



The
Incubation
Network



GENDER and PLASTIC **RESEARCH REPORT**



Sustainability assessment report of the
informal waste collection system in Tuy Hoa

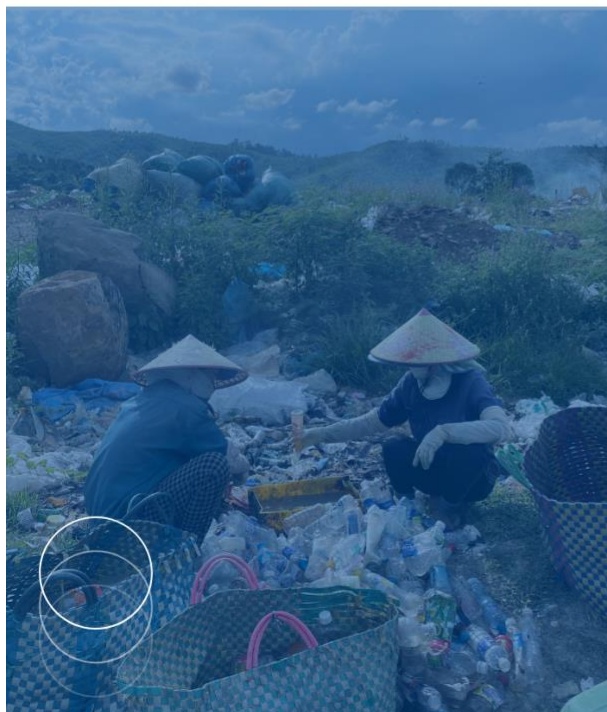


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I. OVERVIEW

To properly assess the status of waste collection activities in the local area of Phu Yen Province including; (a) The size and nature of women informal waste work (WIWW) activities (e.g., the role and contribution of WIWW in the provincial waste management strategy/formal recycling chain), (b) the composition and path of waste collected by the WIWW group, (c) A broad needs assessment, it requires an accurate database not only as a basis for proposing an appropriate management model to the informal collection and recycling system but also to address social and environmental issues.

From the above-mentioned urgent requirements, GreenHub has conducted surveys in order to characteristics of the informal recyclable waste collection system which involves both formal and informal collectors in Tuy Hoa City. Tuy Hoa city is the largest and only city in Phu Yen province where the components of the informal collection system are most fully formed. They include informal waste collection, transportation and recycling systems. This informal system often not appear fully in rural areas. On the other hand, small components of the system such as collectors, small buyers will go from rural areas to urban areas such as Tuy Hoa city to collect and trade recyclable waste.

The results will contribute to the development of solid waste management solutions in general, and ensure sustainability for the plastic recycling activities in particular.

The target audience includes:

- Department of Natural Resources and Environment of Phu Yen province (Phu Yen DONRE)
- Women's Union of Phu Yen province and grassroots levels
- Department of Labor, Invalids and Social Affairs of Phu Yen province (Phu YEN DLISA)
- Tuy Hoa City People's Committee
- Tuy Hoa City Confederation of Labor
- Phu Yen Urban Environment Joint Stock Company (Urban Environment Company)

I.1. Objectives:

- To assess the roles and characteristics of components in the informal plastic collection system (such as waste picker, junk buyer, workers in Phu Yen Urban Environment

Company – Formal waste collector/worker (FWW), junk shop) in the local area of Tuy Hoa City. In which gender factors will be assessed in detail.

- To identify plastic waste characteristics which are collected, transported by informal systems in Tuy Hoa City.
- To preliminarily identify the flow of plastic waste collected by informal system in the local area of Tuy Hoa City.

I.2 Implementation method

I.2.1 Object and scope

Data collection for the research was conducted in 9 wards and 4 communes in Tuy Hoa City, in October to November 2020, November to December 2021 and August 2022.

The selected survey subjects are all components of the informal collection system involved in the plastic scrap collection system in Tuy Hoa City, including

- Group 1: Informal waste collector – IWC (includes waste picker and junk buyer) – 36 people (1st phase) and 50 people (2nd phase).
- Group 2: Environmental sanitation & waste collection workers of Phu Yen Urban Environment Joint Stock Company – Formal waste collector/ worker (FWW) – 36 people.
- Group 3: Junk shops - 7 junk shops (1st phase) và 16 junk shops (3rd phase)

Table 1. Synthesis of samples for each target group

No.	Actor	Sample Size	Scope of Survey	Date Surveyed
1	Informal waste collectors (i.e., WIWWs)	36	9 wards	October - November 2020
2	Formal waste collectors/workers (workers of Urban Environment Company)	36		
3	Informal waste collectors (i.e., WIWWs)	50	4 communes	November to December 2021

4	Junk shops	25	9 wards and 4 communes	January 2020 and August 2022
	Total	147		

1.2.2 Implementation method

- Survey method by questionnaire: sample questionnaire is provided in the Appendix of this report;
- Methods of field survey and direct interview;
- Methods of data analysis and evaluation: data is analyzed by Excel software, using the methods of correlation analysis.

The research process is as follows:

- Prepare questionnaires to collect necessary information and data;
- Select subjects to participate in the survey. Selection criteria are as follows: each ward/commune will select at least one representative sample for each target group;
- Conduct survey on 13 wards and communes of Tuy Hoa city;
- Form a data collector group, interview by questionnaire all the selected samples. The number of samples for each type of object is presented in Table 1;
- Enter the collected information and data. Analyze, synthesize and evaluate survey results.

II. RESULT AND DISCUSSION

II.1 Roles and characteristics of components in the informal collection system in Tuy Hoa City

In Tuy Hoa City, plastic wastes are generated from commercial areas, residential areas and agricultural production activities. As being collected together with the urban waste collection system, they will be classified and separated with other scrap types due to the collection of informal systems. Plastic scrap which are derived from industrial facilities will be collected and reused by those bases themselves. And for the rest waste, they'll be sold to private enterprises with plastics recycling.

As well as other urban centers, the plastic waste collection system in particular and recyclable waste in general (including paper, metal, glass, ...) in Tuy Hoa is generated by a network consisting of waste collectors, scrap dealers/ junk buyers, scrap trading establishments (junk shops). For plastic recycling facilities, the city now does not have any establishments. Plastic wastes collected in Tuy Hoa will be sold to collecting/recycling facilities in other urban areas nearby such as Binh Dinh, Khanh Hoa, Ho Chi Minh, Binh Duong,...

The diagram of the informal recycling collection system in Vietnamese cities and the diagram of the formal domestic solid waste collection system are shown in Figure 1 and Figure 2, respectively.

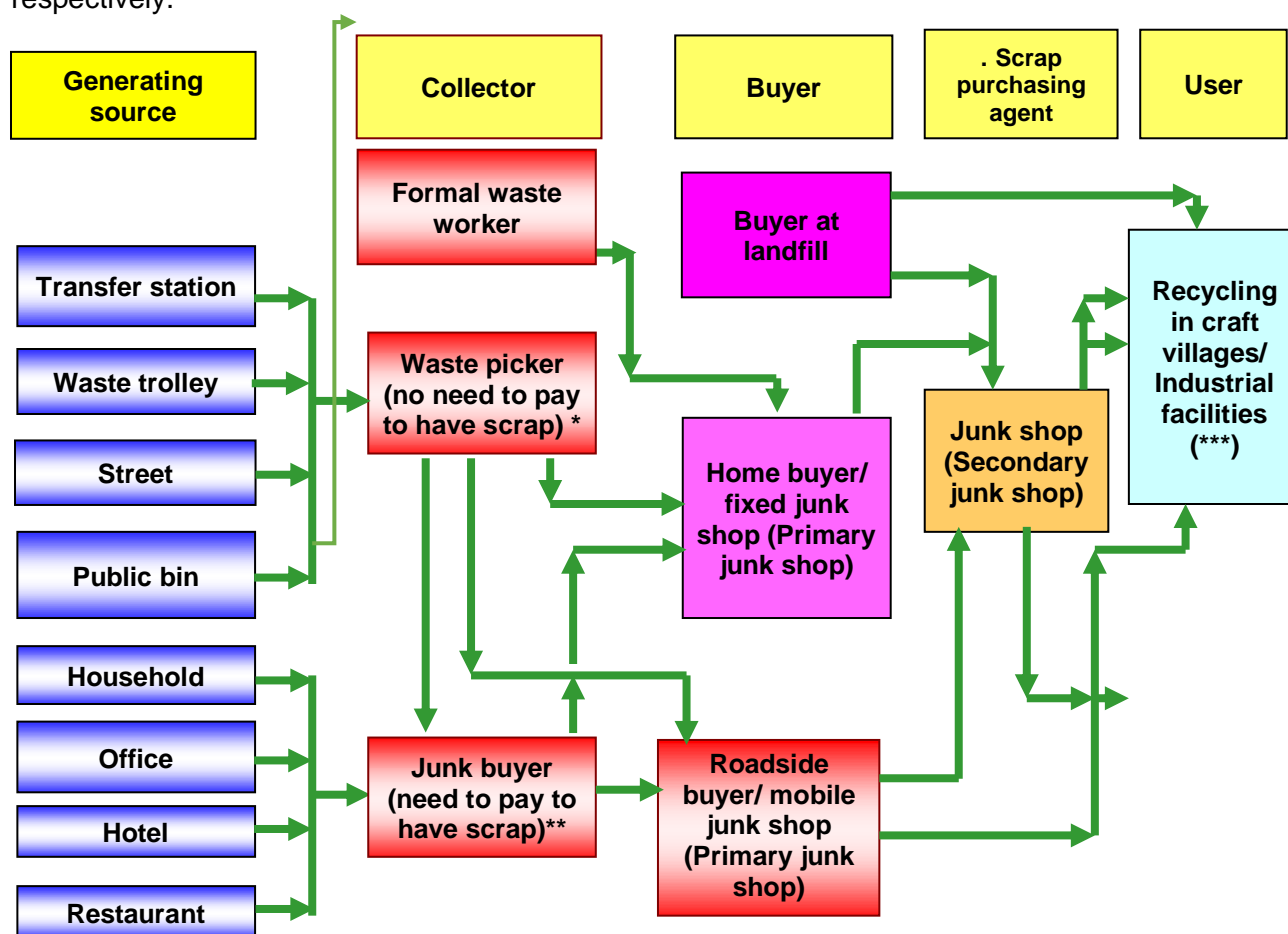


Figure 1. The diagram of informal plastic waste collecting and recycling system in Vietnamese cities

* Waste picker (no need to pay to have scrap): They collect waste from public places where the waste's owner is unknown, so they don't have to pay anyone to buy recyclables in there.

**** Junk buyer (need to pay to have scrap):** They collect waste from the source owner who is willing to sell it to them and they pay to buy without any kind of formal or informal agreement between the junk buyer and the waste source. Because of the following reasons:

1. The amount of cash for the transaction is very small, the buyer and the seller are not willing to set up a contract/agreement for such a small business.

2. Junk buyers are informal labor groups. They don't have the ability to set up such arrangements

3. It is not necessary for them to make such contracts/agreements because they do not prove and report their personal income to the state, and the state (or any organization) does not manage informal workers. Therefore, they also do not participate in paying personal income tax.

(*)** Recycling in craft villages/ Industrial facilities are the end points for a product life cycle. From here the waste is recycled into products or semi-finished products or as raw materials for other uses depending on the purpose of each craft village/industrial establishment and their second life cycle is created.

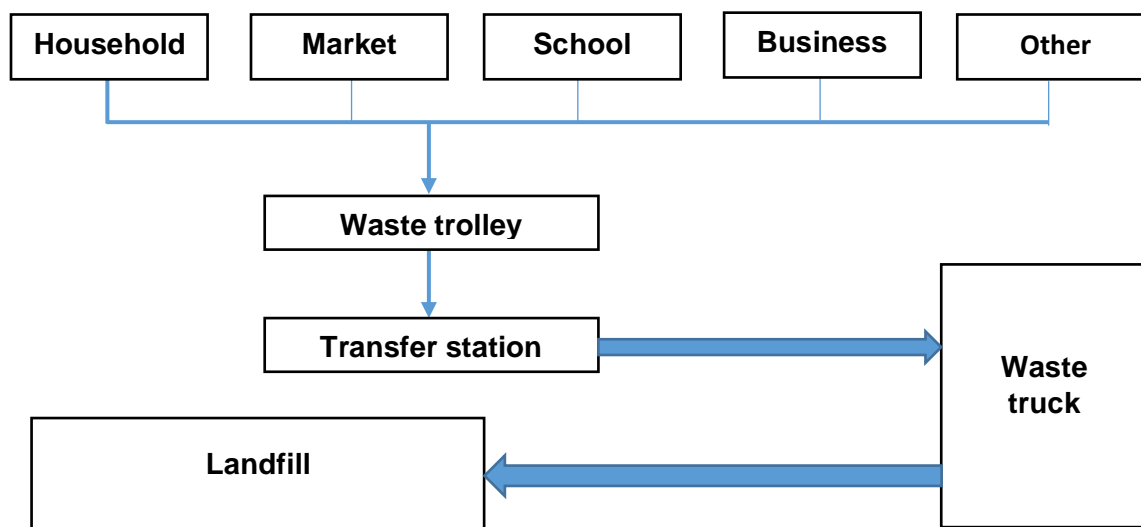


Figure 2. The diagram of formal domestic solid waste collection system (*) in Vietnamese cities

(*) These formal domestic solid waste collection systems are managed by private companies/public companies/ or a combination of both public and private. The system is legally formed and operated and is managed by the state through contracts with companies

II.1.1 Informal waste collectors: junk buyer (scrap dealer) and waste picker, formal waste collector (FWWs) .

The first level in the recycling system consists of informal waste collectors such as: waste pickers, junk buyers and formal collectors like formal waste workers (FWWs) . These objects,

despite having the same task in the system, they are distinguished by the difference in sources, materials, equipment's and demands for operating activities.

The waste pickers rely mostly on the sources of public places, without much operating capital, using simple tools and generally collecting low – quality, low selling value materials such as plastic straws, nylon, single used plastic or high - quality materials with high selling value but their number collected is very small such as plastic bottle, hard plastic, cans.

The junk buyers who collect materials with higher quality from private sources such as households, agencies, restaurants, ... requires daily operating capital including the capital to buy recyclables and personal expenses for food and water while working (if any) and use more complex instruments such as: bicycles, motorbikes with additional waste containers/ tanks made from metal meshes for transporting. Those collectors often sell scraps after each day of junk shops.

FWW is responsible for collecting domestic waste (without sorting) from waste sources such as households, businesses (hotels, restaurants,...), markets, etc and transporting them by waste trolley to the transfer station so that the waste trucks come and transport all domestic solid waste to the landfill. In the working process, they carry out collection and classification of scraps which can recycle, then sell these scraps to groups of junk buyers or junk shops in the vicinity of the area. They are allowed to collect scrap during work by Phu Yen Urban Environment Company. They don't have to pay for scraps, therefore no initial capital needed. Scrap collection activities are not considered the main job of Formal waste collectors (FWWs), which only help them increase their income.

a. Age

The age distribution divided into two groups of objects which are the informal waste collectors (waste pickers & junk buyers) and FWWs represented in table 2.

- The informal waste collectors are mostly between middle - aged and older adult. In which the largest proportion of the elderly workers (from 50 years upwards) accounted for 46.5% of the total (50 - 60 years old accounted for 33.7% and over 60 accounted for 12.8%). The oldest person is 70 years old, the youngest is 35.
- FWW participating in the survey are mainly in the working age, from 30 to 50 years old. The age group from 40 to 50 has the largest proportion (44. 44%). There are only 2.78%

of people surveyed are at the age of 60. The youngest is 30 years old (02 persons), the oldest is 67 years old (01 person).

- This data is totally explainable as all FWWs have signed labor contracts with the company, receiving support regimes, labor insurance which are under the Government management, therefore, the employee's age must comply with the provisions of law.

Table 2. Age distribution

No	Age	Informal waste collector (Waste picker & Junk buyer)		Formal waste worker- FWW	
		Quantity	Proportion (%)	Quantity	Proportion (%)
1	Under 30 years old	1	1.2%	2	5.6
2	From 30 to 40 years old	9	10.5%	12	33.3
3	From 40 to 50 years old	36	41.9%	16	44.4
4	From 50 to 60 years old	29	33.7%	5	13.9
5	Over 60 years old	11	12.8%	1	2.8
	Total	86	100.0	36	100.0

b. Gender

- 99% of informal waste collectors are women. As for FWWs, the proportion of women accounted for 80.6%, the rest is men (19.4%).
- The result shows that women have the main role in the activities of the informal collection and waste collection system in Tuy Hoa City. Most of the people involved in these jobs are women. This can be explained as follows: Women are considered as the weaker sex and have more barriers in finding jobs with stable income than men. Women often face the double burden of having to ensure the quality of work and career development while still having to shoulder the weight of family responsibilities (*). Therefore, women can only

participate in informal jobs, flexible in terms of time, especially women from rural areas with poor conditions, jobs such as scrap collection, street vendors, etc. are more suitable.

* According to information from Report Women, Employment and Wages: An Overview of Women Workers in Vietnam by Action Network for Migrant Workers (M.net)

Table 3. Gender distribution

No	Gender	Informal waste collector (Waste picker & Junk buyer)		Formal waste worker- FWW	
		Quantity	Proportion (%)	Quantity	Proportion (%)
1	Male	1	1.2	7	19.4
2	Female	85	98.8	29	80.6
	Total	86	100.0	36	100.0

c. The working years

Table 4. The working years

No	Working years	Informal waste collector (Waste picker & Junk buyer)		Formal waste worker- FWW	
		Quantity	Proportion (%)	Quantity	Proportion (%)
1	Under 5 years	11	13.0	20	55.6
2	5 - 10 years	9	10.0	2	5.6
3	10 – 15 years	14	16.0	2	5.6
4	15 – 20 years	24	28.0	8	22.2
5	Over 20 years	28	33.0	4	11.1
	Total	86	100.0	36	100.0

- The time spent collecting and buying scrap of the group of informal waste collectors over 20 years accounted for the highest proportion (about 33.0%). In which, 10/86 people have worked for more than 30 years, accounting for 11.6%, the longest seniority is 40 years (from 1980 to the present). Persons with the least seniority (01 person) in scrap collection and purchase activities is

1 year (From 2019). Their long tenure with this job shows that for this group, scrap procurement can be considered their main job. More than 50% of informal waste collectors who have been in this job for more than 15 years indicate that they lack the ability to switch and look for another formal job. In addition, this also demonstrates the suitability of informal waste collection with the capacity and conditions of the informal waste collectors with the flexibility of the work.

Working time at Phu Yen Environmental Urban Company of FWWs under 5 years accounts for the largest proportion (about 55.6%). The number of long-term workers (over 20 years) accounts for 11.11%, of which the oldest seniority is 31 years (From 1989 to now).

d. Daily working hours

- Most informal waste collectors work more than 8 hours/day (accounting for about 40.7 % of the total number of people participating in the survey). They usually work 11-13 hours/day for moving from rural areas to urban areas by bicycle, motorbike from 5am - 6am, collecting, buying and selling recyclables and returning home at 5-6pm. The number of people recorded working 11-13 hours/day is up to 20/ 86 people.
- About 33. 7% of informal waste collectors are only working about 6-8 hours per day. The rest of the day they take care of their families and do other jobs.
- For FWWs , the average number of working hours is 8 hours/day to be responsible for the collection of domestic solid waste from the city. The Phu Yen Urban Environment Company does not require and does not prohibit them from sorting waste, collecting scraps in working time. The scrap collection depends on the need to increase income of them). The workers working in shifts, subject to the coordination of the collection team leader.

Table 5. The working hours of the informal waste collectors

Working hours	Quantity (person)	Proportion (%)
1 – 5 hours	22	25.6

6 - 8 hours	29	33.7
9 - 11 hours	17	19.8
Over 12 hours	18	20.9
Total	86	100.0

e. Jobs other than scrap collection

- For the informal waste collectors, 22 out of 86 people (25.6%) confirmed that they have a job other than scrap collection. Other jobs are mostly farming, maid job, selling fish, planting vegetables, ... In which, 17/22 people spend 1-5 hours/day participating in informal waste collection. The rest still work more than 5 hours a day for scrap collection. Thus, it can be seen that the majority of people in the group informal waste collectors consider this activity as the main job which brings them the main income and they spend most of their labor time on this work. There are only a few people, due to financial demand, health status, ... chose another job.
- Contrary to the above group, FWWs are in the group of people whose main job are domestic solid waste collection. The proportion of people with other jobs besides the main job/waste collection work accounted for 22. 22% (8 out of 36 people), corresponding to the estimated amount of people whose income are over 5,000,000 VND (In Vietnamese Dong)/per month (This is total income per month including from their other jobs).
- The recyclable waste sorting and collection then selling them activities are considered as a job that helps FWWs to increase their income, because of its convenience and relevancy to their main work. Therefore, there are 77.8% of FWWs confirmed that they often sort and collect scrap along with the daily waste collection process. There are eight people who do not collect recycling waste in the process. The main reason is that they do not have enough time, the income from this activity is not high, ...

Table 6. Percentage of informal waste collectors who have jobs other than scrap collecting and purchasing

Table 7. Percentage of formal waste workers (FWWs) participating in the survey that collects recycled materials

Having other jobs	Quantity (person)	Proportion (%)
Yes	48	55.8
No	38	44.2
Total	86	100.0

Collecting recyclable materials	Quantity (person)	Proportion (%)
Yes	28	77.8
No	8	22.2
Total	36	100.0

f. Average monthly income

Table 8. The average of monthly income

No	Average income person/month (VND)	Informal waste collector (Waste picker & Junk buyer)		Formal waste worker-FWW	
		Quantity	Proportion (%)	Quantity	Proportion (%)
1	Under 1million	2	2.3	0	0.0
2	1 - 3 million	58	67.4	0	0.0
3	3 - 6 million	21	24.4	29	89.6
4	6 - 10 million	3	3.5	7	19.4
5	Over 10 million	1	1.2	0	0.0
6	No rely	1	1.2	0	0.0
	Total	86	100.0	36	100.0
The average income in the Tuy Hoa City in 2020: 4,450,000 VND/person/month					

- The average income from procurement of junk buyers is from 1 – 6 million VND/month (91.9%). In particular, the most common income is about 3 million VND/month. The highest income level of the scrap collection is recorded as 13 million VND/month (01 person). The lowest level is half a million/month. There's a huge gap between the minimum and maximum income level due to the fact that the interviewees have different scrap collection source. Informal waste collectors (junk buyers) who collect from restaurants and

hotels have more scraps (also income) than informal waste collectors collect on the street (waste pickers who don't need to pay to have scrap).

- Similarly, the monthly income of FWWs averages about 4,500,000 - 4,800,000 VND per month, including basic salaries and other support. In addition, 19.44% of surveyed FWWs have income of more than 5,000,000 VND per month due to other income sources from growing vegetables and farming. On average, each FWW earns about 54,000 VND/month from collecting recyclable waste. In which, the highest income from this extra job is 322,000 VND.
- If comparing this income level with the average income in Tuy Hoa City (in 2020) which is 4,450,000 VND per month, it can be seen that the income level of these two groups of subjects (informal waste collectors and formal waste collectors) are low and moderate. Especially for informal waste collectors, as this is the group which is heavily impacted. Thus, the activity of scrap collection does not provide the entire income, but it is still maintained and is a stable monthly source of income for informal waste collectors.

II.1.2 Scrap purchasing agent (Junk shop)

Scrap purchasing agent (Junk shop) is in the next step of the collection and recycling chain (Figure 1). There are 2 types of junk shops: (1) junk shops at fixed places and (2) mobile junk shops.

Mobile junk shops are usually located along the streets or shops along the fence of landfills. Scrap is purchased quite large (average about 500kg) but of low quality. Junk shops along the streets which collect scrap are mainly from junk buyers. The informal waste collectors often choose junk shops that are convenient to their areas of sale, and often stick to these junk shops through familiar relation.

The biggest difference between fixed and mobile junk shops is that most of the mobile junk shops are along the sidewalks, and fixed junk shops are at fixed places. Because the fixed junk shops work at fixed location, there is no advantage near the sources as the mobile junk shops. The fixed junk shops have to develop a patron system to ensure a stable supply of scrap. This will create competition with the mobile junk shops to capture the cohesion of informal waste collectors. For the survey in Tuy Hoa city, 100% of junk shops accessed were fixed junk shops.

In the recycling system, in order to ensure the abundance of scrap sources, junk shops often have trade relationships and exchange with all systems of recycling. It means that the supply of

scrap for junk shops include all the lower level of recycling system (waste pickers, formal waste workers (FWWs) , junk buyers) and their scrap buyers are small-scale recycling or industrial facilities. The location of junk shops in the recycling system allows them to exchange scrap trading with large number, and their customers are both in and out side of Tuy Hoa.

The survey team conducted the information survey of 7 junk shops (phase 1) and 16 junk shops (phase 3). The results show that junk shops were most concentrated in Phu Thach Ward (5/23 junk shops), followed by Ward 1 (4/23) and Ward 5 (3/23).

Table 9. Regional distribution of junk shops

Ward	Quantity (junk shop)	Proportion (%)	Ward	Quantity (junk shop)	Proportion (%)
1	4	17.4	Phu Thach	5	21.7
4	2	8.7	Binh Kien	2	8.7
5	3	13.0	Binh Ngoc	2	8.7
9	1	4.3	An Phu	1	4.3
Phu Dong	1	4.3	Hoa Kien	1	4.3
Phu Lam	1	4.3	Total	23	100.0

a. Age

- Junk shop owners are commonly aged 40-50 (about 35%) and 30-40 year old's (30.4%)
- There are no junk shop owners under 30. It shows that this is a career that does not attract young workers, although the requirements for qualifications and investment capital are not high. Since the effectiveness and role of this work are not known to many people, so is the informal waste collection. Young workers have many job opportunities due to their health and age advantages and they do not appreciate this job because the society's prejudice about it has long been formed.

Table 10. Age distribution of junk shop owners

No	Age (Year old's)	Junk shop owners	
		Quantity	Proportion (%)

1	Under 30	0	0.0
2	From 30 - 40	7	30.4
3	From 40 - 50	8	34.8
4	From 50 - 60	5	21.7
5	Over 60	3	13.0
	Total	23	100.0

b. Gender

- For the group of junk shop owners, the gender distribution is quite different from the group of junk buyers. If the group of junk buyers is 99% female, then for the group of junk shops, this proportion is not too different (40% male and 60% female)
- The proportion of men and women is not too different as above, often appearing in junk shops. Because in junkshops, the volume of waste collected is more, so the workload and revenue are also more. Specifically, when the volume of waste collected is large, the volume of heavy and complicated jobs that are suitable for male workers also increases. For example, Main work at junk shop is carrying, loading and unloading heavy and bulky waste blocks, arranging warehouses (large amount of waste blocks), driving waste trucks to sell. The suitability of male physical for the above tasks makes them a priority for recruitment for these positions. For these works, the demand for male workers in junk shops is quite large, from which the male workers' working days are paid more because of their health advantages. Such wages and characteristics of work attract male workers to participate more than simple, lower-income jobs (such as waste collection as a junk buyer/ waste picker).

Table 11. Gender distribution of junk shop owners

No	Gender	Junk shop owners	
		Quantity	Proportion (%)
1	Male	9	39.1

2	Female	14	60.9
	Total	23	100.0

c. *Years of junkshop activities*

- The average time of scrap business of all junk shops is 16.3 years. In which the longest operating junkshop is 31 years, the junk shop has the shortest business period of 3 years.
- Accounting for the largest proportion are junk shops operating for 5-10 years (30%) and over 20 years (26%). This shows that scrap trading activities have been carried out for a long time in Tuy Hoa City.

Table 12. Distribution of operating time of the junk shop

No	Operating year	Junk shop	
		Quantity	Proportion (%)
1	Under 5 years	2	8.7
2	5 - 10 years	7	30.4
3	11 - 15 years	4	17.4
4	16 - 20 years	4	17.4
5	Over 20 years	6	26.1
	Total	23	100.0

d. *The number of daily working hours and monthly working days*

- Most junk shops work from 10 to 12 hours/day (accounting for about 74% of the total number of junk shops participating in the survey). Only one small junk shop said they only had worked 4 hours a day due to the personal needs and reasons of the owner at the time of the survey. The rest have more working time.
- Most junk shops work more than 26 days a month, of which 19/23 junk shops work all 30 days a month. They only take a break during the Lunar New Year every year.
- This shows that the working conditions at these junk shops are quite strenuous, the labor time is large.

Table 13. Distribution of the number of daily working hours and monthly working days of the junk shops

No	Daily working hours	Quantity	Proportion (%)	No	Monthly working hours	Quantity	Proportion (%)
1	1 - 8 hours	6	26.1	1	1 - 22 days	1	4.3
2	0 - 12 hours	17	73.9	2	23 – 26 days	0	0
3	Over 12 hours	0	0	3	Over 26 days	22	95.7
	Total	23	100.0		Total	23	100.0

e. Number of employees at the junk shop

- The average number of workers working at the junk shops is 4 permanent employees, which has the highest proportion (accounting for 52.2%). There are 3/23 junk shops having over 10 workers, in which 1 junk shop has 15 workers. The number of workers is proportional to the amount of waste that the junk shop handles. This suggest that the majority of junk shops are on a micro scale with the average collection capacity of about 200kg of plastic waste/day, mainly in the form of households.
- Notably, 17 out of 23 establishments (74%) hire more employees from outside of family members. Particularly, there is a junk shop that hire 13 part-time workers. This explains the characteristics of scrap trading activities as unstable in volume and source of scraps. Scrap trading activities are usually pro-active in the last months of the lunar year, especially near the Lunar New Year, equivalent to January and February of the calendar year. Because on this occasion, Vietnamese people often tend to buy new furniture, new goods to decorate the house to welcome the New year. At the same time, they will dispose of and sell old goods and furniture. The rest of the year, the workload is not too many fluctuations but is quite stable. Except in the case of natural disasters, extreme weather (usually can be happened during October-November) may affect the amount of paperboard collected.

Table 14. Distribution of the number of workers at the junk shops

No	Number of workers	Quantity	Proportion (%)
2	1 - 4 persons	12	52.2
3	5 - 9 persons	8	34.8
5	Over 10 persons	3	13.0
	Total	23	100.0

f. Average income and expenditure of scrap trading activities

- The average revenue for junk shops is 15,000,000VND/ month. In which the junk shop with the highest revenue is 90,000,000 VND/month, the lowest junk shop is 4,500,000 VND/month.
- The average cost of junk shops is about 7,000,000 VND. In which, the average cost on items includes electricity (4.1%), water (0.6%), machinery and equipment (1.4%), tax/ fee (2.7%), and labor (91.2%). The cost structure shows that the cost of hiring labor accounts for a large proportion in the operation at junk shops. The average salary of outsource workers at junkshops is about from 4,000,000 VND - 5,000,000 VND/ person/ month. Other costs are very small, insignificant.
- The balance of revenue and cost indicates that the monthly net profit from junk shops about 7,000,000 to 8,000,000 VND/month. This profit for the junk shop owners is higher than the average income per capital of Tuy Hoa City which is 4,500,000 VND/month.

Table 15. Average net profit of junk shops

No	Average income (VND/month)	Junk shop owner	
		Quantity	Proportion (%)
1	Under 5 million	1	4.3
2	6 - 10 million	5	21.7
3	11 - 20 million	8	34.8
4	Over 20 million	9	39.1
	Total	23	100.0

g. Desires and aspirations of junk shops

In order to find out the wishes and aspirations of junk shops, the research also conducted interviews with the surveying junk shops about their difficulties, desires and aspirations on the issues related to waste collection and recycling. The issues mentioned are mainly related to health, finance, policy, society, and technology.

- Health issues are the biggest concern for both the owners and the workers of these junk shops. The reasons given by the junk shops are the toxicity when in contact with daily scraps (plastic waste), the cramped working environment, and unsanitary conditions that significantly affect the health of workers.
- Financial issues are considered one of the biggest concerns of most junk shops. 100% of the interviewed junk shops confirmed that they are fully active in the input and output of scrap trading, that is the source of purchasing scrap plastic as well as the output of consuming plastic scraps after collection is not lacking. The most difficult problem of these junk shops is the capital source for buying scrap plastic, and they do not receive any financial support from the local government. The biggest desire of these junk shops is to get preferential loans, or support in terms of interest rates and tax/fee reductions for this type of business so that they can have more operating capital. Some of the reasons that hinder their desire are (1) This type of business like junk shops is not on the list of business which supported loans or incentives from the banks and the Vietnamese government; (2) Most junk shops, especially small-scale junk shops with the main participation of family members, often operate informally (without business registration), so accessing loans or support from the country is even more impossible.
- In terms of policy, junk shops often do not receive any support or encouragement from the government. Therefore, they are often greatly affected when there are economic or policy fluctuations, such as the Covid 19 pandemic in recent years.

II.2 Flow diagram of plastic scraps in Tuy Hoa City

II.2.1 Characteristics of collected and transported plastic scraps

Plastic scraps are a plastic product or plastic material that is discarded from the production or consumption process, recovered for recycling, and reusing as raw materials for the production of other products.

Normally, the classification of recyclable plastics is based on the plastic identification number. However, similar to other urban areas, plastic waste collected, bought/sold by the informal system in Tuy Hoa is classified based on the characteristics, applicability and cost of each type of plastic instead of classification based on international conventions. Specifically, at Tuy Hoa, plastic waste will be classified into the following categories:

- 1) "Flexible plastic" is the common name for plastic wastes, which are cosmetic bottles, food bottles, etc., regardless of whether they are colorless, or colored (white, red, blue,...). These plastic products are usually mainly produced from PP plastic.
- 2) "Coca Plastic" refers to plastics from beverage bottles, drinking bottles. They are mainly PET plastic.
- 3) "Brittle plastic" is the common name for plastic waste products, which are kitchen bottles, children's toys, water pipes, food containers, etc. Plastic wastes of this type are of inferior quality, not of good quality, including colorless and colored resins, the purchase price is also the cheapest among purchased plastics. The main components of this plastic waste are mainly PVC, PS, and PA.
- 4) "Hard plastic" is often used to make household items, they are usually made from HDPE plastic with different colors.
- 5) "Flexible nylon" is mainly collected as nylon bags used to store electronic items. This type of nylon is characterized by toughness, clarity or translucent, colorless.
- 6) "Brittle nylon" is mainly nylon with hard, brittle characteristics, usually transparent bags, no handle, which is often used as a bag for clothes, when the bag is rubbed, it makes a rustling sound.

The volume and proportion for each type of plastic collected, bought/sold by the informal system in Tuy Hoa City are shown in Table 16. The results show that "flexible plastic" and "coca plastic" are composed mainly of PP and PET plastics, which were purchased with the highest proportion, accounting for about 84% of the total volume collected. This is completely reasonable, because these are the two types of plastic most used in households and consumer products. Especially for collectors who are formal waste workers (FWWs), most of the plastic wastes (approximately 90%) they collect and sell are beverage bottles, drinking bottles, etc., which are products from PET or HDPE plastic.

With "hard plastic" whose main component is HDPE, this is a technical plastic, so they still retain their technical characteristics after the recycling process. The proportion of "hard plastic" collected accounts for 3-7% of the total number of plastics. Finally, "Brittle plastic" is the common name of the remaining plastic wastes that are purchased/sold without classifying the color, type and plastic material, origin, characteristics, etc. of the plastic.

Nylon is a rather special type of plastic scrap, due to its persistence in natural decomposition conditions. In Tuy Hoa, high quality nylon bags such as industrial wrapping paper, electronic product packaging paper, etc. are classified as "flexible nylon", the rest of other types of nylon bags are classified as "brittle nylon" "also purchased.

Table 16. Proportion of purchased plastics for each target group

Usual name	Plastic types	86 Junk buyers		36 formal waste workers (FWWs)		23 junk shops	
		Average purchase volume (kg/day)	Proportion (%)	Average purchase volume (kg/day)	Proportion (%)	Average purchase volume (kg/day)	Proportion (%)
Coca plastic	PET	369.8	38.0	14.2	80.4	1,980	39.9
Brittle/ Flexible plastic	PP	468.2	48.1	3.0	17.1	2,197	44.3
Hard plastic	HDPE	89.8	9.2	-	-	567	11.4
Brittle plastic	PVC, LDPE	42.8	4.4	0.3	1.6	100	2.0
Flexible nylon		2.9	0.3	0.2	0.9	60	1.2
Brittle nylon				-	-	60	1.2
Total		973.5	100.0	17.7	100.0	4,964	100.0

- On average, each informal waste collector collects/trades about 11.3 kg/plastic waste/day. After being purchased, plastic waste will be sold to junk shops in the area.

- On average, each FWW participating in the survey collects about 0.49 kg plastic waste/day. Scrap collected by formal waste workers (FWWs) is often resold to junk buyers or junk shops. The choice of place to sell depends on habits and geographical distance. In which, 63.9% of formal waste workers (FWWs) collect scrap and sell it to the junk shops, 31.1% sell it to junk buyers. The average amount of collection of formal waste workers (FWWs) is much lower than that of informal waste collectors because formal waste workers (FWWs) only pick up leaked waste from among domestic waste discharged from the waste source: households, hotels, restaurants, streets,... without paying. While, before disposing of household waste, the waste source owner may have sorted and stored the scraps for sale to the junk buyers.
- On average, each junk shop collects about 215.8 kg of plastic waste/day. 6 out of 23 junk shops re-purchased for other junk shops. The remaining 17 out of 23 are sold to recycling facilities.

According to the waste audit report of Phu Yen Urban Environment Company in 2019, the total amount of domestic solid waste generated by Tuy Hoa city is about 150 tons/day. In which, the collection rate of Phu Yen Urban Environment Company reaches about 70 - 85% of the total amount of waste generated, then the waste is buried at the city landfill. Plastic waste accounts for 18.31%. Thereby, it is possible to roughly visualize the amount of plastic waste generated in Tuy Hoa city at about 27.6 tons/day. Thus, it can be seen that the average amount of plastic waste collected per day by each junk shop is equivalent to 0.78% of the amount of plastic waste per day collected by Phu Yen Urban Environment Company. And it contributes to the reduction of 215.8 kg of landfilled waste every day.



Figure 3. Brittle plastic



Figure 4. Coca plastic/Plastic bottle



Figure 5. Hard plastic



Figure 6. Brittle nylon



Figure 7. Survey of junk buyer

Figure 8. Survey of junk buyer

II.2.2 Flow diagram of plastic waste

In Tuy Hoa City, the system of collecting and recycling plastic waste by the informal system has the same model as in other urban areas, but there are still some differences as follows:

- 1) The distinction between waste picker and junk buyer is mainly based on means and tool of work, working capital and source of waste collected.
- The waste pickers have the main source of waste (bins) in the street or dumping site, they collect waste that is not owned by anyone. The main source of waste of junk buyers are households, hotels, restaurants,... Besides, junk buyers have the advantage of price policy when they are willing to spend money to buy recyclables from waste source owners.

Although the amount of payment is not large, waste generating source prefers to be paid for their waste contributions. So that, the amount of waste collection of junk buyers is more than waste picker. Because if the generating source keeps the recyclings for sale, the amount of recycling waste that leaks into the environment/streets will be less.

- The waste pickers have been taken over the market when junk buyers receive more waste thanks to the price policy. Because of the above reasons, waste pickers are tending to convert to junk buyers to be able to collect more waste because the conversion is easy to make, they just need to change the way they collect and invest a small amount of money capital, means, tools for daily trading. So the number of waste pickers in the inner city is very small, almost negligible.
- 2) The network of junk shops covers almost the entire city. Junk shops can be divided into 2 levels:
 - Primary junk shops have the following characteristics: small scale (1-2 people), laborers are usually only family members (wife, husband, children), small volume of daily buying/selling plastic waste, their partner are usually informal waste collectors, Formal waste workers (FWWs) , and their customers are usually the same level of junkshops or secondary junkshops. In addition, there are almost no activities other than buying and selling at primary junk shops, which means that plastic waste will not be sorted, separated label, or cleaned, ...
 - The secondary junk shops have the following characteristics: larger scale with about 500 – 1,000 kg waste collected/day, labors including family members, and possibility of hiring workers outside their family. The daily amount of plastic waste is purchased and sold significantly. The plastic waste is purchased mostly from the primary junk shops, or the secondary junk shops, there is only a small amount acquired from the informal waste collectors and formal waste workers (FWWs) . Plastic waste shall be sorted according to the plastic waste category in Table 16, packed and sold to other secondary junk shops in the inner city, or recycling facilities...

The final place of plastic collection and recycling system at Tuy Hoa is the plastic recycling facilities. During the survey period, Tuy Hoa City doesn't have any large-scale plastic recycling base. There are only a few plastic recycling facilities at small scale, non-concentrated, so the mass of collection and recycling plastic waste is not considerable. As a result, most of collected



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plastic wastes will be transferred into surrounding areas or provinces such as: Binh Dinh, Khanh Hoa, Ho Chi Minh, Binh Duong,...

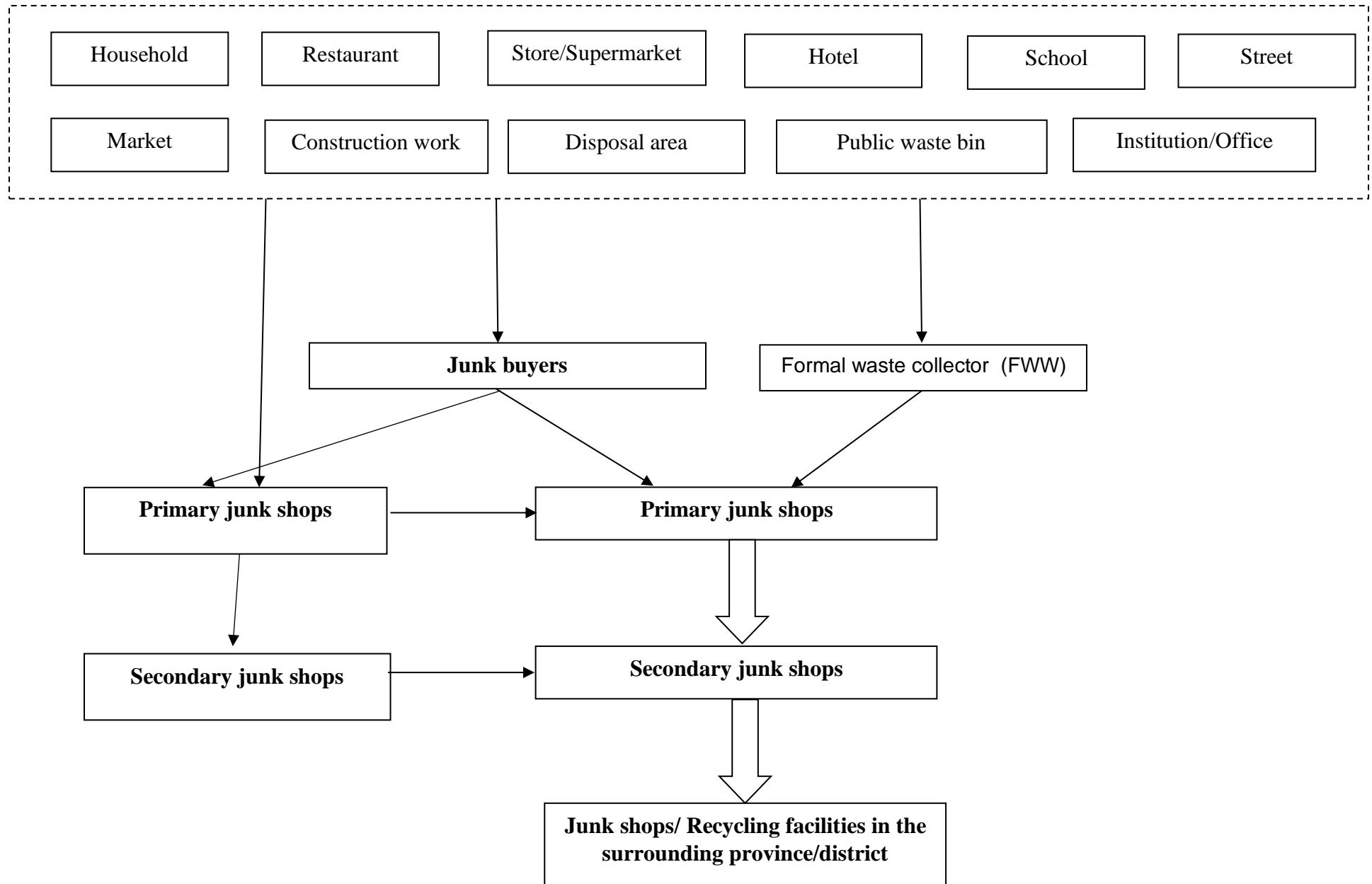


Figure 8. Recyclable waste flow diagram at Tuy Hoa city

II.3 Assessment of the sustainability of informal plastic collection and transport system in Tuy Hoa City

Profit is one of the factors affecting the sustainability of the plastics collection and recycling system, therefore GreenHub implements survey of purchasing price for each type of plastic waste which are bought and sold by 2 objects who have the greatest collection in the system of junk buyer and junk shop, results are shown in table 17.

The result shows that the purchase/sale price for "coca plastic" is the highest, though the profit is not the highest. However, due to the large amount of plastic generated, they are considered the main source of income for buyers.. Similarly, for "flexible plastic", the average purchase price is 5,250 VND/kg, the average profit is 1,250 VND/kg of plastic. With "hard plastic" and "brittle plastic", the profit is 1,000 – 2,000 VND/kg. Despite the high profit, the volume of purchases /sale is small. Therefore, it should not be considered as the main source of this group.

When comparing the cost of plastic waste in Tuy Hoa with other cities such as Can Tho Province (which was also conducted survey by GreenHub in 2022), the purchase price of all types of plastic waste is relatively similar, which are shown in table 17.

Especially, if comparing the first and the last price of buying/selling plastic waster in the informal plastic waste collection and recycling system, which are 3,250 VND/kg (buying price of the junk buyers) and 8,750 VND/kg (selling price of junk shops) with "coca plastic" respectively, or 3,250 VND/kg and 6,500 VND/kg with "flexible plastic", it can be found that the collection, purchase/sale of plastic waste may bring about significant profit to these systems. This chain benefits for waste generators, collectors, junk shops. If there weren't too many fluctuations in market supply and demand, junk shops would have the largest margin in this chain.

It is clear that if the collecting, buy/sale recycling scrap activities in general, and plastic waste in particular are managed effectively, it will not only help reducing the impacts on the environment of plastics but also creating employment, which provides a significant income source for population in the urban areas.

Table 17. Price of buying/selling plastic waste of each target group

	Junk buyers	Junk shops
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Plastic types	Average purchase price (VND/kg)		Average selling price (VND/kg)		Average purchase price (VND/kg)		Average selling price (VND/kg)	
	Tuy Hoa	Can Tho*	Tuy Hoa	Can Tho*	Tuy Hoa	Can Tho*	Tuy Hoa	Can Tho*
Coca plastic	3,250	-	5,500	-	7,000	7,000	8,750	8,000
Flexible plastic	3,250	-	4,000	-	5,250	7,000	6,500	8,000
Hard plastic	3,500	-	4,000	-	3,000	6,000	5,000	8,000
Brittle plastic	550	-	1,000	-	1,000	1,000	2,000	2,000
Flexible nylon	850	-	1,250	-	3,000	2,000	4,500	3,250
Brittle nylon					2,000		3,000	

Note: * survey data conducted by GreenHub in Can Tho (4/2022)

III. CONCLUSIONS

Conclusion 1: In Tuy Hoa, the scrap collection and transporting system in general and plastic waste in particular rely heavily on the informal sector. This system has the following characteristics:

- Simple labor, does not require high qualifications, as well as an investment capital for production and operation.
- This system is usually organized at a personal scale or household. With a small scale, they are easily affected by the impacts when there are economic and market fluctuations.
- The relationship between components in the system is very tight, primarily based on economic benefits. It makes this system operate flexibly, responding quickly to the needs of the market.

- Women have a very important role in waste collection and transportation activities at all levels in this system. Women are a disadvantaged group in many areas of social life, but in the field of informal labor, women are even more disadvantaged because they are not recognized by society for their profession. The profession of collecting scrap is often considered cheap, a lowly job, with many prejudices. In addition, working conditions are not safe for health, taking many risks at work are the main problems that female workers face in the operation of this system.

Conclusion 2: The informal system of collection and transportation currently plays a very important role in the collection of scrap, when the activities of the formal sector are still limited and inadequate. These activities have brought many social benefits, specifically:

- Make full use of recyclable waste, reduce the volume of domestic waste sent to landfill
- Create job opportunities and income for a part of urban residents, contribute to poverty alleviation by bringing in income from scrap collection and transportation.
- Especially, for female workers, which is the main labor group of the system, scrap collection and transportation activities help them have more income to solve the family's economic burden when they are idle or not have a stable job.

Conclusion 3: The informal sector's scrap collection activities often do not receive any support or encouragement from the management agencies. Therefore, it will be greatly affected when there are economic or policy fluctuations.

For female workers in this system, they are endure many subjective barriers and challenges from objective factors than in other occupations, but they have almost no support through official policies, specific solutions and formal methods to encourage scrap recovery.

Conclusion 4: This informal collection system is still the main system which support for the formal collection system by collecting recyclable waste from source, reducing amount recyclable waste come into the landfill. Therefore, it helps to reduce the pressure of waste treatment at the landfill for the formal system. The informal collection system operate quite effectively in the collection of plastic scrap in Tuy Hoa at the present time, although this system has been exposed many limitations and shortcomings. So it is necessary to have a management model or an organization to help link activities in the field of waste collection, transportation and recycling, to act as a bridge and to support management agencies of the state implements and supervises the

implementation of regulations on recycling, in while supporting recycling enterprises to operate in the direction of sustainable development in accordance with Vietnamese law.

IV. RECOMMENDATION

Based on the obtained results and the above conclusions, the research proposes the following recommendations for the operation of scrap collection in general and scrap plastic in particular to operate effectively and sustainably:

Recommendation 1: Establishing a waste collection and recycling association at province level including the participation of all the components of the informal waste collection system with the supports from government, the establishment of the association will be a bridge between transport and collection facilities, recycling businesses and state management agencies, helping to carry out waste collection and recycling activities to operate and develop in a sustainable way.

Forming an association with the participation of informal waste collectors, owners, workers of junkshops is the first step in shaping and exposing informal collectors to the community and government. And this requires the support and the orientation of state agencies such as the Women's Union, the Department of Natural Resources and Environment and NGOs to create a foundation for members of the association to be able to operate and manage by themselves with the supervision of the government. Having an association for the informal collection system in Phu Yen brings the following missions:

- Facilitating the expansion of information, knowledge and awareness as well as facilitating capacity building for the members of association who participate in the informal waste collection system by the advantage of available gathering group, connection and sharing of information in the association;
- Improving the mental life of WIWWs to make them more confident; creating a community to share about WIWW's work and life, facilitate cooperation and help among members;
- An association will raise the weight of the voice of the informal waste collection system than individuals on their roles and contributions to waste management as well as recommendations on their rights and support from the government;
- Facilitating interventions and support of NGOs, local authorities;

- Creating a foundation for the formalization of the informal waste collection system, thereby orienting this system to operate effectively and make a positive and sustainable contribution to waste management in general and the implementation of the Regulation on Extended Producer Responsibility (according to the Law on Environmental Protection of Vietnam)

Recommendation 2: Establish a Waste Recycling Fund for Tuy Hoa city. The Recycling Fund is a unit under the direct direction of the Department of Natural Resources and Environment. The Fund's duties include:

- Loans for recycling collection projects that help improve local waste collection rates, reducing the amount of plastic waste that leaks into the ocean. It will be perfect if these projects are proposed and implemented by the association or its members after being provided with full capacity.
- Participate in proposing policies to support collection and recycling activities,
- Participate in the promotion of waste collection and recycling projects
- Support and provide information for collection and recycling units,
- Raise public awareness on waste separation at source, increase waste reduction, reuse and recycling.

Recommendation 3: To improve efficiency and develop plastic collection and recycling activities, it is necessary to implement synchronously many solutions including legal solutions, economic solutions and solutions to raise public awareness in order to change consumption habits and dispose of plastic waste.

Specific solutions and stakeholder engagement are presented in Table 18.

Table 18. Solutions and stakeholders' engagement

No	Solutions	Stakeholders
1	- Integrate plastic segregation into the operational structure of municipal solid waste (and other recyclables) services.	Collectors, DONRE, Phu Yen Urban Environment Company,
2	- Raise the awareness of those who conduct plastic waste collection activities. Do not litter low recycling value	Collectors, DONRE, Phu Yen Urban Environment Company, Women's Union,

	waste and other into the environment during collection and sorting before sale.	Department of Information and Communication (DOIC)
3	- Change the mechanism of waste segregation at source as well as the activities of informal collectors or other pragmatic recovery mechanisms that focus on only plastics of high commercial value.	Collectors, DONRE, Phu Yen Urban Environment Company, DOIC and waste source owner
4	- Provide information, build a bridge between the formal and informal sectors to combine the two sides to promote plastic waste recovery.	Collectors, Women's Union, DONRE, Phu Yen Urban Environment Company, DOIC, DLISA, DOF
5	- Develop strict sanctions for all forms of indiscriminate plastic emissions into the environment	Collectors, DONRE, Phu Yen Urban Environment Company, DOIC, DLISA, DOF

Recommendation 4: Develop and implement official written recognition by local authorities of the role of women informal waste collectors, as well as recognition for the need for social security support for this group, in order to support those involved in waste collection, transportation and recycling. In particular, it is necessary to have policies that pay special attention to female workers, who are a vulnerable group but are the main labor force and have been shouldering many responsibilities in environmental protection. Solutions focus on ensuring benefits, minimizing risks, and protecting vulnerable groups from economic or policy fluctuations such as social assistance packages, toxic subsidies. At that time, it not only helps to solve the urban waste problem, but also has a humane meaning when creating jobs for a part of urban residents.

APPENDIX 1

Junk shop Interview

1. Basic information (If there is no space, please write information on the back of this survey)

Survey date: ____ / ____ / ____

Hours (from...to...):

(Ex. Jan./ 15 / 2001)

(Ex. 7: 45 ~ 8: 10)

Name and Surname of interviewer:

Address of the junkshop: (Marked on the map):.....

2. Interviewee

Name:

Gender:

Age

Position:

General questions (for all type of stakeholders)

- Role in the supply chain (*potential proxy- type of activities they involved in*)
- Where do you usually get (where relevant, e.g., aggregator- buy) your plastic waste from?

Please specify the location (village/city/district)

- Where do you usually sell (where relevant, e.g., aggregator- buy) your plastic waste from?

Please specify the location (village/city/district)

- How often do you usually sell plastic waste?

3. Labors

Total number of labors:

Subject	Number	Subject	Number	Total
Family member		Not a family member		
Male		Female		
Adult (Over 15-year olds)		Child		
Full time		Part time		

4. Working time

Number of working hours in a day	: ~ : , Total: Hours (excluding rest)
Number of days off in a month	(Day/Month)

5. Scrap product and plastic waste purchased daily

Waste (e.g., metals, paperboard, newspaper)	Characteristics	Average Purchase Volume (kg)	Average Purchase Price (VND)	Buy From
Others waste				Waste collectors: () person/day Waste seller: () person/day Phu Yen Urban Environment Company employees: () person/day Other: () person/day
				Waste collectors: () person/day Waste seller: () person/day Phu Yen Urban Environment Company employees: () person/day Other: () person/day
				Waste collectors: () person/day Waste seller: () person/day Phu Yen Urban Environment Company employees: () person/day Other: () person/day
				Waste collectors: () person/day Waste seller: () person/day

				Phu Yen Urban Environment Company employees: () person/day Other: () person/day
Plastic Waste				Waste collectors: () person/day Waste seller: () person/day Phu Yen Urban Environment Company employees: () person/day Other: () person/day
				Waste collectors: () person/day Waste seller: () person/day Phu Yen Urban Environment Company employees: () person/day Other: () person/day
				Waste collectors: () person/day Waste seller: () person/day Phu Yen Urban Environment Company employees: () person/day Other: () person/day
				Waste collectors: () person/day Waste seller: () person/day Phu Yen Urban Environment Company employees: () person/day

				Other: () person/day
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6. Waste product and Plastic Waste sell daily

Waste	Characteristics	Average Purchase Volume (kg)	Average Purchase Price (VND)	Sell for...
				Retailer () Junk Shop ()
				Retailer () Junk Shop ()
				Retailer () Junk Shop ()
				Retailer () Junk Shop ()
Plastic Waste				Retailer () Junk Shop ()
				Retailer () Junk Shop ()
				Retailer () Junk Shop ()
				Retailer () Junk Shop ()

7. Economic balance in purchasing retailers (Vietnamese Dong/month)

Regular revenues	Salary		
	Others		
Regular expenses	(1) Electricity	(2) Water	(3) Estate rent
	(4) Employee	(5) Machines, devices	(6) Tax/fee
	(7) Others		

8. Obstacles and Desire (Describe Obstacles and desires with your current purchasing establishment.)

APPENDIX 2

Informal waste collector interview

1. Basic information (If there is no space, please write information on the back of this survey)

Survey date: ____ / ____ / ____

Hours (from...to...):

(Ex. Jan./ 15 / 2001)

(Ex. 7 : 45 ~ 8 : 10)

Name and Surname of interviewer:

Address of the junkshop: (Marked on the map):.....

2. Interviewee

Name:

Gender:

Age:

Number of family members:

Which family members participate in waste/ scrap collection:

3. Waste collection activity

Working hours/ day	(fromto.....) : ~ : , total: hours (excluding rest)
Day off/ month	(Days/month)
Full-time or part-time	Full time: Part-time:
Time to start working	(When did you start this work?)
Do you have other jobs?	(If yes, what is that job?)
Is there a change over time to your waste collection?	Peak time: from.....to..... Off peak time: from.....to.....
Do you preliminarily process the collected plastic waste?	(e.g., cleaning, sorting, ...)
What are your means and tools of work?	(e.g., bags, gloves, boots, masks, bicycles, ...)

4. Monthly family income (VND/month)

Your family's monthly income comes from:			
Waste collection	from you:	from other fam members	Total:

Others job	from you:	rom other fam members	Total:

5. Scrap product and plastic waste are collected daily

Waste (e.g., metals, paperboard, newspaper)	Characteristics	Average Purchase Volume (kg)	Average Purchase Price (VND)	Buy from: (eg. Households, hotels, restaurants,...)
Others waste				
Plastic waste				

6. Scrap product and plastic waste sells daily

Waste (e.g., metals, paperboard, newspaper)	Characteristics	Average Purchase Volume (kg)	Average Purchase Price (VND)	Sell for... (If selling to junk shop please provide its name and address)
Others waste				Retailer () Junk Shop ()
				Retailer () Junk Shop ()

				Retailer () Junk Shop ()
				Retailer () Junk Shop ()
Plastic waste				Retailer () Junk Shop ()
				Retailer () Junk Shop ()
				Retailer () Junk Shop ()
				Retailer () Junk Shop ()

7. Relationship with existing buyers

Why do you choose this junkshop/junk buyer sell your scraps?	1. profit 2. relative relationship 3. long time friend 4. borrowing/debting their money 5. don't know any other option other
--	---

8. Obstacles and Desire (Describe Obstacles and desires with your current work)

APPENDIX 3

Formal waste collector/ Formal waste collector (FWW) interview

1. Basic information (If there is no space, please write information on the back of this survey)

Survey date: / /

Hours (from...to...):

(Ex. Jan./ 15 / 2001)

(Ex. 7 : 45 ~ 8 : 10)

Name and Surname of interviewer:

Address of the junkshop: (Marked on the map):.....

2. Interviewee

Name:

Gender:

Age:

Is your company a state-owned enterprise or a private enterprise?

.....

Total number of members in your team/workgroup:.....people

3. Family information

Number of members in your family	Adult (over 15 years old):..... people		Child:..... people	Total:..... people
Who does the main income?	1.	2.	3.	4.
Average income of main income (VND/month)

Waste collection activity

Working hours/ day	(fromto.....) : ~ : , total: hours (excluding rest)
--------------------	--

Day off/ month	(days/month)
Full-time or part-time	Full time: Part-time:
Time to start working	(When did you start this work?)
Your job duties	(eg. Collecting waste from households, transpoting waste to the waste collection point, ...)
Do you have other jobs?	(If yes, what is that job?)
	(If yes, what is the income from other jobs?)
What are your means and tools of work?	(e.g., bags, gloves, boots, masks, bicycles, ...)
Do you collect recyclable scraps while on duty?	Yes or no
	If yes, is this your main job?
	If yes, how many hours/ days do you collect scraps waste on average? (hours/day)
Average monthly volume of waste recyclables selling	Type 1: Volume: (kg/month) Type 2: Volume: (kg/month) Type 3: Volume: (kg/month) Type 4: Volume: (kg/month) Type 5: Volume: (kg/month) Type 6: Volume: (kg/month)
Unit price of each type of recyclable waste	Type 1: Price: (VND/kg) Type 2: Price: (VND/kg) Type 3: Price: (VND/kg) Type 4: Price: (VND/kg) Type 5: Price: (VND/kg) Type 6: Price: (VND/kg)
Who do you sell to?	(eg. Junk shops/ junk buyer: Name, address)

4. Obstacles and Desire (Describe Obstacles and desires with your current work)