

## CRAFT VILLAGE DEVELOPMENT AND ENVIRONMENTAL PROTECTION CHALLENGES IN THE RED RIVER DELTA OF VIETNAM<sup>2</sup>

*This paper examines and assesses craft village development and challenges in the environmental management of craft villages in the Red River Delta region of Vietnam. This is the area where most of the craft villages of the country are concentrated. They contribute to creating jobs, increasing incomes for rural people, contributing to the successful implementation of the goal of hunger eradication and poverty reduction. However, this rapid development also creates many environmental consequences for rural areas. From the data published by state agencies and case studies in some craft villages in the Red River Delta, this article shows that economic development, rural urbanization create dynamism force for enterprises, households in craft villages to expand production, but also leads to fierce market competition between craft villages as well as environmental pollution. Although Vietnam has implemented many environmental protection policies, pollution in craft villages is still serious. Therefore, in order to ensure the handicraft village environment, research shows that it is necessary to promote supervision and monitoring of the implementation of environmental protection measures by businesses and households, in addition to building a policy of reasonably economic development for this area.*

*Keywords: environmental pollution; Red River Delta; craft villages; enterprises  
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### 1. Introduction

The process of economic development and industrialization has been taking place in most countries around the world, causing certain impacts on the environment and public health. Since the implementation of the Doi Moi in Vietnam, in 1986 up to now, the rural craft villages have strongly developed in both quantity and scale. The Red River Delta region – where most of the craft villages of the country are concentrated – is also a region facing serious environmental pollution. In particular, the air and water pollution is complicated and

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has a big impact on the public health. The cause of this situation comes from the production and business activities of enterprises and households, transportation and domestic activities etc. Although being aware that the direct discharge into the environment violates the regulations, which can have a great impact on the environment and public health, many production households and businesses have no specific measures to reduce the amount of waste generated. This is a big challenge for state management agencies in craft villages. How to mobilize the participation and practical contributions of people and businesses to environmental protection is the key that helps craft villages to control pollution.

Currently, craft villages in Vietnam have many different concepts, which can be approached from a certain perspective, but can also be approached from many different perspectives or from the development model of the craft village. For example, from the perspective of administrative management, it is considered that a craft village is an ancient administrative unit. This is a place with a large population, organized activities, and has its own rules and customs in a broad sense (Pham Con Son, 2004: 9). From an economic perspective, author Duong Ba Phuong believes that a craft village is a rural village with one or several handicrafts separate from independent handicrafts and business activities. Income from these craft villages accounts for a high proportion of the total income value of the whole village (Duong Ba Phuong, 2001, p. 13). From a historical perspective, craft villages are said to be villages that formerly relied on agriculture. However, due to certain objective conditions such as favourable geographical location, secondary occupations with consumption markets on the regional and regional levels, they have switched to producing specialized handicraft products, but still not separate from agriculture. Craft villages have a team of professional or semi-professional artisans. They have a certain secret of making production. The items produced by artisans are aesthetically pleasing and have a large market for consumption (Truong Minh Hang, 2012). From a cultural perspective, a craft village is said to be a physical and mental entity that is geographically fixed, occupationally stable or a group of closely related occupations to produce a product, has a long history and is circulated in folklore (Le Thi Minh Ly, n.d). From the perspective of the general approach, the author Tran Minh Yen said that the craft village is a socio-economic institution in the countryside, constituted as a craft village element, existing in a certain geographical space. In which many households are mainly living by craft; there is a socio-economic and cultural link between them (Tran Minh Yen, 2004). Legally, according to Circular 116/2006/TT-BNN dated December 18, 2006, of the Ministry of Agriculture and Rural Development, a craft village is one or more residential clusters at the hamlet, phum, squirrel level or similar residential areas in a village or town where there are rural craft activities, producing one or more different types of products.

Thus, it can be generalized that a craft village is a form of organizing the daily life and production of the rural community, with the characteristic that the majority of residents in the village perform the same a certain type of occupational activity for a living, and thereby form the type of social structure characterized by that occupational activity. Craft villages are different from ordinary villages in Vietnam in that there is a concentration of craft production activities in the community in many different forms of production organization, with their own cultural and historical characteristics and most of them are recognized by the state.

Until now, research on craft villages and craft village development has mainly focused on traditional craft villages. For example, Pham Con Son' research in 2004 (Pham Con Son 2004) confirms that traditional craft villages in Vietnam were set up and developed along with historical development. Up to now, research on craft villages and craft village development has mainly focused on traditional craft villages. The main professions are handicraft, fine arts, ceramics, stone, and bronze casting.... They are presented to associate with the cultural and historical characteristics of the area by the author. The process of industrialization and modernization has a clear impact on the development of craft villages, causing many craft villages to be lost. This is showed in Duong Ba Phuong's research in 2011 (Duong Ba Phuong, 2011). Until the research of the group of authors, in which the editor was Truong Minh Hang in 2012 (Truong Minh, 2012), presented quite in detail the characteristics and development of each group of craft villages in Vietnam, including stone crafting; metalworking; woodworking; knitting profession; painting; pottery; weaving and embroidery; paper-making, horse-making; folk painting profession; other jobs. There are also relatively clear engravings on craft villages specializing in producing and trading famous products of the provinces. For example, Ha Nguyen author in 2016, presented quite clearly the traditional craft village in Hanoi such as, Bat Trang ceramics, gilded in Kieu Ky, papercraft villages in Tay Ho etc. therefrom; we can see the cultural beauty of the Hanoi people.

Craft village environmental issues are mentioned sporadically in separate studies. For example, Do Kim Chi research in 2005 (Dang Kim Chi, 2005) shows that the development of craft villages in Vietnam is spontaneous, without planning, with low production levels, and simple labour. Most craft villages have not paid attention to environmental management, pollution control, and waste treatment. The evidences for these claims are also mentioned quite clearly in the studies. Over time, the craft village has also had a new development, receiving more attention from the management agencies. This is mentioned in Do Viet Hung's study in 2017. The author has affirmed that the promotion of industrial-oriented trade village development, creating a large number of products, especially for new craft villages such as paper production villages, metal recycling villages etc., are causing serious environmental pollution. Meanwhile, the management of the government has revealed many limitations. A report by the Ministry of Natural Resources and Environment in 2018 mentions a number of water pollution problems in river basins in Vietnam, including some river basins that flow through craft villages.

The development of craft villages is not only considered in terms of quantity, but also the scale and quality of their development. Environmental problems arising directly from the production and business activities of households and enterprises in craft villages have been mentioned in a number of studies. However, their roles and responsibilities in environmental management and protection are not really respected. Most of the local management agencies are "doing by themselves" to carry out the environmental protection activities according to the guiding documents of the authorities. These are the contents that have not been mentioned, or very little mentioned in the previous works.

This paper analyzes and evaluates the development of craft villages in the Red River Delta region; the current situation of air and water environmental pollution; as well as the perception and action of private business leaders or, in other words, their role in protecting

the environment. Since then, the author gives recommendations to promote the role of business leaders in protecting the environment in this area.

This study is based on the actual survey results on production and business activities, perceptions and actions of business owners and individual business households in protecting the environment of craft villages in four provinces in the Red River Delta region. They include Hanoi, Bac Ninh and Hung Yen. These are the four provinces with a large number of craft villages and businesses in the Red River Delta region. At the same time, this research is also conducted according to data from reports of the Ministry of Natural Resources and Environment, People's Committees of provinces and cities and data collected from reports of Vietnam trade village associations.

The paper uses the results of the survey in 2019 and 2020 from 400 samples, surveyed in craft villages in four provinces of Hanoi, Bac Ninh, Vinh Phuc and Hung Yen. The groups of craft villages classified in this survey include: processing of household wood, fine-art wood; processing and preserving of agricultural and aquatic products; stone crafting; weaving, sewing, dyeing and embroidery; fine art pottery; wicker rattan and bamboo leaves; production and business of ornamental organisms; metal and non-metal recycling craft village. The questionnaire is designed in the style of a combination of structural and non-structured questionnaires to assess the level of awareness and behaviour of the surveyed subjects about the environmental issues of craft villages in the areas and to get their suggestions and wishes to solve the problems. Respondents will evaluate by their personal awareness of environmental issues in the craft villages where they live and do business.

Private enterprises, individual production and business households are subjects causing environmental pollution, mainly in craft villages. Leaders of private enterprises include business owners, representatives, business owners, people participating in the direct management and administration of production activities of private enterprises in craft villages. The head of an individual business household is usually the head of the household that applies for business registration.

## **2. The Development of Craft Villages in the Red River Delta Region**

The increase in the number and size of craft villages is a very clear sign of the development of craft villages in Vietnam. The increasing number of craft villages could be newly formed craft villages, and possibly old craft villages restored, consolidated and developed. Increasing the scale of development means an increase in the number of labourers and the production scale of households and enterprises in the craft village. Since then, the volume of products and goods created by the craft villages has been increasing, creating a significant source of income for the craft villages, ensuring the lives of the people.

Regarding the number of craft villages, according to statistics in 2014, Vietnam has about 5,096 craft villages, 1,839 craft villages with all the criteria prescribed by the government etc. In which, there are over 2,000 traditional craft villages, with 53 craft groups, creating about 200 different types of handicraft products (Ministry of Natural Resources and Environment, 2015). By 2019, the number of craft villages is 5,400 trade villages. Products

of Vietnamese craft villages are plentiful, diversified, with beautiful designs and high quality. For example, silk from Van Phuc village, pottery of Bat Trang village, or silver carving in Dong Xam village etc. have been recognized as national brands. Although the products of many traditional craft villages have high economic value, Vietnam has not fully exploited their potentials (Ngoc Anh, 2019).

Many famous craft villages, which have been handed down and strongly developed up to now, for example, Bat Trang pottery village (Gia Lam, Hanoi); Cat Dang lacquer village (Y Yen, Nam Dinh); embroidery village (Van Lam, Hoa Lu, Ninh Binh); Dong Ho painting village (Thuan Thanh, Bac Ninh); Non Nuoc stone carving village (Ngu Hanh Son, Da Nang); Van Phuc silk village (Ha Dong, Hanoi); Cau Cao Nhan village (Thuy Nguyen, Hai Phong); My Dong casting village (Thuy Nguyen, Hai Phong); the puppet show Nhan Hoa (Vinh Bao, Hai Phong); the empty village of Lam Yen (Dai Loc, Quang Nam); Bau Truc Pottery Village (Ninh Thuan); My Nghiep brocade weaving village (Ninh Thuan) etc.

Besides, over time, some craft villages have been lost, and at the same time, new craft villages have emerged; there are craft villages that are steadily developing, but there are also craft villages that operate in moderation.

Table 1

Some lost craft villages in Hanoi

No.	Lost craft village	Product
1.	Dong My lacquer village	Lacquer
2.	Dai Ang conical hat village	Leaf cones
3.	Nghia Do honous paper	Honous paper
4.	Trieu Khuc sports festival	Sports festival
5.	Van Canh poonah-paper	Poonah-paper
6.	Ngu Xa copper casting	Copper casting
7.	Kim Hoang lacquer painting	Lacquer painting
8.	Dao Xa musical instruments	Musical instruments
9.	Lien Bat forge	Forge
10.	Hoa Xa texture	Texture
11.	Truong Thinh rattan and bamboo	Rattan and bamboo

*Source: author compiled.*

Not only Hanoi, but in our country, there were hundreds of craft villages that once prospered. Up to now, they have been lost like silk weaving, cocoon making, hewn, wooden clogs, painting, mosaic etc. There are many reasons for this situation. Such as, the craft village space is shrinking due to the rapid urbanization rate. The products of the craft village are no longer suitable with the development trend, no longer suitable for modern life, lack of applicability. Handicraft village products are subject to fierce competition between industrial products and product competition among craft villages. There is no next generation of craft village traditions etc. For example, Dong Ho painting village (Bac Ninh) with the age of >400 years still has very few families. Instead, they do other jobs. In some craft villages, artisans all their lives are crafting, crafting, rich in experience and skilful but unable to create new designs. Young people receive extra lessons in schools, dynamic, sensitive to the market, but lack of technical skills, professional skills, do not have a deep view of traditional values, like to follow the new generation, catch imitate etc. This is a major limitation for the product

development of the craft village. Production activities in the craft villages are fragmented, small, and lack of linkage. Brand promotion activities are still weak. Enterprises and products lack competitiveness in international markets etc.

Currently, the scale of craft villages is very different. From the perspective of production organization, most of the production and business establishments in the craft villages are organized in the form of individual business households, cooperatives, private enterprises, joint-stock companies, of which households do business individuals make up the largest proportion. The nature and scale of production of these types are very different. Individual business households can hire labour and mobilize loans for production. However, most of the individual households mainly use family labour, and at the same time, use their own capital to maintain production. As a result, production households have the advantage of being autonomous, flexible, and flexible in making use of their labour, leisure time and available facilities at home. However, these production households also have certain limitations in terms of relationships, legal status, and difficulties in technological innovation or signing labour contracts.

To further development, a number of craft villages appear some enterprises with large production scale, capable of replacing manual mechanization, and equipped with transport cars to transport raw goods. Therefore, the turnover of these enterprises is much larger than that of production households. However, most of these businesses are spontaneous, with little support from state agencies. Business owners in craft villages often start their own business, with little access to loans. Craft village enterprises often do not want to register their business to avoid management. Thus, the majority of production and business establishments in the craft village are small. Currently, there appear forms of production with like urban industrial production or concentrated industrial zones. They are companies, enterprises in rural areas. Up to now, the number of private enterprises in craft villages in the Red River Delta is approximately 3930 (Do Viet Hung, 2017).

Regarding the structure, the craft villages have developed the professional structure, which is also quite diversified and plentiful, suitable to the requirements of the domestic and foreign markets.

In terms of development space, craft villages are distributed mainly in the Red River Delta (accounting for about 60 percent), the Central region (about 30 percent) and the South (about 10 percent). The Red River Delta region includes 10 provinces and cities directly under the Central Government, which are the economic and cultural pillars in the North of Vietnam.<sup>3</sup> This area is geographically located from latitude 21°34'N (Lap Thach district) to about 19°5'N (Kim Son district), from 105°17'E (Ba Vi district) to 107°7'E (on Cat Ba island), with an area of over 20,973 km<sup>2</sup>, accounting for about 7 percent of the total area of the country. The North and Northeast borders the Northeast region of Vietnam, the West and Southwest borders the Northwest region of Vietnam, the East borders the Gulf of Tonkin, and the South borders the North Central region. The main river systems are dominated by the Red River and Thai Binh River, of which the Red River is the second largest river system in

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<sup>3</sup> From 2019 up to now, there are some statistics of Vietnam adding Quang Ninh province to the list of provinces and cities in the Red River Delta region, but this study does not include Quang Ninh, because it is a province in the Northeast region of Vietnam.

Vietnam. The Red River system originates from China to provide domestic and production water for the whole region. The water quality of this river varies according to season and region, but so far, in Vietnam, there have been no studies assessing trans-regional and cross-border pollution on this river system etc.

The Red River Delta is densely populated, with about 20 million people accounting for 22 percent of the country's total population. This is the leading region for economic development in the North, with a thriving infrastructure system including the system of roads, railways, river ports, sea etc. This creates a driving force for the connection, development and movement of the whole region with neighbouring regions such as the Northern key economic region, the capital region, the Northern Midlands and the Mountains region. In terms of the economic scale, the Red River Delta ranks second in the whole country, after the Southeast region, accounting for 35.8 percent of the country's GDP, nearly 34 percent in budget revenue, and approximately 35 percent of annual exports. The economic structure is inclined towards industry and services, but this is still the second largest food and food sector of the country. The GDP growth rate of the provinces in the region is quite high in recent years. In 2020, despite the Covid-19 epidemic, the growth rate of Hanoi is 3.98 percent, Vinh Phuc is 2.21 percent, Bac Ninh is 1.36 percent, Hai Duong is 2.10 percent, Hai Phong is 11.22 percent, Hung Yen is 6.13 percent, Thai Binh is 3.23 percent, Ha Nam is 7.02 percent, Nam Dinh is 5.05 percent, Ninh Binh is 6.35 percent (Thuy Long, 2021).

This is also the area with the most craft villages in the country, especially traditional craft villages, with a history of hundreds of years of establishment and development, such as ceramics (Hanoi, Hai Duong), silk, lacquer, bamboo and rattan (Hanoi), fine art wood (Hanoi, Bac Ninh) etc. There are approximately 1,336 craft villages in this area, creating jobs for about 1.2 million workers with an average income of 35-37 million Vietnam dong/person/year (Vuong Dinh Thanh, 2017). Products produced from craft villages, especially handicraft products are diversified and plentiful. They are created by the hands of fine artisans and craftsmen, passed down from generation to generation; even the secret of making production is accumulated through generations in the family. In addition to meeting the domestic market, export is considered the main consumption direction for handicraft village products. Export turnover in 2016 is estimated at over 500 million US dollars. The average growth rate of handicraft villages in the period of 2011-2016 is always 10-15 percent/year.

This can be explained by some reasons, as follows: First, craft villages are closely linked to the lives of rural people, attracting a large number of workforce, and are the main source of income for most families. In the Red River Delta region, communication handicraft is the oldest and most developed in the North (Pham Con Son, 2004). Second, this is an area with favourable conditions for raw materials, with both an abundant labour force and a large consumption market. Third, craft villages need little capital; have the ability to turn capital quickly; create many jobs and are usually done in peasant families during leisure time.

In terms of labour, division of labour: craft villages in rural Vietnam were formed and developed to create jobs for farmers during leisure time in rural areas. Gradually, the labour force is clearly assigned and specialized to meet the economic development needs of the country. Craft villages already have a relatively clear division of labour. Professionals in the

village live mainly on their income from that profession. They make up a sizable proportion of the total population of the village.

Table 2

Number of craft villages in some provinces and cities in the Red River Delta by province

Craft village	Ha Noi	Vinh Phuc	Bac Ninh	Hung Yen	Thai Binh	Nam Dinh	Hai Duong	Ninh Binh	Ha Nam	Hai Phong
Fine ceramics	3	1	2	0	1	0	2	2	3	2
Processing household wood, fine arts wood	47	12	11	4	19	9	13	1	8	4
Processing and preserving agricultural and aquatic products	50	0	4	10	22	6	13	4	8	10
Stone crafting	1	1	0	0	0	0	1	1	2	0
Mechanical, metal	12	1	1	0	7	3	5	0	1	0
Textile, garment, dyeing, embroidery	59	1	5	2	61	8	13	2	9	0
Leather shoes, leather tanning	11	0	0	1	0	0	4	0	0	0
Rattan and bamboo	105	4	5	9	114	6	11	4	8	6
Production and business of ornamental organisms	3	1	0	7	0	1	0	3	1	3
Recycle and treat waste	1	0	1	3	0	0	0	0	0	1
Iron, copper cast and inlaid metal	1	0	4	2	6	4	1	0	0	2
Others*	14	6	6	7	24	4	8	3	5	8
<b>Total</b>	<b>307</b>	<b>27</b>	<b>39</b>	<b>45</b>	<b>254</b>	<b>41</b>	<b>71</b>	<b>20</b>	<b>45</b>	<b>36</b>

\* include craft villages in production of building materials; aquaculture of animals, aquatic and marine products; waterway transport; building; musical instrument producing; salt production; paper production, printing and copying of books, magazines, tapes; toys manufacturing; producing products from rubber, plastic; plant farming; medicine; producing incense

Source: Author's statistics.

For product structure: Currently, the product structure of craft villages is not flexible and innovative. Product structure: Currently, the product structure of craft villages is not flexible and innovative. According to survey data in 2016, about 72.5 percent of products are traditional, only 27.5 percent of products are new products. On average, a manufacturer in the craft village can create from 2.35 – 4.17 new product samples annually, of which 80-85 percent of samples ordered by customers or copied samples are available on the market (Vuong Dinh Thanh, 2017). Thus, it can be said that the ability of manufacturing establishments to develop product designs by themselves is still limited.

In order to meet the consumer demand of the domestic market as well as the foreign market, craft villages must diversify products while improving product quality, meeting quality requirements according to regulations. The product diversification can be done through the diversification of product categories, specifications, designs, prices etc. Traditional craft products need a combination of new and advanced production technologies and craftsman's skills and techniques. By doing this, the products of craft villages are able to compete in the domestic and international markets.



### 3. Environmental Management Challenges in Craft Villages in the Red River Delta

#### *The challenge of environmental pollution*

In fact, besides the social and economic issues, craft villages in the Red River Delta are facing many environmental challenges such as air, soil, water, noise pollution etc. This is a comment in the Socio-Economic Development Report, Annual Environmental Report of Red River Delta Provinces, and at the same time, these are also the issues raised in the questions for business households when conducting surveys in craft villages.

Table 3  
Environmental challenges in craft villages in the Red River Delta region

Current environmental problems in craft villages	Total sample survey	The answer is "yes"		The answer is "no"	
		Amount	%	Amount	%
Air pollution	400	323	80.75	77	19.25
Water pollution	400	298	74.50	102	25.50
Soil pollution	400	156	39.00	244	61.00
Solid waste pollution	400	302	75.50	98	24.50
Contamination of nylon bags	400	265	66.25	135	33.75
Odor pollution	400	321	80.25	79	19.75
Noise pollution	400	120	30.00	280	70.00
Others	400	89	22.25	311	77.75

Note: The answer "yes" or "no" is the subjective, personal opinion of the respondent

Source: Author's survey data in 2020.

Survey results (Table 3) show that most of the surveyed subjects admitted that they have to face the challenge of environmental pollution, in which, air pollution (80.75 percent), odour pollution problem (80.25 percent), water pollution (74.50 percent) etc. These are problems, which arise directly in the production and business process of enterprises, production households in craft villages. This also shows a significant change in the perception of business leaders and production households on environmental issues in general in recent years. Before that, the prominent issues in the craft village included: income, employment, education etc. (Vo Thanh Danh, 2010).

Regarding to air pollution, in craft villages, especially wood processing and recycling villages in the Red River Delta, is taking place quite seriously (Amann et al., 2018, p. 20). The main exhaust gases include dust, SO<sub>2</sub>, H<sub>2</sub>S, CO, slightly alkaline, acid vapour, solvent vapour, etc. (Ministry of Natural Resources and Environment, 2017). General survey results in 2018 of Hanoi showed that 60/65 craft villages had environmental pollution, and only 6/65 craft villages met environmental safety standards. In terms of air pollution, there are 12 seriously polluted craft villages, mainly wood recycling and processing villages; 10 polluted craft villages; 43 craft villages are not polluted (Tong Minh, 2020). In 2019, the results of analyzing air samples in 228 craft villages showed that there were 12 seriously polluted craft villages, mainly villages of recycling and wood processing; 10 pollution villages (Hoang Son, 2020). In Vinh Phuc, the results of the survey and classification of craft village production establishments by type of production and potential for environmental pollution in 7 craft villages in Vinh Tuong district in 2015 showed that 2 carpentry villages belong to An Tuong commune is determined to be quite serious dust, smoke and noise pollution. They arise from

sawing, sawing, polishing and solvent vapor from painting. In Bac Ninh, the results of annual monitoring in Van Mon craft villages show that the concentration of SO<sub>2</sub> is 3.1 times higher than the permitted standard, the concentration of NO<sub>2</sub> is 2.2 to 2.6 higher than the standard times. Dust concentration in the craft villages is quite high and most of them exceed the permitted level by 1.1 – 1.8 times (Nguyen Cuong, 2016). In Phong Khe craft village, the analysis results of air samples showed that dust content exceeded the permitted standard from 2.05 to 2.14 times. The SO<sub>2</sub> content exceeded the permitted standard from 1.38 to 1.39 times. In Chau Khe, the dust content exceeds the permitted standard by 1.8 – 1.9 times, the SO<sub>2</sub> content exceeds the permitted standard by 1.4-2 times (Thu Van, 2020).

Survey results assess the level of air pollution for business leaders and business households in the Red River Delta craft villages also show that most of them are aware that air pollution is taking place quite seriously.

Table 4  
Assessment of air pollution levels in craft villages in the Red River Delta region

Agreement level Issues	Number of respondents	Agreement level										Average point
		Disagreement		Irresolution		Agreement		Quite agreement		Very agreement		
		Number	%	Number	%	Number	%	Number	%	Number	%	
1. Currently, the environment of the craft village in the locality where you live and produce is polluted heavily	400	46 (46)	11.50	74 (158)	18.50	108 (324)	27.00	89 (356)	22.25	83 (415)	20.75	3.22
2. The atmosphere has a lot of suspended dust and pollutants	400	25 (25)	6.25	45 (90)	11.25	70 (210)	17.50	118 (472)	29.50	142 (710)	35.50	3.77
3. Odor pollution from exhaust gas and wastewater	400	60 (60)	15.00	51 (102)	12.75	78 (234)	19.50	108 (432)	27.00	103 (515)	25.75	3.36
4. Production noise is a concern	400	56 (56)	14.00	65 (130)	16.25	154 (462)	38.50	85 (340)	21.25	40 (200)	10.00	2.97

Note: Disagreement – 1 point; Irresolution – 2 point; Agreement – 3 point; Quite agreement – 4 point; Very agreement – 5 point.

(...) number of points

The average point = total number of points / total respondents

The answer on the level is the subjective and personal opinion of the respondent.

Source: Author's survey data in 2019-2020.

Thus, the results in Table 4 show that most of the business leaders agree to strongly agree with the assessment that “Currently, the environment of the craft village in the locality where you live and produce is polluted heavily”, with an average point of 3.22. In which, they said that the atmosphere of the craft village is full of suspended dust and pollutants, with an average point of 3.77; Odor pollution from exhaust gas and wastewater in craft villages has an average point of 3.36; Production noise is a concern with an average point of 2.97. As for odour and noise pollution, when people live in areas with unpleasant odours and noises, the

human will gradually “adapt” and often tend to “ignore” the smell, sound, giving so the rating point is lower than the remaining comments.

For water pollution: It occurs in most craft villages in the Red River Delta, especially in the processing agricultural products and recycling villages. The pollution level is quite serious in lakes, ponds and river basins that flow through the craft villages (Ministry of Natural Resources and Environment, 2017 p. 20). Pollution levels depend on hydrology, weather (pollution levels increase in the dry season) and the control of waste sources.

Pollution takes place mostly in organic pollution. Typical pollution parameters are BOD5, COD, TSS, total N, total P, and Coliform (Ministry of Natural Resources and Environment, 2017: 25). They all exceed the allowed standards. For example, in Phu Loc wine-making village (Hai Duong), all wastewater from nearly 200 wine-making businesses is discharged directly into a pond, then discharged into an irrigation canal, which flows across the village without any treatment. In Banh Da Tong Buong village (Hai Duong), wastewater after the production is not treated and is discharged directly to the general drainage system of the village. The monitoring results for the surface water environment of the Center for Environmental Monitoring and Analysis of Hai Duong province showed that the COD content exceeded 12-15 times, TSS exceeded 2-3 times, Coliform exceeded 11-19 times, Ammonium exceeds 12-16 times, and phosphate exceeds 26-31 times the permitted standard (Nguyen Cuong, 2016).

The source of air and water pollution at craft villages in the Red River Delta region comes mainly from the production stages that households and enterprises carry out; living activities of the people; industrial production, trade, service etc. For different groups of craft villages, the stage of air and water pollution is also different. For example, the wood processing craft village, the production stage that causes the most pollution is material handling, product processing; while in the recycling villages, the main stage of pollution is transporting, gathering and treating recycled waste (Do Viet Hung, 2017).

Survey results on sources of air and water pollution at craft villages in the Red River Delta are shown in Table 5.

Thus, the source of air and water pollution in the craft village comes from many different sources, of which from production activities in the craft village accounts for 67.63 percent of the selected samples; from traffic activities with 63.07 percent; living activities 53.94 percent; from industrial production 43.98 percent. This also shows that, in the craft village, water and air pollution are affected by many different sources at the same time. Assessing more specifically the pollution level of each source, the table above shows that the highest pollution level is from production with an average point of 3.51, followed by transport with an average point is 2.39, industrial activities and daily life activities have an average point of 2.05.

In addition, the challenge of air and water pollution is becoming more and more serious in the craft villages due to the factors on Table 6.

Table 5

Sources of air pollution in wood processing and recycling craft villages in the Red River Delta region

Source of pollution	Number of respondents	(%)	Pollution level										Average point
			Very little		Light		Moderate		Severe		Very severe		
			Number	%	Number	%	Number	%	Number	%	Number	%	
1. From craft village production	271	67.63	35 (35)	12.92	25 (50)	9.23	55 (165)	20.30	81 (324)	29.89	75 (375)	27.68	3.51
2. From the daily life activities	216	53.94	37 (37)	17.13	141 (282)	65.28	32 (96)	14.81	3 (12)	1.39	3 (15)	1.39	2.05
3. From agricultural production activities	8	2.07	2 (2)	25.00	3 (6)	37.50	3 (9)	37.50	0 (0)	0.00	0 (0)	0.00	2.05
4. From industrial production activities	176	43.98	78 (78)	44.32	37 (74)	21.02	41 (123)	23.30	15 (60)	8.52	5 (25)	2.84	2.05
5. From transport activities	252	63.07	38 (38)	15.08	100 (200)	39.68	98 (294)	38.89	8 (32)	3.17	8 (40)	3.17	2.39
6. From others	202	50.62	78 (78)	38.61	98 (196)	48.51	18 (54)	8.91	5 (20)	2.48	3 (15)	1.49	1.79

Note: Very little – 1 point; Light – 2 point; Moderate – 3 point; Severe – 4 point; Very severe – 5 point.

(...) number of points

The average point = total number of points / total respondents

The answer on the level is the subjective and personal opinion of the respondent.

Source: Author's survey data in 2019-2020.

The table above also shows that, there are four groups of causes that make air and water pollution more serious in the craft village, including: (1) increasing production and business of enterprises and households with an average point of 3.61 and the number of respondents from the level of agreement to very agreement accounting for 87.97 percent; (2) Lack of technology for collection and treatment, with the average point of 3.64 and the number of respondents from the level of agreement to very agreement accounting for 86.31 percent; (3) Lack of financial resources, with an average point of 3.62 and the number of respondents from agreement to a very agreement for 85.89 percent; (4) Increasing the people activities, with the average point of 3.32 and the number of respondents from the level of agreement to very agreement accounting for 81.33 percent.

Thus, it can be said that businesses and households at craft villages in the Red River Delta have correct awareness of the pollution situation, the cause of pollution, as well as the cause of the air and water pollution increasing in craft villages. This is an important basis to mobilize their participation in environmental protection activities in these villages in the future.

Table 6

Causes of environmental pollution in craft villages are getting more serious

Source of pollution	Number of respondents	%	Agreement level										Average point
			Disagreement		Irresolution		Agreement		Quite agreement		Very agreement		
			Number	%	Number	%	Number	%	Number	%	Number	%	
1. Increasing production and business of businesses and households	400	100	15 (15)	3.73	33 (66)	8.30	161 (483)	40.25	75 (300)	18.67	116 (580)	29.05	3.61
2. Increasing people activities	400	100	37 (37)	9.13	38 (76)	9.54	169 (507)	42.32	75 (300)	18.67	81 (405)	20.33	3.32
3. Lack of awareness of households and businesses	400	100	81 (81)	20.33	81 (162)	20.33	83 (249)	20.75	83 (332)	20.75	71 (355)	17.84	2.95
4. Lack of sanctions, management regulations	400	100	73 (73)	18.26	76 (152)	19.09	81 (243)	20.33	81 (324)	20.33	88 (440)	21.99	3.09
5. Lack of technology for collection and treatment	400	100	23 (23)	5.81	32 (64)	7.88	138 (414)	34.44	80 (320)	19.92	128 (640)	31.95	3.64
6. Lack of financial resources	400	100	27 (27)	6.64	30 (60)	7.47	105 (315)	26.14	148 (592)	36.93	91 (455)	22.82	3.62
7. Lack of individuals and organizations leading	400	100	86 (86)	21.58	76 (152)	19.09	78 (234)	19.50	63 (252)	15.77	96 (480)	24.07	3.02

Note: Disagreement - 1 point; Irresolution - 2 point; Agreement - 3 point; Quite agreement – 4 point; Very agreement - 5 point.

(...) number of points

The average point = total number of points / total respondents

The answer on the level is the subjective and personal opinion of the respondent.

Source: Author's survey data in 2019-2020.

*Challenges in creating and implementing environmental management measures*

Regarding the creation of environmental management measures

In recent years, Vietnam has developed a number of specific policies and laws on environmental protection in general, but specific policies related to the environmental protection of handicraft villages seem to be lacking or mainstreamed into other policies. For example, the environmental management policy for the river flowing craft villages in the Red River Delta region is integrated into the water resource use management plan in the Nhue and Day river basins in 2015 and a vision to 2020; integration into provincial water resources planning.

Besides, legal documents regulating environmental management activities in craft villages are incorporated into other documents. For example, regulations on the management and control of pollution and degradation of river water resources in the craft village area were incorporated into the “decree on river basin management” in 2008, integrated into the revised Law on Water Resources<sup>4</sup>.

Environmental criteria are integrated into the regulations on consideration and recognition of craft villages according to Circular No. 31/2016 / TT-BTNMT, dated October 14, 2016, of the Ministry of Natural Resources and Environment. Regulations on environmental protection are only approved at the “project” level, namely, Decision No. 577 / QD-TTG in 2013, the master project on environmental protection for craft villages up to 2020 and orientations to 2030. Some localities such as Hanoi and Bac Ninh are still in the stage of building regulations on environmental protection. Vietnam still lacks specific regulations on the agency responsible for collecting the environmental protection fees wastewater, and waste emissions in the region. There are no legal documents specifically for the protection of the handicraft village environment according to the characteristics of each type of production etc.

Currently, some documents are available, but the regulations are not appropriate. For example, according to the current regulations, every business and production entity must prepare an environmental impact assessment report or commit to protect the environment or prepare an environmental protection project, but until now, most of the production households in the craft villages do not practice for many different reasons. In fact, this content is very difficult to apply to specific craft villages. Therefore, it is necessary to study and issue a form of commitment to environmental protection with simpler, more compact content.

On the other hand, regulations on gas and wastewater emissions, in general, are generally introduced for craft villages. If these standards are applied to the craft villages, it is still too high. Therefore, the production facilities in the craft village are all household-scale; there are no conditions and money to install the system of environmental treatment equipment, which meets current standards. Although the guiding documents for the implementation of the Law on Environmental Protection have been built a lot, but still do not fully take into account specific and objective factors for trade villages, the effectiveness and effectiveness of some documents are still low.

In craft villages, businesses, production and business households have not developed regulations on the protection of the air and water environment; they have only developed general hygiene regulations to limit waste discharge indiscriminately. This is a weakness, which businesses and production households need to overcome in the future.

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<sup>4</sup> For service and production facilities in craft villages, the Law also clearly stipulates that craft villages must have wastewater collection and treatment systems suitable to the scale of wastewater discharge and the ability of receiving wastewater of water source and be certified by a competent state management agency on water resources before submitting it for approval (Article 37) and restrict exploitation of underground water in craft village areas that have centralized water supply systems and water services to ensure quality requirements (Article 52).

Regarding the implementation of environmental management measures

The implementation of measures to manage and protect the environment in craft villages includes: implementation of policies and legal documents; investigation and assessment of the water and air environment; law dissemination, community awareness-raising; implementing environmental planning and projects; organizing the state management apparatus on environmental protection in general, the air and water environment in particular; inspection and supervision etc. They are still very limited.

For example, there are a number of regulations on environmental protection for craft villages, as mentioned above, but compliance with the regulations has hardly been implemented. The local government also ignores environmental issues and attaches importance to economic development. Although people and enterprises in the craft village are fully aware, they are still intentionally violating them for their own interests.

The implementation of the inspection and examination of the observance of the law on the protection of the handicraft village environment is carried out quite seriously in the provinces. Therefore, the management agency has discovered and sanctioned many cases of environmental pollution in general, including air and water pollution. The table below illustrates some specific contents:

Table 7

Sanction for administrative violations of environmental protection in some provinces in the Red River Delta region

No.	Province	Number of units are sanctioned	Amount (billion Vietnam dong)	Year
1	Hung Yen	83	6,7	2013-2018
		77	2,8	2019
2	Bac Ninh	156	6,8	2016-2018
3	Ha Noi	25		2010-2015

*Source: Pham Ha, 2019; Nguyen Dai Dong, 2019; Doan Thanh, 2020.*

In Hung Yen, from 2013 to 2018, management agencies have inspected and examined the observance of the law on environmental protection in more than 300 production facilities, detecting and sanctioning 83 units for environmental violations with the total amount of 6.7 billion VND. In 2019, 97 cases of environmental violations were discovered, of which 77 cases were sanctioned, with more than 2.8 billion VND etc. (Pham Ha, 2019).

In Bac Ninh, the Provincial People's Committee has set up a quick response team to deal with environmental pollution issues in the province. The province also strengthened the inspection and examination, and at the same time, they resolutely dealt with strictly production establishments that violated the law on environmental protection etc. In the 2016-2018 period, the Department of Natural Resources and Environment, the Management Board of industrial zones and the environmental police force conducted a planned inspection and unexpected inspection of the observance of the law on environmental protection for 518 production establishments in the province. Through inspection, they discovered and sanctioned administrative violations for 106 facilities, with a total fine of 3,771 billion VND, mainly small and medium production units in craft villages. In addition, districts, towns and cities also unexpectedly checked 403 facilities, detected and sanctioned administrative

violations for 50 facilities, with a total fine of nearly 3 billion VND (Nguyen Dai Dong, 2019). In 2016 and 2017, Bac Ninh province established an interdisciplinary inspection team, conducting a comprehensive inspection of 60 manufacturing facilities in Phong Khe 1 industrial zone and 32 manufacturing facilities in Phu Lam industrial zone. As a result, 28 production facilities were sanctioned for administrative violations with a total fine of over 5 billion VND (Nguyen Dai Dong, 2019).

Strictly control and monitor environmental pollution through automatic monitoring. For example, large waste discharging units, having wastewater generated over 100 m<sup>3</sup> per day and night, must install automatic wastewater monitoring. In 2017, Hanoi carried out monitoring every two times per month for 28 large waste generating facilities; in 2018, monitoring was carried out once a month for five facilities, two times per month for 13 facilities and three times per month for 10 facilities. Thereby, it was discovered that 50 in 209 times of wastewater discharge exceeded environmental standards, requiring facilities to take measures and treatment. At the same time, the management agency also requires 37 facilities to install and operate the wastewater monitoring station automatically and continuously, a facility that installed an automatic emissions monitoring station.

The craft villages have been investigated and assessed by the local management agency on the air and water environment. However, this assessment is not conducted regularly and periodically. Even the assessments only focus on some craft villages that are experiencing serious environmental pollution, reflected by the media and local residents.

Environmental management is integrated into the general management function, so the task of environmental protection is inevitable to be secondary compared with the socio-economic development goals.

The planning of industrial zones and clusters for craft villages are only done in the power supply. The internal traffic system is sketchy, most of them have no regulations on environmental protection, there is no centralized wastewater treatment system and gas treatment system etc., that meet standards.

The reason for this situation is the lack of clear delineation of roles and responsibilities in protecting the environment of handicraft villages among ministries, as well among ministries and localities. Staff in charge of environmental management and protection in general, water and air environment management and protection in particular at all levels are too thin in number and limited in qualifications. There is a lack of investment capital for technology innovation, construction of wastewater treatment facilities, and exhaust gas from craft villages, etc.

Evaluation of the implementation level of environmental management and protection measures is shown in the table below:



Table 8

Evaluation of the implementation level of environmental protection activities in the Red River Delta region

Environmental management and protection activities	Number of respondents	%	Agreement level										Average point
			Very bad		Bad		Normal		Good		Very good		
			Number	%	Number	%	Number	%	Number	%	Number	%	
1. Having an environmental protection license from the regulatory agency	400	100	53 (53)	13.28	196 (392)	48.96	101 (303)	25.31	32 (128)	7.88	18 (90)	4.56	2.41
2. Fully fulfilling the obligations of environmental protection tax and fees in accordance with regulations	400	100	76 (76)	19.09	71 (142)	17.84	156 (468)	39.00	53 (212)	13.28	43 (215)	10.79	2.79
3. There are separate regulations on environmental protection	400	100	78 (78)	19.50	83 (166)	20.75	123 (369)	30.71	53 (212)	13.28	63 (315)	15.77	2.85
4. Energy usage level	400	100	80 (80)	19.92	90 (180)	22.41	65 (195)	16.18	81 (324)	20.33	85 (425)	21.16	3.00
5. Finding ways to save raw materials and input materials	400	100	15 (15)	3.73	27 (54)	6.64	123 (369)	30.71	153 (612)	38.17	83 (415)	20.75	3.66
6. Investing in advanced, modern and environmentally friendly technologies, reducing emissions at the stages where machines can be used	400	100	73 (73)	18.26	75 (150)	18.67	156 (468)	39.00	56 (224)	14.11	40 (200)	9.96	2.79
7. Building programs to reduce emissions and wastewater	400	100	51 (51)	12.86	148 (296)	36.93	153 (459)	38.17	23 (92)	5.81	25 (125)	6.22	2.56
8. Covering vehicles which carry goods and raw materials	400	100	46 (46)	11.62	68 (136)	17.01	133 (399)	33.20	71 (284)	17.84	81 (405)	20.33	3.18
9. Technology for recovering and treating waste gas and wastewater	400	100	98 (98)	24.48	179 (358)	44.81	88 (264)	21.99	28 (112)	7.05	8 (40)	2.07	2.19
10. Organizing communication, education and training activities on environmental protection for employees	400	100	50 (50)	12.45	63 (126)	15.77	138 (414)	34.44	61 (244)	15.35	88 (440)	21.99	3.19
11. Consulting with local communities and stakeholders on environmental issues of businesses and household businesses	400	100	53 (53)	13.28	53 (106)	13.28	146 (438)	36.51	63 (252)	15.77	85 (425)	21.16	3.18

Note: Very bad – 1 point; Bad – 2 point; Normal – 3 point; Good – 4 point; Very good – 5 point. (...) number of points

The average point = total number of points / total respondents

The answer on the level is the subjective and personal opinion of the respondent.

Source: Author's survey data in 2019-2020.

Table 8 shows that enterprises and individual household businesses in the craft villages have different assessments of the degree of implementing some measures to protect the air and water environment in the craft villages that they do. Specifically, the assessment with a good and positive trend is shown by “Finding ways to save raw materials and input materials”, enterprises and household businesses performed quite well with an average point of 3.66 and 58.92% of the respondents evaluated “good to very good”. This is, of course, because this is an important determinant of the revenue and profitability of the business. With “Organizing activities of communication, education and training on environmental protection for workers”, “Consultation with local communities and stakeholders on environmental issues of enterprises”, were done well by the enterprise, with the average point of 3.19 and 3.18. In which the number of votes for the implementation of these two activities at the average level is 34.44 percent and 36.51 percent, the number of votes that the implementation of these two activities as “good to very good” is 21.99 percent and 21.16 percent. Enterprises and production households also performed relatively well in “Covering vehicles carrying goods and materials” with an average point of 3.18 and 38.17 percent of the questionnaires evaluated “good to very good”, 33.20 percent of the reviews performed in an average. This is due to the increased awareness of business leaders about environmental protection and covering regulations for transportation have been stricter.

For the not-so-good reviews include, “Having an environmental protection license from the regulatory agency” the average point is only 2.41; “Fully fulfilling the obligations of environmental protection tax and fees in accordance with regulations”, with an average point of 2.79; “Promulgating separate regulations on environmental protection”, with an average point of 2.85; “Investing in advanced, modern, environmentally friendly technology, reducing emissions at stages where machines can be used”, with an average point of 2.79; “Greenhouse gas emission collection, storage and commercialization measures and technologies” with an average point of 2.19.

The cause of the above phenomenon comes from some issues, such as: the provisions of the discharge permit, the inappropriate tax regulations, make businesses incur too large expenses; the process of applying for a license is still too complicated, with many procedures, wasting time, waiting time is too long, even negative in this process; the process of applying for a license is still too complicated, with many procedures, wasting time, waiting time is too long, even negative in this process; businesses, production and business households have not really paid attention to making their own regulations on environmental protection, because they think that does not solve the problem; production scale of enterprises is not large, production capital is limited, human resources are trained mainly by the job training, so the investment in renovating equipment, production technology and gas treatment waste, wastewater is a difficult problem, not easy to find a solution.

#### **4. Some Solutions Manage the Environment in Craft Villages in the Red River Delta**

It can be said that enterprises, production households and individual businesses are properly aware of the current situation of air and water pollution as well as the extent of implementing some solutions to solve pollution problems in localities. Some solutions are implemented

well, but some solutions are not implemented well. However, the survey results showed that they had a straightforward look at the issues. This is also the basis for proposing solutions to reduce air pollution for craft villages:

Firstly, the craft villages in the Red River Delta need to put the air and water pollution solving in particular and environmental pollution in general first. Because the survey results show that it could be a priority issue that local management, businesses, individual business households, people are aware and need to deal with. Emissions, polluting wastewater from production activities of businesses, households as well as from transport activities need to be minimized in many different ways. For example, the government needs to check and monitor regularly and continuously the exhaust gas and wastewater discharge activities; guiding businesses and business households to build and implement production processes to save raw materials, fuel, materials, to limit gas emission, wastewater and to produce environmentally friendly. It is necessary to handle resolutely gas emission facilities, which violate regulations many times. Enterprises need to proactively reduce the generated gas and wastewater, and comply with the regulations on the time and amount of discharge.

Second, completing the system of regulations on controlling air and water pollution in craft villages, to simplify and transparent procedures and procedures for granting environmental licenses in general as well as for granting licenses for exhaust gas and wastewater discharge in particular. To do this, it is necessary to coordinate the implementation of management agencies and business leaders, and at the same time apply scientific and technological advances to monitoring, monitoring and evaluating discharge activities openly and transparently. If so, businesses have an incentive to apply for different licenses on environmental protection.

Third, promoting the use of tax and fee solutions related to environmental protection in general, air and water environment in particular. Management agencies should urge enterprises, individual business households to pay taxes and fees of gas emission and wastewater charges. It is necessary to check, examine and sanction strictly enterprises and individual business households that violate the regulations on environmental protection.

Fourth, supporting enterprises to improve technology to save raw materials, input materials, gas and wastewater treatment technology. In fact, the survey also shows that businesses and household businesses in the craft villages do not invest in technology improvement and waste gas treatment because they face many difficulties in capital and human resources to maintain production. Therefore, the state and local government should have programs and packages to support advanced production technologies, low emissions, financial, human resources or support through environmental protection funds for craft villages.

Fifth, raising more awareness of enterprise and individual business owners in the craft villages on water environmental protection in the locality. From there, awareness can be turned into concrete action. The main polluters in the locality have initiatives and solutions to protect the common environment in the handicraft village area. The management agencies, business owners, and business households at craft villages in the Red River Delta are aware. For example, through the sharing of funds, building and operating drainage systems, waste and gas treatment systems at craft villages from the state, enterprises, production facilities

and local residents, it is entirely possible to improve the quality of the air and water environment in the craft villages in a positive direction, is able to do.

## 5. Conclusion

Thus, air and water pollution is an alarming problem at craft villages in the Red River Delta region. This issue receives the attention of the government, enterprises, production households, businesses, and the community. Air and water pollution arises mainly from production activities of businesses and households; traffic activities etc. Recognizing the importance of the air and water environment protecting, many measures to reduce emissions have been implemented. Therefore, in order to solve the above problem, management agencies, authorities, businesses and people need to coordinate closely and to implement five solutions synchronously the next time. In this way, craft villages in the Red River Delta can have a clean air environment; guarantee the right to live in a clean environment of people.

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