.65	2.5	4.57	3.8	6.95
Văn Môn	27.98	3	10.72	5.2	18.58
Đại Bái	41.29	0.8	1.94	1.8	4.36

(Source: From the study and synthesis of the researchers, 2018)

The annual yield of rice production in this area is also significantly damaged. In the period of 2007 and 2010, the average rice yield of the region is 190kg-200kg/sao (Sao is a unit of measurement of the area of rice cultivation in the Northern Delta, equivalent to 360m<sup>2</sup>). From 2013 to 2016, however, this figure is only 100kg-120kg/sao [13]. The productivity of rice cultivation has been declining, and the cost of production has been increasing at market prices, so it is unprofitable for farmers to continue growing rice. Many households continued to abandon rice-fields without much benefit. Some of these fields have been turned into landfills, which made the problem of environmental pollution worse. According to the forecast of the Department of Natural Resources and Environment of Bac Ninh in 2015, if this situation continues, the concentration of pollution in the land in these areas will increase 2-3 times by 2020. Moreover, due to the increase of fallow land, many people do not have enough land for cultivation. This leads to unemployment, more difficult life, along with emerging diseases that will burden the family as well as the local government.

Facing with the above situation, the local authorities have just introduced a number of measures that were introduced only to limit and prevent people from continuing to waste into the environment without any effective measures to solve this problem.

#### 4. Discussions

By means of research methods, the authors found that air pollution in the trade villages of Bac Ninh is a worrying issue for the province. This is reflected in the people’s awareness in traditional trade villages about the level of environmental pollution surrounding them. It is worth mentioning that of the 350 people surveyed, no

one thought that their environment was still fresh, and 311 people (88.85%) of respondents said that their living environment is polluted very seriously or seriously. As such, people living in traditional villages have noticed that the environment around them is polluted. This confirms Wallenstein's (1997) thesis on environmental pollution that makes environmental issues more noticeable in society [15]. At the same time, the conflicts, disputes and arguments also strengthened Bachler's (1998) thesis which said that the environment is the cause of stress, a catalyst for stress, and the environmental threats that likely contribute to insecurity and conflict.

However, the survey result also points out that this conflict was repressed by the vicinage and family relationships that had long been attached. This showed that social relationships are also a contributing factor to the causes of constraints or conflicts caused by environmental pollution. This result clarified the thesis made by Dabelko and Simmons which said that environmental conflict is a type of conflict involving environmental stress or environmental degradation that can play a role in the cause, consequence or other factors, along with many other social, political or ethical factors [5].

Recognizing the importance of that habitat, the research found out whether the need to continue maintaining the activities of traditional villages or not. The results showed that 268 people (76.6%) surveyed still wanted to maintain the activities of traditional villages. There were 31 people (20.2%) who aspired to move to another business without pollution, and only 11 people (3.2%) wanted to leave for other places. The explanation for this problem is that people living in traditional villages are aware of the extent of pollution around their living environment, however, because of their livelihoods, they are forced to accept living in this environment. Because this is the production business associated with the life of many generations. In the countryside like Bac Ninh, they find it difficult to find other stable jobs to ensure the life of the whole family. A small number of wealthier and unbound households are willing to relocate to keep their children safe, but not everyone is able to do so. Moreover, in this traditional village, many generations of their ancestors have lived, so now it is difficult for them to abandon the traditional custom of keeping the ancestral land. A study on an individual showed: "the newcomers to the village are also shocked by the pollution here, and it is difficult for us who are local people to live up to the standards, we have to do everything to adapt and get used to it eventually". Many families who do not work have left. And we do toxic jobs, known as toxic, polluted but it is a "profession".

This also shows that the local policy for traditional trade villages will be very difficult to remove these villages in the immediate future. New job development policies to stabilize people's lives are needed but will be long-term. Immediately, it is still necessary to maintain these villages, but it will have to consider the environmental protection factors for people, such as supplying clean water systems, requiring that production and business must discharge according to regulations and have measures to clean up the habitat around the neighborhood. To solve this problem, it is required the involvement of governments and citizens in both finances and specific actions.

## **5. Conclusion**

Limitations of the study: Local monitoring results have not been carried out regularly over the years, therefore, when that local authorities and people were actively or negatively affected during the period leading to the

change of the parameters. However, the data only reflects the status determined at the time of observation.

Production activities of traditional trade villages have caused pollution of the land, air and water environment of local people. Pollution consequently affects people's health, village relationships and the people's ability to produce agriculture. Although people living in these villages are aware that the environment is polluted, nevertheless, because of their livelihood, they have to accept it. However, most of the people here still expect government intervention to improve their living environment.

The study also shows that the local authorities have not taken measures to prevent the people from continuing to cause the pollution as well as no measures to treat and improve the environment that has been contaminated today. This is a problem that is very difficult to solve but when dealing with environmental pollution here, local authorities cannot remove traditional village production activities while people are still pursuing. Local governments are not able to convert the economy to all the households here, nor can they move from here to other places.

The solution is to show people the common responsibility for solving environmental pollution, including government and people. People, in production and business, should have an exhaust system with national standards, the exploitation and collection of scrap must comply with state regulations.

The government should deal with those who break the law of the environment. At the same time, it is necessary to invest in the clean water system and improve the environment that is being contaminated at present.

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- [19] Geoffrey D. Dabelko is a Professor, Associate Dean, and Director of Environmental Research at The George V. Voinovich School of Leadership and Public Affairs at Ohio University in Athens, OH. From 1997 to 2012, he was Director of the Environmental Change and Security Program (ECSP), a nonpartisan policy forum on environmental, population and security issues at the Woodrow Wilson International Center in Washington, DC., a senior advisor to the Wilson Center and ECSP where he helps facilitate dialogues between policy makers, practitioners and academics with complex

connections linking the environment, health, population, conflict and security.

[20] Bac Ninh is a province in the Red River Delta (Vietnam). At present, the population of Bac Ninh is about 1,153,600 people, of which 557,190 men make up 48.3% and 575,041 women make up 51.7%. Urban area is 318,516 people, accounting for 27.6% of the province and rural area is 813,715 people, accounting for 72.4%. The average population density is 1,376 people /km<sup>2</sup>. In 2017, the province's economic growth was high (+19.12%); industrial scale reached over VND 1,080 trillion (current price) and export reached approximately USD 30 billion, creating "new feats"; state budget revenue reached more than VND 22 trillion, maintaining the rank 10/63 provinces and cities of Vietnam; attracting high FDI capital and large development investment capital, which has made Bac Ninh become the bright spot in Vietnam for economic development.