

**REPORT**

# Market Study of SUP's in Kerala

Study report on Single-Use Plastics in the Kerala Markets and their usage during previous plastic bans.

Prepared by

**Bring Back Green  
Foundation**



# ABOUT US

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Bring Back Green is an initiative that focuses on rewriting the unsustainable past that we have ridden upon till now due to greed and speed. Our core belief is that every young person is a powerhouse of change and if it is well exploited by providing opportunities it can radically revolutionise the entire planet. The team at BBG are very young and socially oriented students starting from the age of 18.

The works of the organisation spans across various environmental conservation activities such as waste management, sustainable menstruation, public policy advocacy, environmental research and projects. The firm also works on documentaries, publishing of books and associated ventures for the progress of its goals for environmental conservation.

Bring Back Green Foundation was registered as an NGO in 2019 under the Companies Act 2013.

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# 1. INTRODUCTION

## 1.1 SINGLE USE PLASTIC-WHY IT IS A MAJOR CONCERN?

Single-use plastics are goods that are made primarily from fossil fuel-based chemicals (petrochemicals) and are meant to be disposed of right after use—often, in mere minutes. Single-use plastics are most commonly used for packaging and service-ware, such as bottles, wrappers and cutleries. The Central Government has banned the use of 'single-use plastic' from July 1. The Ministry for Environment, Forest and Climate Change had issued a gazette notification last year announcing the ban. The items on which the Central Pollution Control Board (CPCB) have announced a ban are ear buds; balloon sticks; candy and ice-cream sticks; cutlery items including plates, cups, glasses, forks, spoons, knives, trays; sweet boxes; invitation cards; cigarette packs; PVC banners measuring under 100 microns; and polystyrene for decoration.

According to a 2021 report of the Minderoo Foundation, an Australian philanthropic organization, single-use plastics account for a third of all plastic produced globally, with 98% manufactured from fossil fuels. Single-use plastic also accounts for the majority of plastic discarded – 130 million metric tons globally in 2019 – all of which is burned, buried in landfills or discarded directly into the environment. On the current trajectory of production, it has been projected that single-use plastic could account for 5-10% of greenhouse gas emissions by 2050.

The report found that India features in the top 100 countries of single-use plastic waste generation – at rank 94 (the top three being Singapore, Australia and Oman). With domestic production of 11.8 million metric tons annually, and import of 2.9 MMT, India's net generation of single-use plastic waste is 5.6 MMT, and per capita generation is 4 kg. Plastics don't really break down; they just break up. Over time, sun and heat slowly turn plastics into smaller and smaller pieces until they eventually become what are known as micro-plastics. These microscopic plastic fragments, no more than 5 millimeters long, are hard to detect—and are just about everywhere. Some micro-plastics are even small by design, like the micro-beads used in facial scrubs or the microfibers in polyester clothing. They end up in the water, eaten by wildlife, and inside our bodies. They've even made their way up to the secluded Pyrenees mountain range and down to the bottom of the Mariana Trench. For wildlife, micro-plastics can be particularly dangerous; when eaten they can easily accumulate inside an animal's body and cause health issues, like punctured organs or fatal intestinal blockages.

# 1.2 PREVIOUS BANS ON SUPs AND OTHER PE's IN INDIA AND IN KERALA.

## INDIA

India has had national ban on plastic bags since 2016. The Environment (Protection) Act 1986 provides the central government with the right to take necessary measures to protect the environment. The government can make rules to prevent, control and abate environment pollution.

The availability of SUP (Single Use Plastic) products in India is very high compared to other nations. First attempt to ban single use plastic products from the markets comes into effect from July 2022. India didn't initiate a whole country ban on single use plastics till 2022, but many states where enforced ban on plastic products. First announcement of phasing out of Single use plastics was in August 15, 2019 by PMO India. Draft notification on the ban was released in March 2021 and deadline for phasing out of SUPs proposed was January 2022. Final notification was released in August 2021 which extended the deadline to July 2022.

Sikkim is the first state to enforce a partial ban on disposable plastic bans in 1998 and also initiated two important decisions regarding the ban on packaged drinking water Styrofoam, thermol plates, cutlery from entire state( Sikkim government; 2016).

Maharashtra announced plastic ban which is the first plastic ban on early 2018 s along with ban on thermocol related products.

In 2018 Himachal Pradesh also strictly banned the production and use of single use plastics and reduces the use of disposable polybags, cups and tumblers.

Plastic ban on Telegana was held on 2018 June it includes plastic drinking bottles single use straws and containers.

States of U P, Sikkim, Andhra Pradesh, Assam and Meghalaya Tamil Nadu and the other Indian states which banned and reduced the use of plastic products.

## KERALA

Kerala enforced a strict ban on sale, manufacture, transport and storage of single use plastic beginning from January 1 2020 .Violation of these bans are comes under the environmental protection act-1986.Items which are banned according to the ban of 2020 includes plastic carry bags, plastic sheets, plastic coated paper cups, plastic spoons and cups etc. Along with single use plastic materials flex/PVC products with plastic coated clothes of polyester/nylon are also banned and hoarding of this had a punishable offence (Government of Kerala; 2020).

According to this act use of plastic coated cloth for hoarding is also banned and the shops can use paper, cloth and poly ethylene materials as substitute for PVC/flex along with the logo of 'recyclable pvc, expiry date and name of the shop with number. Alternatives of the single plastics are recommended according to the rule of plastic waste management rule, 2016.

After the ban of 2020 other ban taken place is the all India ban on plastic products effects form July 1, 2022.

## **1.3 IMPACTS OF PLASTIC BANS AND LESSONS FROM PREVIOUS BANS**

Bans on single-use plastics can be a first step toward more comprehensive regulations intended to lessen the production of plastic waste and to replace single-use plastics with more environmental friendly, sustainable substitutes.

Countries all around the world have shown concerns about the increasing usage of plastic. Some countries have brought into force various laws or Rules related to plastic bans either on a national level or state level, whereas, some are yet to take major stapes to diminish plastic usage. The primary problems seem to be lack of compliance and lack of affordable alternatives in the nations that have enacted national bans on plastic bags and have reported no to little impact. The latter has resulted in smuggling cases (creation of black markets for plastic bags) or movements towards the usage of thicker plastic bags (which is not controlled), a change that has occasionally exacerbated environmental issues. Small and medium-sized "green" enterprises see bans on single-use plastics as possibilities to grow by promoting innovative, environment friendly alternatives.

In Kerala, even after the ban of 2020, the single use plastic products are available at a larger scale on markets because of the COVID-19 relaxations, lack of proper alternatives and inspections. Most bans prioritize the introduction of affordable alternatives across a wide spectrum, but Kerala has not yet fully achieved this goal following the 2020 ban. We should also be concentrating on bolstering the current waste management system and circular thinking going forward because introducing affordable alternatives in a wide range is a time-consuming process.



## 1.4 Methodology:

The study conducted consisted of primary data collected from 12 districts of the state. Over 1300 shops were structurally interviewed with a previously prepared questionnaire. The shops were selected through simple random sampling. Shops were categorized in 8 sub divisions according to the assumed use and availability of single use plastics. The markets were selected on spatial distribution and its significance in the overall economic activities of the districts.

## Area of Study

District	Market
Thiruvananthapuram	Chalai, Palayam, Manacaud, Nettayam, Vizhinjam, Kazhakoottam, Venganoor, Peroorkkada
Kollam	Kunnikode, Kavanad, Ochira, Punalur, Karunagapally, Thangacherry
Pathanamthitta	Ranny, Thiruvalla, Omallor, Kozhencherry, Pathanamthitta, Vayalathala.
Kottayam	Kanjirapally, Kumarakom, Chanthakavala, Erumeli, Ettumanoor, Changanacherry
Thrissur	Shakthan, Chalakkudy, Chelakara, Ottupara, wadakkanchery, Kodungalur, Kunnankulam
Idukki	Wagamon, Thodupuzha, Kattapana, Nedumkandam, Cheruthoni, Adimali
Palakkad	Olavakoode, Alathur, Kongad, Palakkad, Ottapalam
Kozhikode	S M Street, Faroke, Kakkodi, Nadakavu, Malaparamb
Kasargod	Kanagala. Kumbla, Baniyode, Uppala
Wayanad	Kalpatta, Sulthan Bethery, Manathavady, Panamaram, Meeangadi
Malappuram	Marancherry, Tirur, Manjeri. Kottakal,
Alappuzha	Beach market, New Bazar, Aleppey Mullakkal

## **1.5. SCOPE OF STUDY:**

This market-based research intends to analysis various parameters such as the use of different Banned Single Use Plastics and PE, the alternatives available, and the accomplishments of inspections. The report will not only assist a reflective note on the present times in the aforementioned subdivisions, but also in formulating a comprehensive policy framework than can inculcate a market friendly transition from SUP products to environmentally sustainable goods.

## **1.6. OBJECTIVES:**

The objectives of the study are:

1. To understand the current scenario in stages of Regulation of SUP in the major markets of Kerala State and how it has been attained.
2. To analyze the factors that influences the use of SUP and PE products in the state. It includes market conditions, sustainability and practicality of alternatives, and influence of inspections and economic status.
3. To recognize the challenges and issues in the accessibility to eco-friendly alternatives.
4. To contemplate the focus areas and opportunities of SUP and PE regulations and Ban.

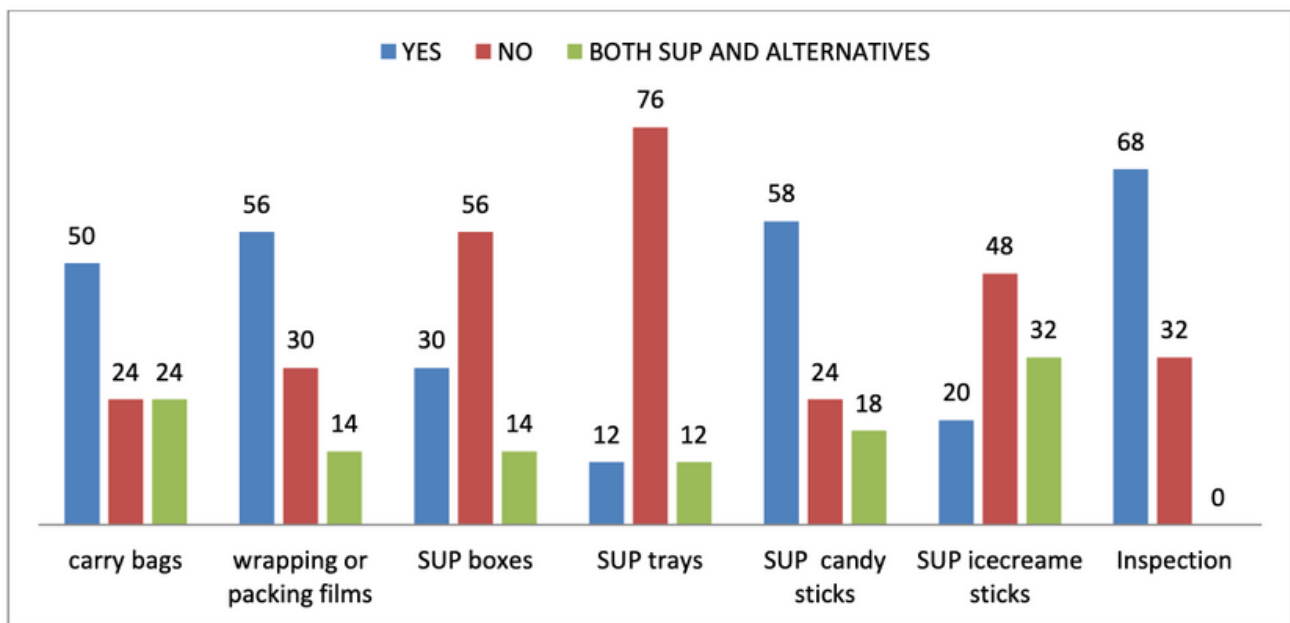
# 2. DATA ANALYSIS 1: SHOP-WISE DATA ANALYSIS

## 2.1. SHOP-WISE DATA ANALYSIS

Data collected from 8 categories of shops across Kerala were analyzed and the charts prepared accordingly.

### 2.1.1. Bakeries/ Sweet Shop

In accordance with the awareness of harmful effects of plastic use many bakeries are tends to minimize the use of single use plastics. Several bakeries are now replaced many single using plastic products to different alternatives. Chart 2.1 shows the extent of the use of different single use plastic products in bakeries or sweet shops.



**Chart 2.1: Availability of different SUPs in the Bakeries/Sweet shops across Kerala**

#### USE OF CARRY BAGS

Among 230 shops half of the bakeries or sweet shops are using SUP carry bags in their shops. 24 percent of the shops are using non-SUP plastic products as alternatives. Again 24 percent of them are using SUP carry bags along with some alternatives.

**Alternatives:** Different alternatives used are Paper bags, Cloth bags, Aluminum sheets

## **WRAPPING OR PACKING FILMS**

More than half of the bakeries are using wrapping films to pack their products (56%). 30 percent of them are not using these types of wrapping SUP sheets. Only a small portion of shops are using both SUP wrapping films along with alternatives.

**Alternatives:** Paper, Brown sheet, Butter paper

## **SUP BOXES**

More than half of the shops are not using the SUP boxes to pack their food items; only 30 percent of the shops are using the SUP boxes. 14 percent of them are using both SUP boxes and alternatives. Most of the products in bakeries are packed in a SUP coated boxes because of the safety and leakages of the food items.

**Alternatives:** Paper boxes, Cardboard boxes

## **SUP TRAYS**

Trays are mostly not a SUP products, 6 percent of the shops are using non-SUP trays in their shops rather than SUP trays.

**Alternatives:** Wood trays, Steel, Fiber, Ceramic, Hard plastic

## **SUP CANDY STICKS**

58 percent of the shops are using SUP candy sticks. These are getting from the manufacturer itself. Alternatives are rarely found in case of the candy sticks.

**Alternatives:** Wood

## **SUP ICE CREAM STICKS**

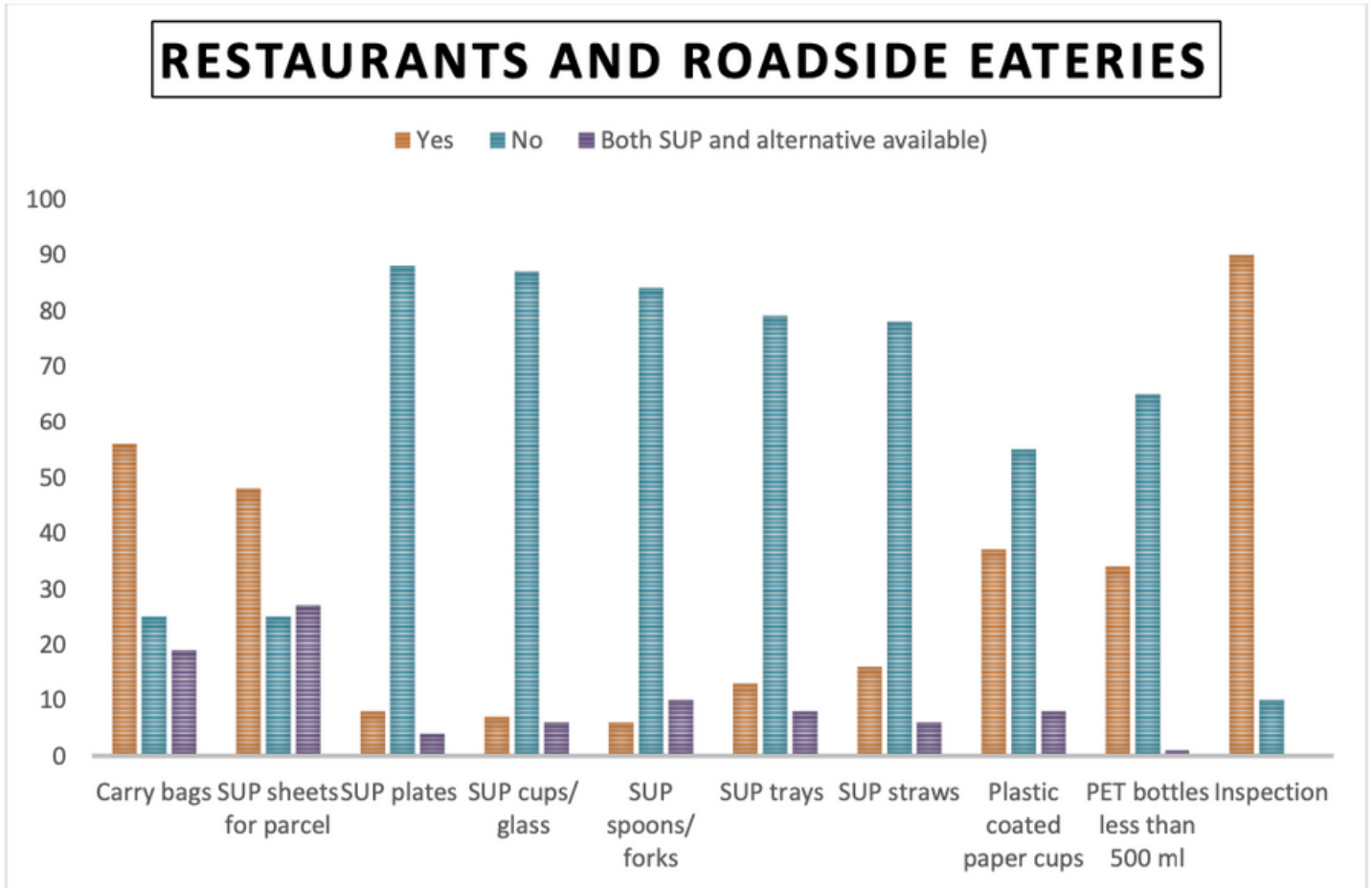
Ice cream sticks are fully based on the brands. Most of the sticks are wooden, but 20 percent of the shops are using SUP spoons for these ice creams.

**Alternatives:** Wood

## **INSPECTION**

68 percent of the shops have regular inspection nearly one or two times. In case of regular inspection also the shops are using SUP products more than the alternatives.

## 2.1.2. Restaurants and Roadside Eateries



**Chart 2.2. Availability of SUPs in Restaurants and roadside eateries**

\*Carry Bags: Most of the restaurants and roadside eateries use SUP carry bags to nearly 60 percent. While only around 25 percent of them do not use SUP bags. Almost 20% of them use both SUPs and alternatives for SUP carry bags.

\*SUP sheets for parcel: 47-50 percent of restaurants and roadside eateries use SUP sheets for parceling and 23-24 of them use alternatives such as banana leaves and aluminium foil only. Both SUP and alternatives are used for parceling in 28-29 restaurants and roadside eateries.

**SUP Plates:** Majority of the restaurants and roadside eateries use SUP alternative plates for serving. Around 9 of them use SUP plates. Alternative for SUP plates are used for serving in less than 5 restaurants and roadside eateries.

**SUP Cups/Glass-** In a huge majority of shops there are NO SUP cups/glass in shops of Kerala. Most of them use alternatives such as steel, glassware etc.

**SUP Spoons/Forks-**Around 85 percent of, SUP spoons/forks are not available, which is a happy sign for us. At the same time in shops between 0-10, both sup spoons/forks are available and also its alternatives are also present.

**SUP Trays-**Majority of the shops such trays are not available. In nearly 80 percent of shops sup trays are not used. And between 5-15 shops, both trays and its alternatives for SUP trays are also available.

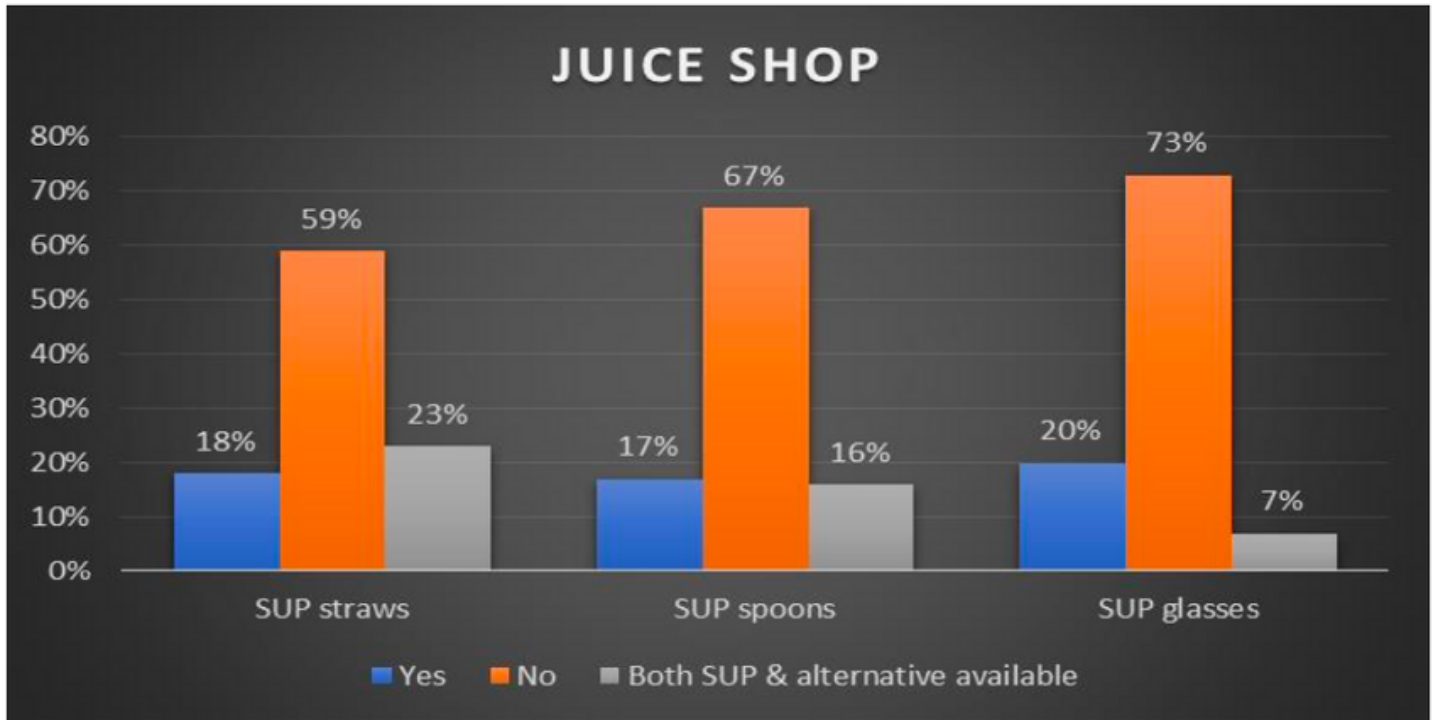
**SUP straws-**In around 10-15 percent of shops such types of straws are used. At the same time around 5-10 percent of shops have alternative straws for it. Furthermore, in 75-80 percent of shops such types of straws are not used. In most cases, SUP straws were available along with the tetra packs.

**Plastic Coated Paper Cups-**In shops nearly 55-60 percent of shops, such types of cups are not available. Nearly 30-40 percent of shops, such trays, which is a sign of worry. Furthermore, 5-10 percent of shops have alternatives used instead of plastic coated paper cups.

**PET bottles less than 500 ml-** In huge percent of shops nearly 70 percent of them have no pet bottles less than 500 ml. And in rest of the shops, PET bottles are also available.

**Inspection-**In a huge number of shops, inspection is conducted. Only in a small percentage of shops, any kind of inspection from local bodies/govt departments have not been done yet.

## 2.1.3. Juice Shops

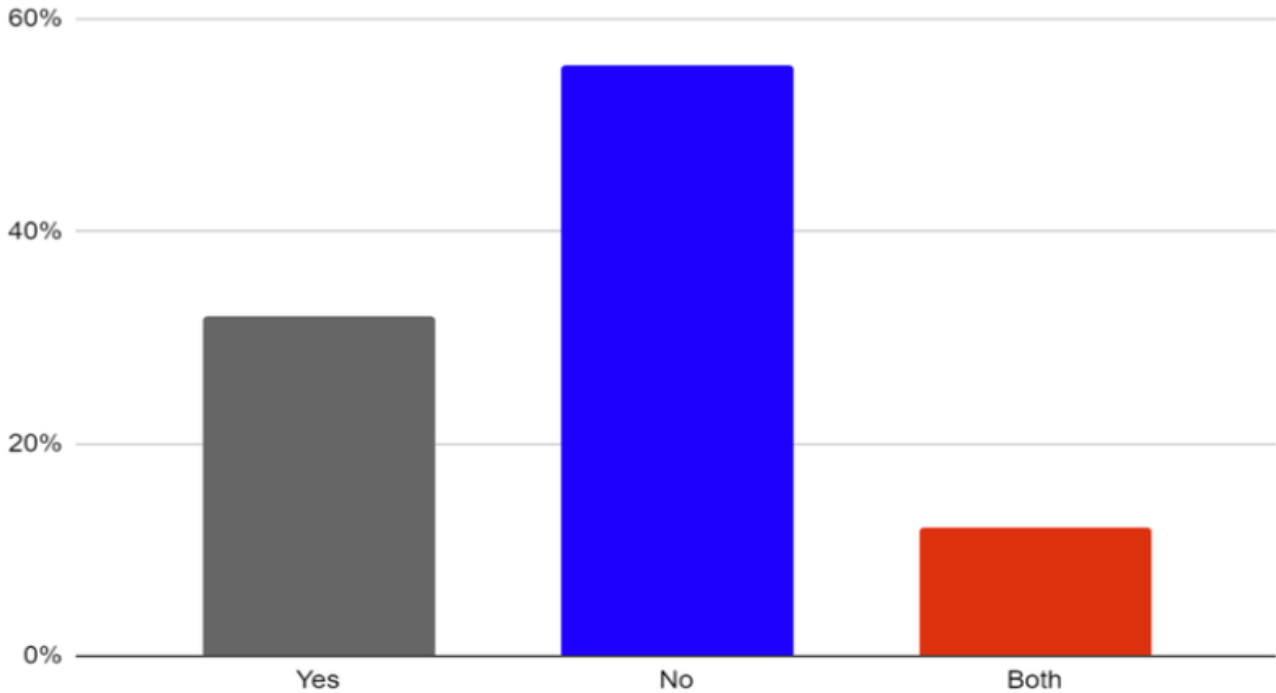


**Chart 2.2. Availability of SUPs in Restaurants and roadside eateries**

- Above 50% of the juice shop owners refrain from using SUP Straws, SUP Spoon & SUP Glasses.
- The most common alternative for SUP Straws is paper straws, 23% of respondents use both SUP straws and alternatives.
- The most common alternatives for SUP Spoon are wooden and steel spoons, 16% respondents use both SUP Spoon and other alternatives.
- Inspection happens in most of the juice shops at least once a month and only, few shops have not received any inspection from local bodies/ Government departments

## 2.1.4. Flex and Invitation Card Printing Shops

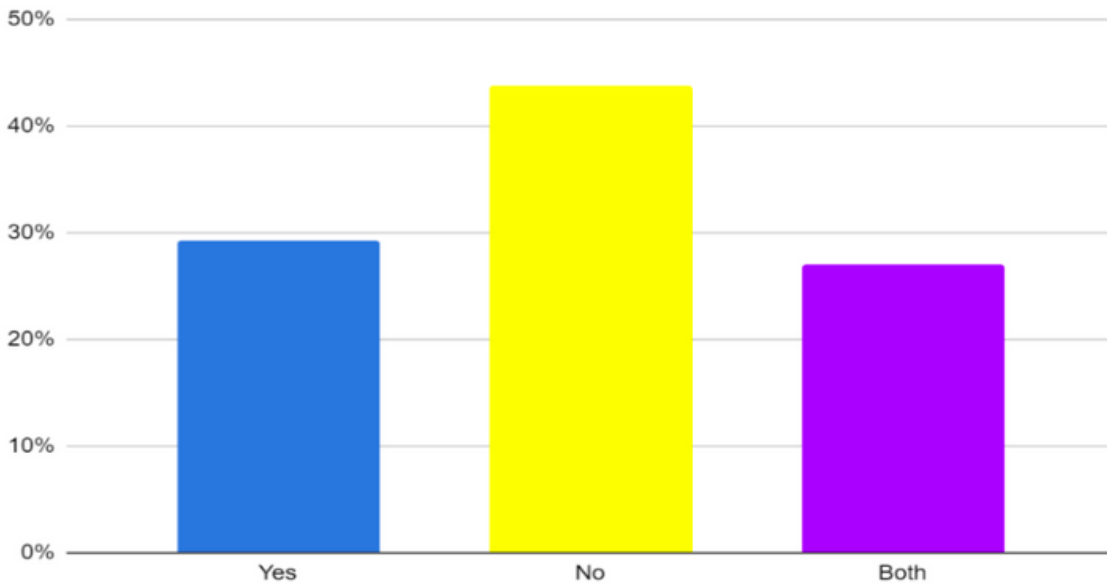
PVC banners below 100 microns



**Chart 2.4: Availability of PVC banners below 100 microns in the state**

- PVC banners below 100 microns are used in 32% of the shops across Kerala.
- 56% shops do not use PVC banners below 100 microns
- Only 12% shops use PVC banners below 100 microns and also alternatives such as paper, polyester, cloth and PVC banners above 100 microns

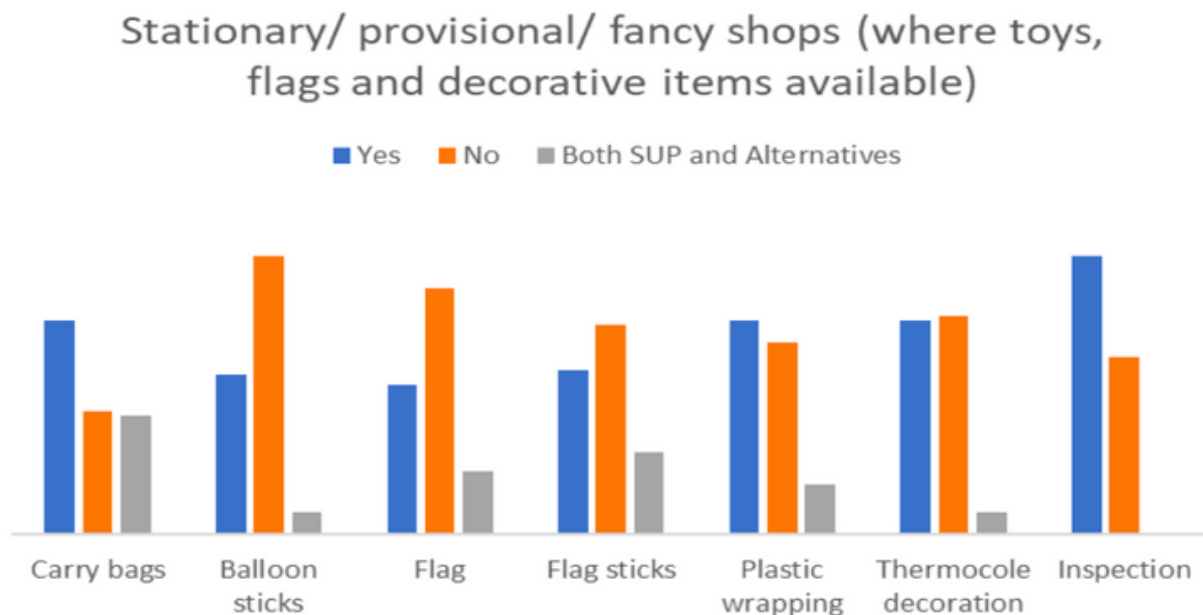




**Chart 2.5: Availability of plastic wrapping on invitation cards**

- Ø Plastic wrapping/ films on invitation cards are used in 29% of the flex and printing shops
- Ø 44% not used plastic wrapping/ films on invitation cards
- Ø 27% used both the plastic wrapping/ films on invitation cards and alternatives
- Ø Paper is the most commonly used alternative in this survey

## 2.1.5. Stationary/ Fancy/ Provisional shops (where toys, flags and decorative items available)



**Chart 2.6: Availability of different SUP items in the stationary shops**

**Carry bags:**

Most shops use SUP carry bags (47%). 27% has no SUP carry bags and 26% of shops have both SUP carry bags and alternatives.

Paper cover, Cloth bag, Cardboard pack, Newspaper, Brown paper, Jute bag are the alternatives used.

**Balloon sticks:**

35% of shops use SUP balloon sticks but most of the shops don't have balloon sticks (61%) and very few shops (4%) has both SUP balloon sticks and alternatives.

Wood stick and thread are the alternatives rarely used.

**Flags:**

Among 163 shops surveyed across Kerala majority of the shops don't use SUP flags. Only 33 % of shops use SUP flags and 11 % use both SUP and alternatives such as cloth flag, paper flag are found in few shops. In most cases, they sell it seasonally and don not have an all-year sale.

**Flag sticks:**

36% of shops use SUP flag sticks but the majority (46%) don't use SUP flag sticks, 18% use both SUP and alternatives.

Wooden stick, paper roll, bamboo stick are alternatives used.

**Plastic wrapping:**

48% of 163 shops surveyed across all the districts of Kerala have plastic wrapping .43% of the shops don't have plastic wrapping and 8% of shops have both plastic wrapping and alternatives.

Paper and brown paper are the alternatives that are widely used.

**Thermocol decoration:**

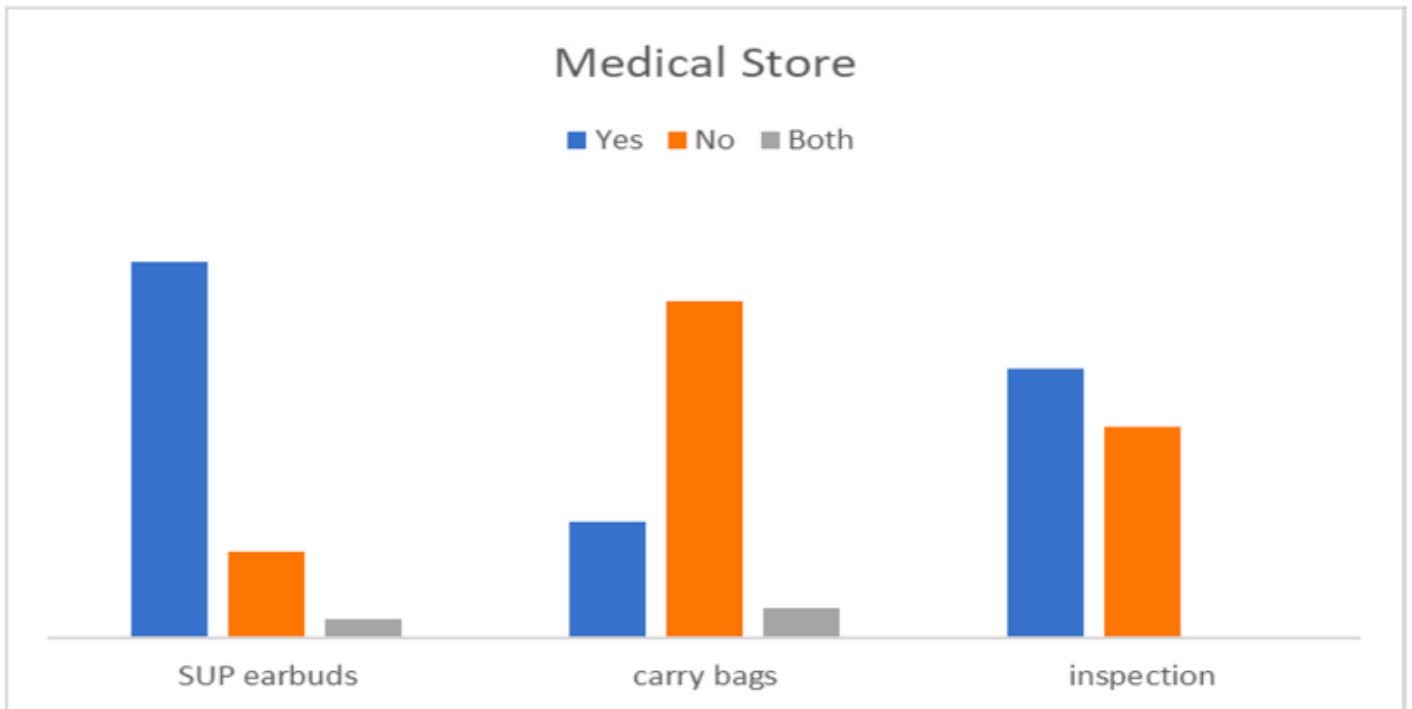
Majority of the shops which sell decorative items have thermocol decorative items (47%).48% don't have them and 5% of shops have both thermocol decorations and alternatives.

Cardboard and paper are the alternatives used.

**Inspection:**

Out of 163 shops surveyed across Kerala more than half of the shops are inspected (61%), but 39% of shops are not.

## 2.1.6. Medical Store



**Chart 2.7: Availability of SUP items in medical store**

### **SUP earbuds:**

In 192 medical stores surveyed across 14 districts of Kerala more than half of the medical stores (78%) have SUP earbuds, 18% don't and only 4% use both SUP earbuds and alternatives. Paper earbuds and wood stick earbuds are the alternatives used by very few shops.

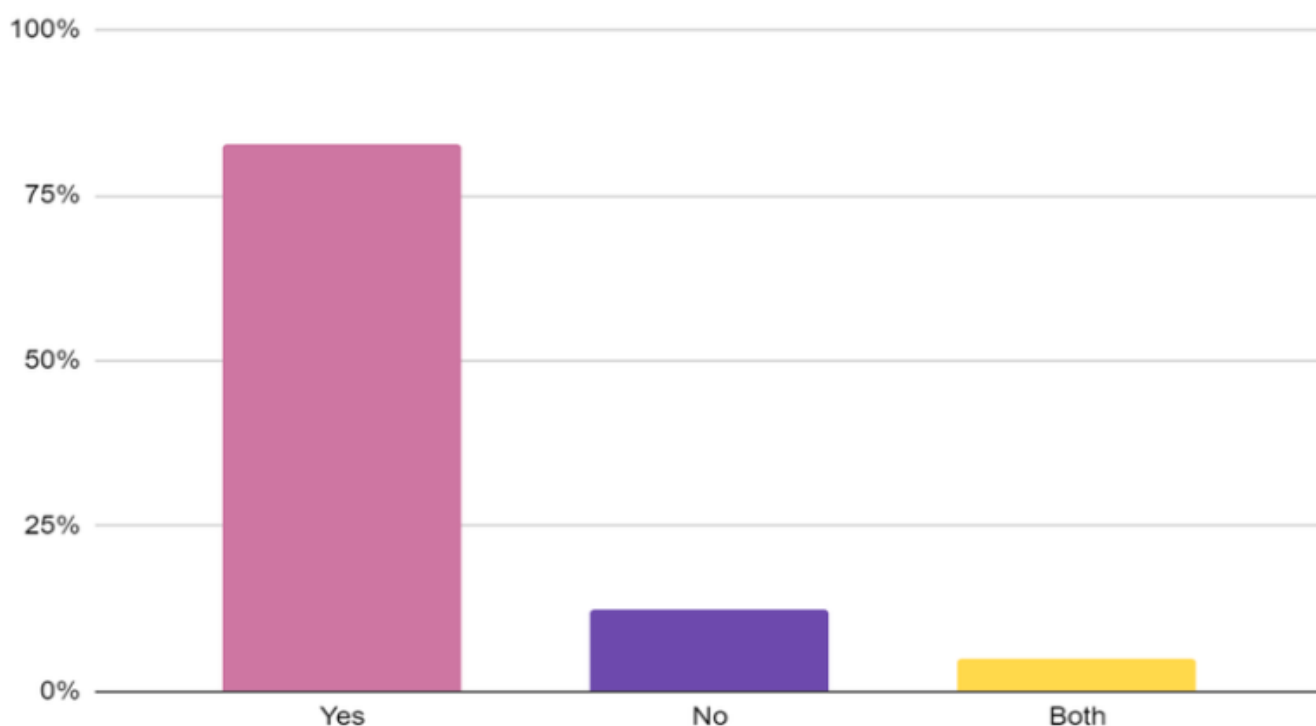
### **Carry bags:**

Out of 192 medical stores surveyed in Kerala majority of medical stores use alternatives (70%).28% of stores use SUP carry bags and 5% of stores have both SUP carry bags and alternatives. Brown sheets, Cloth bag and newspapers are the alternatives widely used.

### **Inspection:**

56% of 192 medical stores surveyed across Kerala has regular inspections nearly 1 or 2 times and 44% of stores are not being inspected.

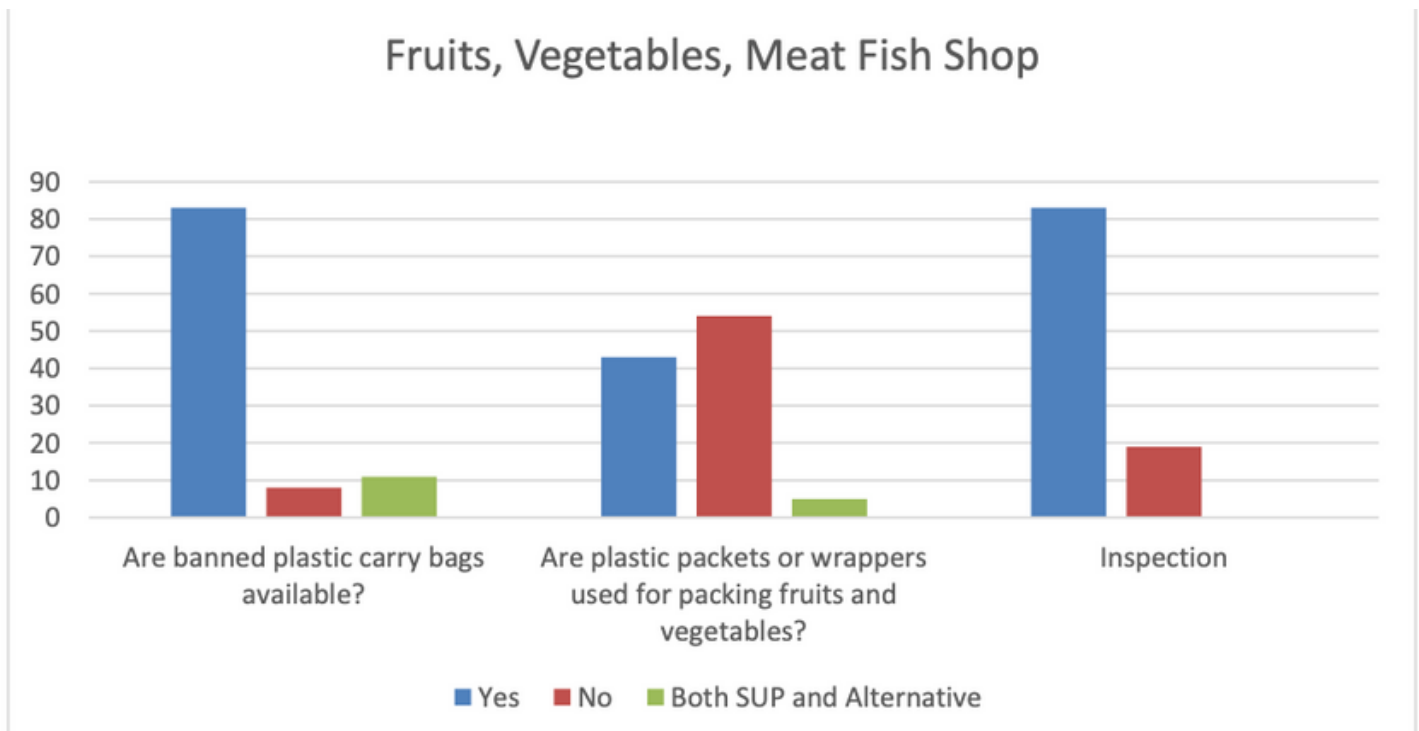
## 2.1.7. Shops where Cigarettes are Available



**Chart 2.8: Availability of plastic wrapping films on cigarette packets**

- The chart shows that in 83% of the shops, wrapping films on cigarette packets is available.
- 15% of shops do not have such wrapping films on cigarette packets, meaning they sell beedi with paper wrapping on it.
- 5% use both wrapping film and alternatives.
- Paper is the most commonly used alternative for wrapping.

## 2.1.8. Fruits, Vegetables, Meat and Fish Market



**Chart 2.9. Availability of SUP items in Fruits/vegetable/ fish/meat markets**

### SUP Carry Bags:

- 81% of the shops use SUP carry bags, and 8% use other alternatives while 11% use both the SUP Carry bags and alternatives.
- The most common alternatives are paper bags, newspaper, cloth bags, Biodegradable plastic cover, and brown paper.
- However, the butchers and fish vendors are the category that uses the least alternatives.

### Plastic Wrappers

- Only 43% of the shops surveyed use SUP wrappers. 52% of the shops use other alternatives like newspaper, brown paper and Leaves. 5% of the shops use both the SUP wrappers and alternatives.

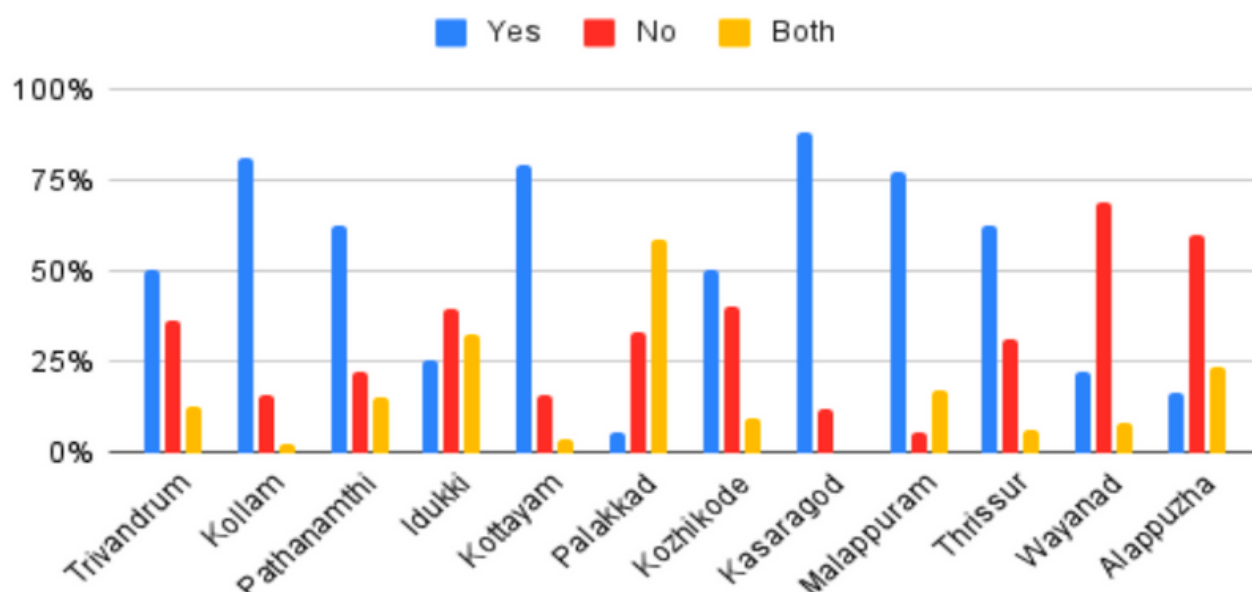
### Inspection:

- 83% of the shops have faced inspection at least once while 17% of them haven't faced one yet.
- Most of the shops have faced 2-3 inspection on an average.

# 3. DATA ANALYSIS 2: DISTRICT- WISE DATA ANALYSIS

The availability major SUPs of concern in different districts were analyzed.

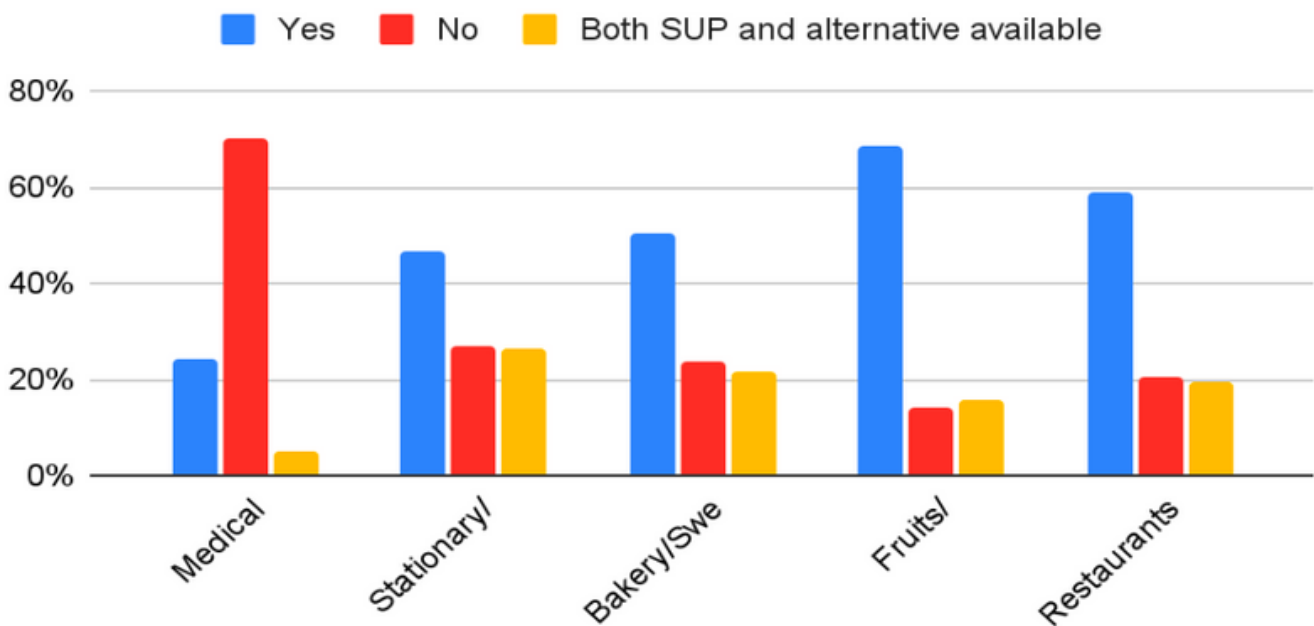
Availability of carry bags in different districts



**Chart 3.1: Availability of SUP carrybags in different districts**

SUP carry bags are a real problem in most of the districts. The survey results shows that, from all the categories of shops, carry bags are available in highest percent in Kasaragod followed by Kollam, Kottayam and Malappuram. More than 75% of the shops from these 4 districts are providing SUP carry bags to their consumers. In the districts of Wayanad, Idukki and Palakkad, SUP carry bags are not much available in the market as per the survey and alternatives like paper and cloth carry bags are available. In some places the biodegradable plastic carry bags which are mistakenly called as alternatives are also available in the market.

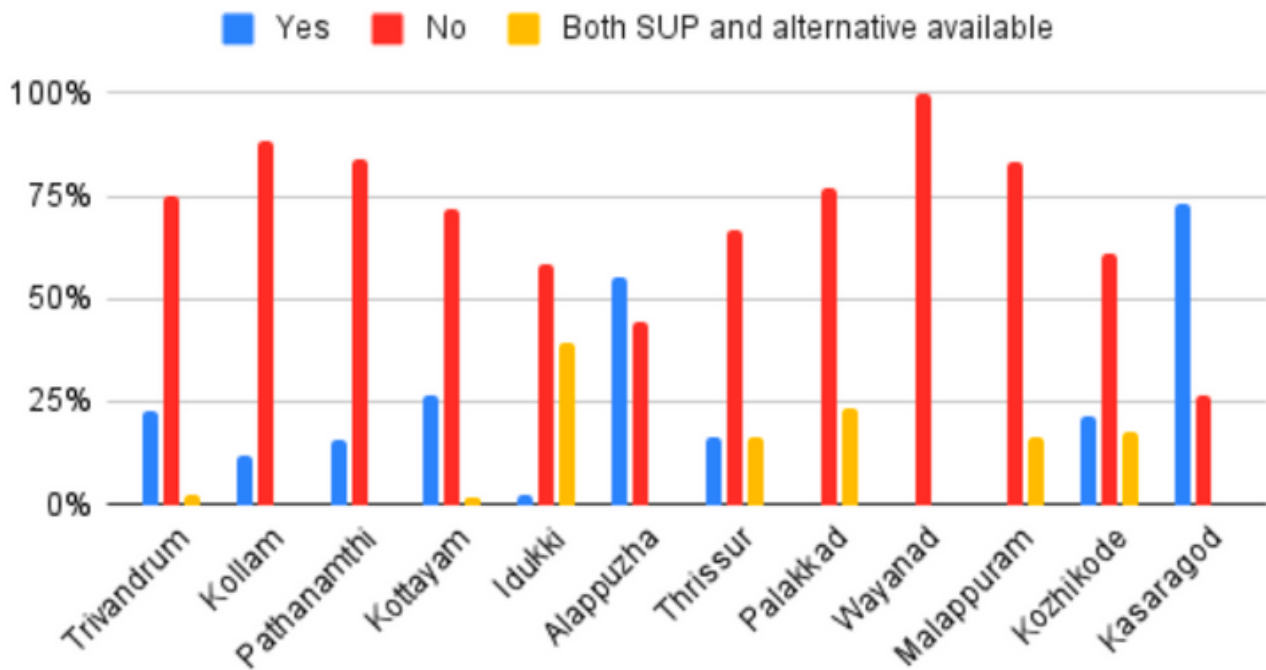
## Availability of SUP carry bags in different categories



**Chart 3.2: SUP carrybags availability in different categories of shops**

SUP carry bags are a real problem in most of the districts. The survey results shows that, from all the categories of shops, carry bags are available in highest percent in Kasaragod followed by Kollam, Kottayam and Malappuram. More than 75% of the shops from these 4 districts are providing SUP carry bags to their consumers. In the districts of Wayanad, Idukki and Palakkad, SUP carry bags are not much available in the market as per the survey and alternatives like paper and cloth carry bags are available. In some places the biodegradable plastic carry bags which are mistakenly called as alternatives are also available in the market.

## Availability of SUP straws

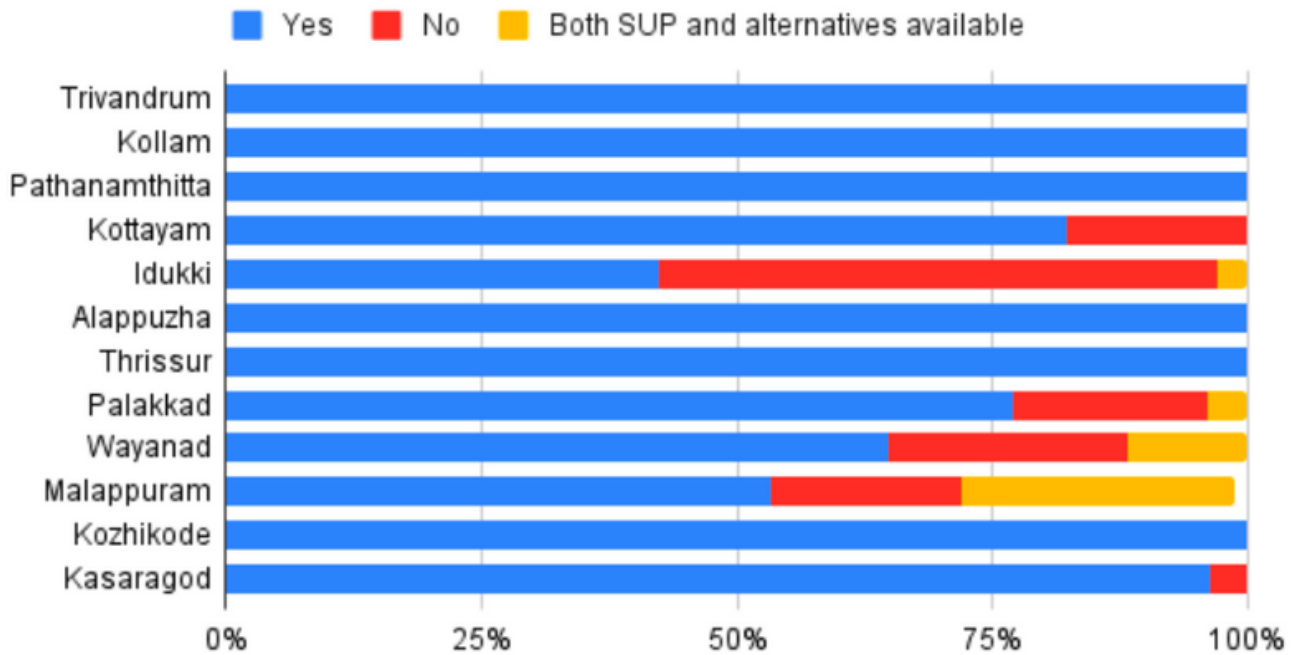


**Chart 3.3: Availability of SUP straws across Kerala**

After a lot of campaigns and awareness programs held in Kerala to phase out plastic straws, now its availability is very less in juice shops and restaurants and it is evident in the survey. But in that case too, shops in Alappuzha and Kasaragod districts have more than 50% of shops providing SUP straws. In other districts, most of the shops are switched to either paper or steel straws. But still the SUP straws coming along with the tetrapacks are a major concern.



## SUP earbuds availability in medical stores



**Chart 3.4 : Availability of SUP earbuds in medical stores in different districts**

The study shows that SUP earbuds are very common in most of the medical stores of all the surveyed districts.

# 4. CORRELATIONAL ANALYSIS

## 4.1. TEST 1

Of the 141 shops of different categories surveyed, it could be concluded that the use of SUP Plastic in various forms like SUP carry bags, wrapping films, straws, flag sticks etc. To understand the impact of inspection by panchayat/municipalities on the use of SUP Plastics, a test of correlation was conducted. the parameters used for the same were the use of SUP Carry bags ( Variable x) and the no. of inspection each shop have faced since the Ban of certain plastic goods in 2019(variable Y). Variable X was chosen as it was a common question for all categories of shops except café. Since the data is categorical, Chi Square test and Cramer's V are the preferred formats of test.

We would be using the Chi Square test of independence. And we will be using 1153 shops in consideration.

Ho: Variable X and Variable Y are independent

Ha: The use of SUP carry bags is dependent on the no. of inspections.

Let the level of significance be at 0.05.

Use of SUP carry Bags	No. of Inspection	0 Inspection	1 Inspection	2 Inspection	3 or more inspection	Total
Yes		202	295	52	33	582
No		124	92	191	164	571
Total		326	387	243	197	1153

Degree of freedom (Df)= (2-1)(4-1) = 3

Critical Value at 3 degree of freedom and 0.05 alpha value, is 7.814

So, if chi square( $X^2$ ) is greater than 7.814, we reject  $H_0$ .

Test statistic=

$$X^2 = \sum (fo - fe)^2 / fe$$

Where  $fe = fc \cdot fr / n$

Table of expected frequency:  $fe$

Use of SUP carry Bags	No. of Inspection	0 Inspection	1 Inspection	2 Inspection	3 or more inspection
Yes		164.55	195.34	122.65	99.43
No		161.44	191.65	120.34	97.56

$$X^2 = \sum 8.52 + 50.84 + 40.62 + 44.38 + 8.68 + 51.81 + 39.94 + 44.36$$

$$= 289.15$$

Since  $X^2 = 289.15$  is larger than the critical Value of 7.814, we can reject the null hypothesis.

We can conclude that there is mathematical inference in the relation between the no. of inspections and the use of banned SUP carry bags and **the use of SUP carry bags are dependent on the no. of inspections that are conducted by the authorities.** The data further provides an insight on the relative distribution of shops in the survey that as **the no. of inspection becomes more frequent, the observed use of SUP bags dwindle.**

## 4.2. TEST 2

Now, another interesting aspect of the impact of inspections was to understand the indulgence of the authorities in different geographical locations. So, to understand the spatial disparity in the inspection conducted we could perform a chi square test of independence on the 2 variables of rural- urban disparity (Variable X) and the no. of inspection each shop have faced since the Ban of certain plastic goods in 2019(variable Y). Each market that belonged to a municipality/corporation were categorized under urban while each market surveyed that belonged to panchayats were considered rural markets.

We would be using the Chi Square test of independence. And we will be using 1044 shops in consideration.

Ho: Variable X and Variable Y are independent

Ha: The use of SUP carry bags is dependent on the no. of inspections.

Let the level of significance be at 0.05.

Rural-urban Disparity	No. of Inspection	0 Inspection	1 Inspection	2 Inspection	3 or more inspection	Total
Rural		279	168	83	71	601
Urban		165	138	92	48	443

Total	444	306	175	119	1044
-------	-----	-----	-----	-----	------

Degree of freedom (Df)= (2-1)(4-1) = 3

Critical Value at 3 degree of freedom and 0.05 alpha value, is 7.814

So, if chi square( $X^2$ ) is greater than 7.814, we reject  $H_0$ .

Test statistic=

$$X^2 = \sum (fo - fe)^2 / fe$$

Where  $fe = fc.fr / n$

Table of expected frequency:  $fe$

Rural-urban Disparity	No. of Inspection	0 Inspection	1 Inspection	2 Inspection	3 or more inspection
Rural		255.59	176.15	100.74	68.5
Urban		188.4	129.84	74.25	50.5

$$\begin{aligned} X^2 &= \sum 2.14 + 0.377079 + 3.123959 + 0.091241 + 2.906369 + 0.512828 + 4.243266 \\ &+ 0.123762 \\ &= 13.52267 \end{aligned}$$

Since  $X^2 = 13.52$  is larger than the critical Value of 7.814, we can reject the null hypothesis.

Thus stating that the rural urban disparity exist and the observed conduction of inspection are duly followed in the urban areas than in the rural areas.

# 5. ALTERNATIVES- FACTS AND CONCERNS

Alternatives to SUPs in the market is very important part of the study as it has the potential to replace most of the SUPs if it is widely available and economically feasible. But we could find that the alternatives are often misinterpreted in the markets which lead to the mismanagement of plastic waste. Major alternatives available in different shops for different SUPs were found out through the survey and analyzed. Also we have analyzed the sustainability and economic feasibility of those alternatives currently available in the market.

## 5.1. ANALYSIS OF ALTERNATIVES IDENTIFIED IN SURVEYED MARKETS



Chart 5.1

## SPOON ALTERNATIVES

Steel Wood Fibre

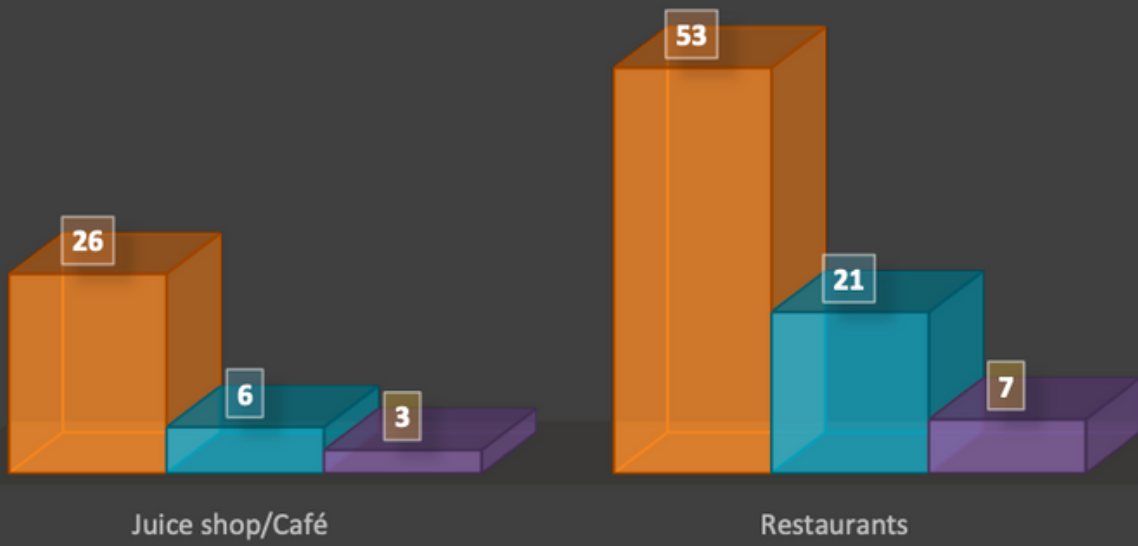
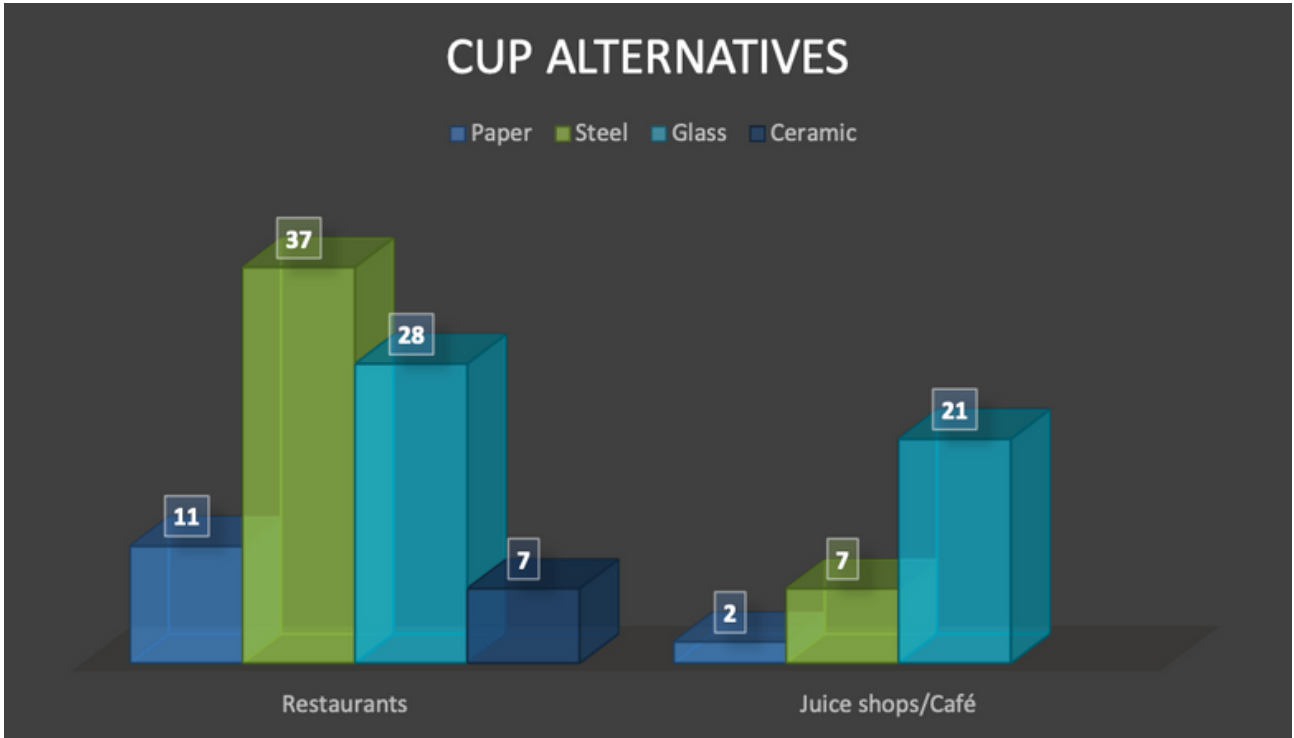
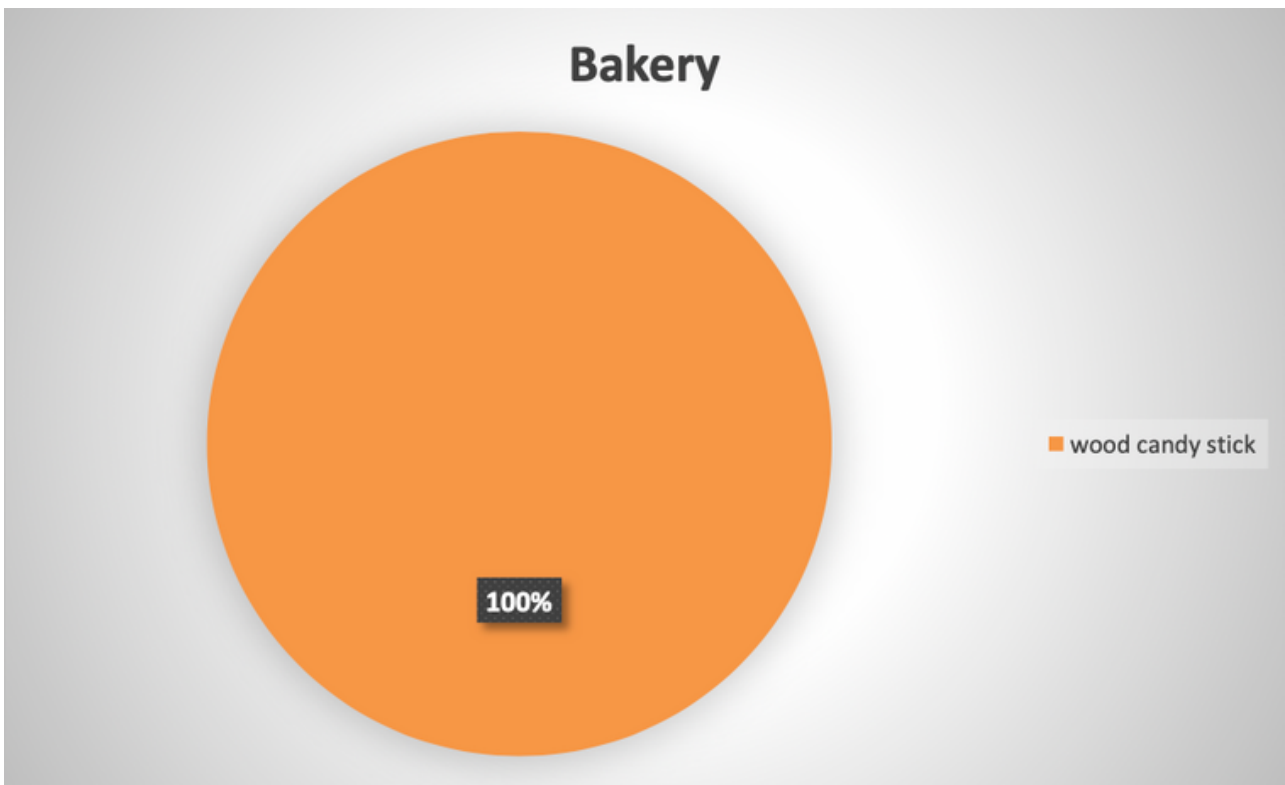


Chart 5.2





**Chart 5.3**



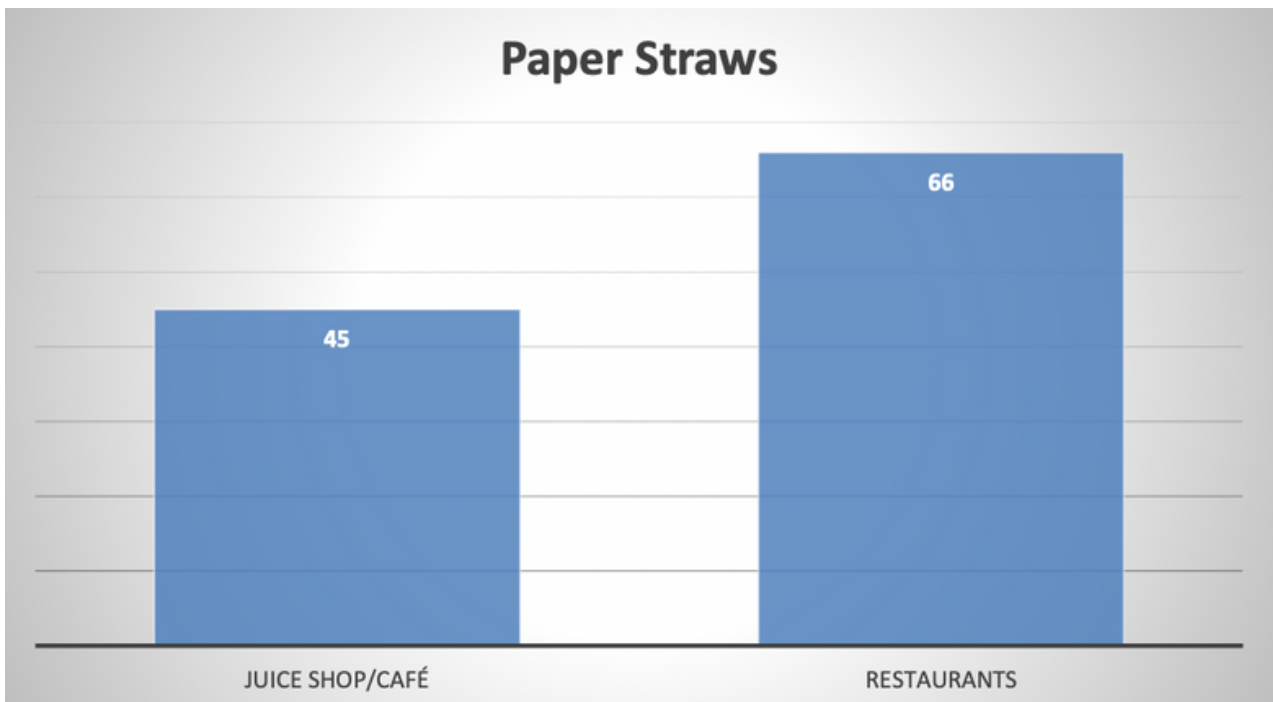
**Chart 5.4**

### Ice-cream stick Alternative

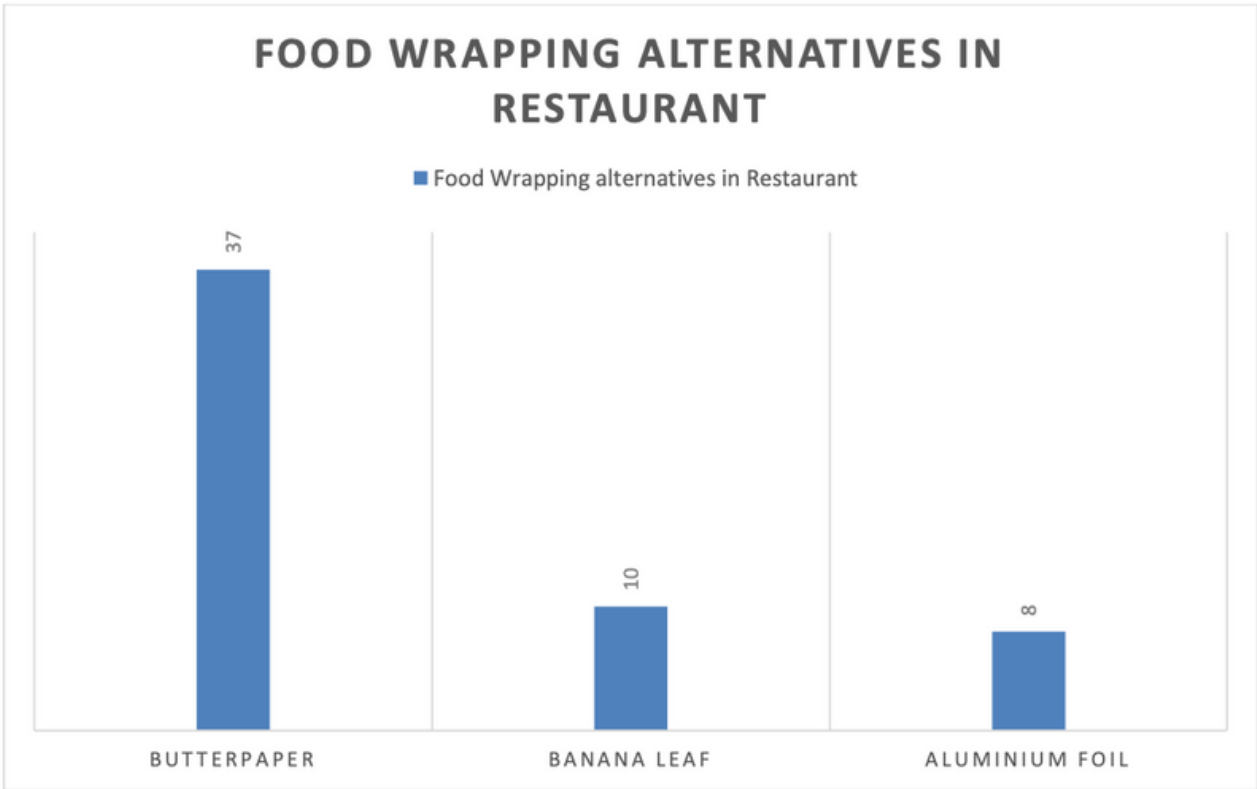


**Chart 5.5**

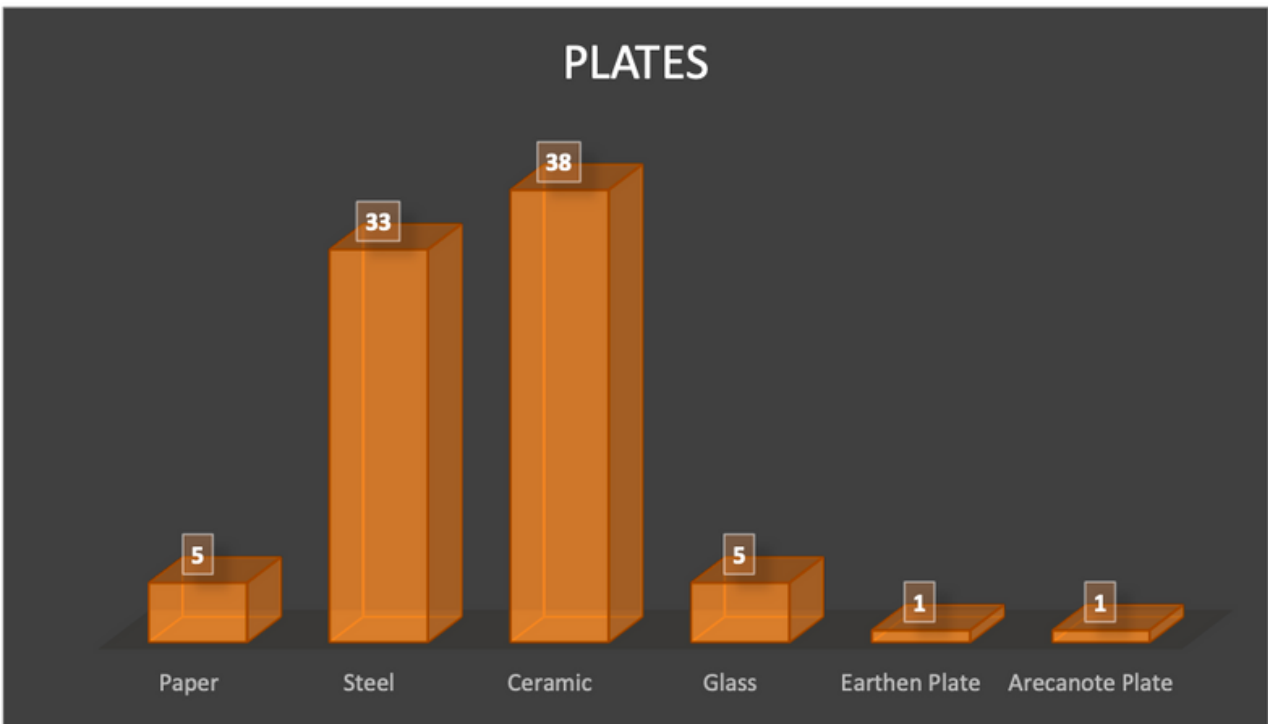
### Paper Straws



**Chart 5.6**



**Chart 5.7**



**Chart 5.8**

## 5.2. MAJOR ALTERNATIVES AVAILABLE IN THE MARKET- A REALITY CHECK

As per the study, the major alternatives for SUP carry bags available in the markets (from shop owners' response) for SUP carry bags are paper bags, cloth bags, non-woven carry bags, jute bags and biodegradable plastic bags. But when we look deep into these alternatives they said, we could clearly see that some of them are misinterpreted as alternative to SUP carrybags.

### REUSABLE PAPER BAGS

Paper bags are used by the most stores like stationary store, fancy store, juice shops, bakery and medical shops. They are biodegradable and cause low litter problems. They can be continually reused and recycled, posing less threat to environment and wildlife. Paper bags are made from a renewable natural resource. They can be used repeatedly and can be processed and transformed to new paper.



### NON- WOVEN BAGS

Non- woven bags are used in few of the stores which is banned by the Kerala Government in 2020. They are made from the synthetic plastic polymer polypropylene, used in bags because it is strong, flexible, and reusable. But they are non-biodegradable, and their increasing accumulation in the environment has been a threat to the planet.



## COTTON BAGS

A cotton bag is a kind of eco-friendly bag made from cotton fabric. The material of the cotton bag is 100% cotton. Cotton bags are thicker and can be used repeatedly as compared to the single-use plastic or paper bags.



## **OTHER ALTERNATIVES**

### **PAPER STRAW: -**

Paper straws are typically made using food-grade paper and other raw materials. They are designed to last through the end of use but biodegrade easily once recycled or disposed of.



### **WOODEN SPOON:**

Wooden spoons are used rarely as an alternative. A cheap wooden spoon is likely to be made of pine, but the best quality wooden spoons are made of either olive wood, bamboo, beech, or maple.



## **WOODEN EARBUDS:**

Wooden earbuds are made from organic cotton and eco-friendly bamboo. But it is used rarely because comparatively expensive than sup earbuds.

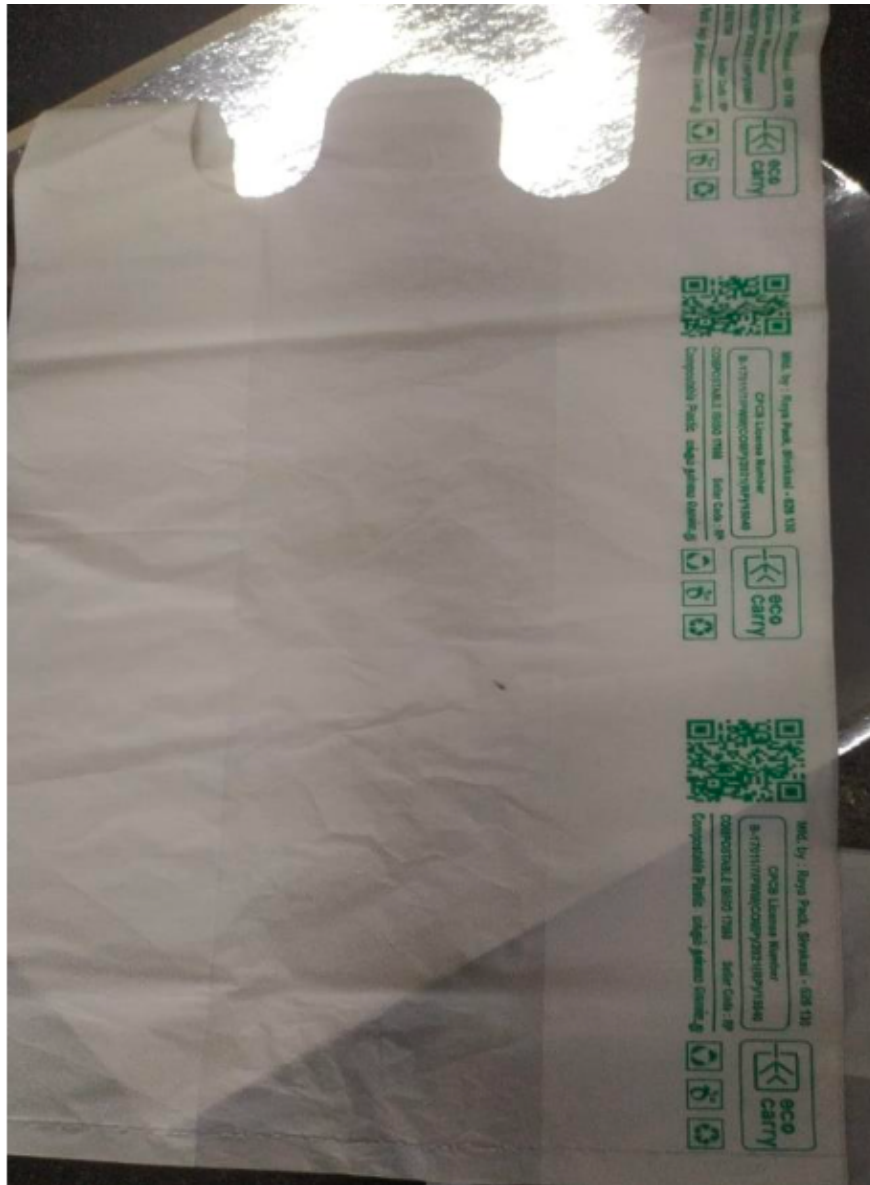


## **STEEL CUTLERIES:**

Cutleries made of steel is very common in the restaurants of Kerala. Plates, cups, glasses, spoon, fork, knives etc. made of steel are durable and reusable.

## **BIODEGRADABLE PLASTICS:**

The biodegradable or compostable plastic carrybags are often given as an alternative to SUP. But these are in reality, compostable or biodegradable only in certain industrial conditions and cannot be composted along with other compostable items in the municipal waste. Also these are a major concern because it may breakdown partially when dumped in soil and exposed to sunlight and UV radiations and become micro plastics which in turn a serious issue.



## 5.3. CONCERNS, SUSTAINABILITY AND ECONOMIC FEASIBILITY OF SUP ALTERNATIVES

### CONCERNS - SUP ALTERNATIVES: -

Most of the shop owners who were kept the SUP carry bag was saying these major points that are;



- Easiness of use and carrying.
- Durability through any weather condition.
- Cheap and available than any other products.

Availability of SUP could be controlled by the phase out started on July 1, 2022. But those other qualities of SUP are still a concern for SUP alternatives.

- Carry bag alternatives such as paper carry bag, cotton bag, jute bag etc. are having some durability problems in rainy condition, especially paper carry bags which are mostly available in every shop (chart 5.1), and where in a state like Kerala it is a concern.
- Although paper bags degrade much quicker in the environment, they require more energy to be produced, are more expensive and once discarded take more space in collection trucks and landfills.
- For leaf made product and packaging, products like banana leaf, areca not leaf, availability issues could be a concern. Easily and wide availability of these products still needed to be overcome.
- Expensive alternatives for packaging could cause cost problems either for consumer or shop owner.
- In case of ear bud alternative even if the alternative available widely it is not acceptable widely. There are strength issues for the ear bud alternative thus can dangerous for ear. Need of ear cleaning lotion, reusable ear cleaners or professional help would be more preferable.
- Paper cups, single use paper plates, and some paper boxes are coming with plastic coating. Paper boxes are widely available alternative for sweet boxes.
- Candy sticks with wooden stick alternative are still a less pick by customers and shop owners.
- Demand-supply gap of local biodegradable products are need to sort out if that are needed to be a better alternative.
- Biodegradable/compostable plastic carry bags are also available in shops, which is not a sustainable alternative.

### **ECONOMIC FEASIBILITY OF ALTERNATIVES: -**

When you go through the shop owners' concerns, economic feasibility is the major problem they are facing in changing to the alternatives. Even though it can be considered as an issue, the way plastics are becoming most hazardous threat to the environment have to be considered the most major issue.



G 1 Disposable Wooden Spoons, 140 mm | Spoon for Home Use | Eco-Friendly | Disposable Spoon | 100 Pieces/Pack | Pack of 1 |

Visit the G. 1 Store  
 ★★★★★ 310 ratings  
 Amazon's Choice for "wooden spoon"

-43% ₹229<sup>00</sup>  
 M.R.P.: ₹399.00  
 Prime One-Day  
 Inclusive of all taxes

Save Extra with 4 offers




TAGROCK Ceramic Soup and Dessert Spoon, Microwave Safe - Pack of 6 (White)

Visit the TAGROCK Store  
 ★★★★★ 240 ratings  
 Amazon's Choice for "soup spoons"

-46% ₹298<sup>00</sup>  
 M.R.P.: ₹550.00  
 Prime  
 Inclusive of all taxes  
 Coupon  Apply 5% coupon. Terms

Save Extra with 4 offers  
 Cashback (4): Apply now & get ₹500 | Snip code



disposable plastic spoon 100pcs

Return Available, Any Query Please Contact on Whatsapp 91-9150030303

Plastic - Spoons

[View product details](#)

₹68.00  
 Aap ka bazar  
 Free delivery and free 4-day ret...



Kristal Premium Stainless Steel Dinner Table Spoon Set of 6pcs (Medium, 6 Piece)

Brand: Kristal  
 ★★★★★ 23 ratings

-53% ₹140<sup>00</sup>  
 M.R.P.: ₹299.00  
 Inclusive of all taxes

Save Extra with 4 offers

Cashback (4): Apply now & get ₹500 back + rewards worth ₹1700 + 5% back on ... | See All

No Cost EMI: Avail No Cost EMI on select cards for orders above ₹3000 | Details

The above spoon price tags can get us into a conclusion how price tags are different between sup and sup alternatives. These are the major concern for shop owners, meanwhile the biodegradability and reuse opportunities are in a way achieving economic feasibility.

# 6. EFFECTIVE IMPLEMENTATION OF SUP BAN

## 6.1. STAKEHOLDERS INVOLVED

To ensure the effective implementation of the single use plastic ban, all parties involved—including those in the production of raw materials, plastic manufacturers, consumer goods firms, national, state, and municipal governments have to play their respective roles. Other important stakeholders include Pollution Control Boards, Suchitwa mission, Haritha Keralam mission, plastic waste collectors and recyclers, scrap dealers and private sector.

### 1. Plastic manufacturers & Consumer good Companies

The plastic manufacturer companies should invest in identifying and upgrading to product packaging and design that eliminates the need for plastics like straw, candy sticks, earbuds with plastic sticks, etc. This should be a collective effort from the companies to switch to new packages that avoid the use of single use plastic wherever possible.

### 2. State & Local level Governments

Implementing a plastic ban does not ensure that the state will become plastic free, hence proper mechanisms to:

- Ensure regular inspections,
- Ensure proper plastic collection facilities are functional
- Subsidize sustainable alternatives,
- Set up cloth bag production units at local government level, making use of used clothes, to promote use of cloth bags, simultaneously providing employment opportunities for women and economically weaker sections.
- Most importantly, the state and central governments should try to strengthen the local self-government institutions for sustainable management of single use plastics.

### 3. Pollution Control Board

Both CPCB and State pollution control boards have crucial roles in planing and implementing comprehensive programs for prevention and control of plastic waste.

#### **4. Suchitwa Mission**

Suchitwa mission has come up with operational models for identifying waste collection agents, training them, establishing Material Recovery Facilities, etc. These models should be implemented and sustained, and their work should be analyzed.

#### **5. Haritha Keralam Mission**

Its mission envisages a clean and green state through waste management, organic farming and conservation of water resources with people's support. Besides the disposal of solid waste, the mission is also planning to undertake a number of initiatives including reviving water resources like ponds, rivers, lakes and streams and increasing the area of land under cultivation as part of the programme.

#### **6. Plastic Waste Collectors & Scrap Dealers**

Plastic waste collectors are important stakeholders for the effective implementation of SUP ban, hence, identifying and giving proper training to them is essential.

#### **7. Shopkeepers**

Shopkeepers should promote the use of sustainable alternatives in place of SUP plastic carry bags like cloth bags, newspaper bags, etc. These alternatives can be put to use in case of shops like bakeries, vegetable/meat/fish shops, stationery/fancy/provisional stores, etc. It is essential for the shopkeepers to collectively decide upon the use of sustainable alternatives, if not in some scenarios, customers choose to go to shops where cheaper SUP carry bags are available

#### **8. Consumers**

As responsible citizens, it is important to carry our own carry bags to shops, and refuse the use of SUP carry bags irrespective of the thickness. Segregation of solid waste in the household is essential to ensure that the plastic waste reaches treatment facilities, from where it can be recycled.

## **6.2. ISSUES FACED BY SHOP OWNERS**

Banning SUP without providing proper knowledge on available alternatives is a big issue as far as shop owners are concerned. For example, in shops where meat and fish are sold, SUP carry bags become a necessity till consumers choose to bring containers for buying it. In the case of vegetable and fruit markets, where cloth bags can be effectively used, many shop owners decide to use plastic carry bags due to the high cost of cloth bags (approx Rs.10 per bag).

Even if some shopkeepers decide to levy the cost of carrybags from the consumers, consumers choose to go to shops where free SUP bags are available. Hence, a lack of collective action from the shop owners is also an important threat to effective implementation of the ban. In several cases, shop owners are not even aware that certain SUP products are banned, as inspectors usually only ask for popular banned items like carry bags, straws and flex. This exposes the failure of the policy communication.

## **6.3. FROM WHERE DO WE START? (THINGS TO BE DONE PRIOR TO THE IMPLEMENTATION OF SUP BAN)**

- All the important stakeholders should be consulted before making and implementing a SUP ban policy, as it is important to identify and resolve the limitations of previous single-use plastic ban policies.
- Inventorization of Single use plastics; estimation of how much fraction of SUP waste is there in the total plastic waste generated. This helps to look for a clear alternative
- A local level action plan to phase out the SUPs (especially for those which can be substituted with alternatives).
- Life cycle analysis and cost analysis of available alternatives
- Provide incentives to SUP manufacturing units willing to switch over to green alternatives.
- Organize campaigns and public awareness programs with the help of NGOs and youth organizations for promoting alternatives to SUP items.
- The government must hold a roundtable conference with all the stakeholders, including food delivery services such as Zomato and Swiggy, to discuss these alternatives.
- The government must also issue directions to urban/local bodies to install kiosks in markets for promotion and sale of SUP alternatives.
- The Government departments and the Pollution Control Board must constitute teams at various districts, respectively, to ensure enforcement of the ban.
- The government should continue to issue public notices in newspapers and social media.
- Higher and other educational institutions must organize classes, seminars, workshops in relation to the promotion of alternatives of SUP products
- Government and authorities must ensure that alternatives are available at the markets at a fair price to the consumers.

- Effective EPR implementation especially for MLPs
- Awareness campaigns- consumer awareness campaigns, raising business awareness, media outreach, Scientific research, constructive amendments in policies (include ban of MLPs)

## **6.4. STRENGTHENING EXISTING SOLID WASTE MANAGEMENT SYSTEM IN THE STATE THROUGH COMMUNITY ENGAGEMENT**

Decentralised systems not only reduce the cost incurred for the collection, transportation and disposal of waste by the municipal authority, but also, enhance environmental awareness of the beneficiaries and provide employment to the members of informal waste sector. The concept of Integrated Solid Waste Management (ISWM) closely follows, which is based on the fact that the waste stream is made up of distinct components that can be managed and disposed of separately. The LSGIs should tie up with Clean Kerala Company to tackle the E-waste problem which earns an amount of Rs 10 per kg of recyclables provided to them.

LSGIs in Kerala, which is not an industry friendly area, recycling units cannot be placed for the disposal of waste here itself by the state. Corporations and others LSGIs should procure a bailing machine at the earliest to compress paper and plastic waste before transporting them to Tamil Nadu. For instance, a private agency in Ollur crushes plastic waste to balls which can be used for tarring. Measures should be taken to upgrade the workmanship of such agencies so that plastic waste can be used at our state itself. Thus the cost of transportation can be saved in the process.

Managing solid waste well and affordably is one of the key challenges of a government. Going through waste management systems of cities around our country and the world, it is quite evident that waste generation is not the parameter of environmental degradation. It is inability of the government and the people to dispose it off rightly that count. Thus high time has arrived for the government to implement planning strategies to tackle the situation and the people to understand the seriousness of the problem and act wisely. Solid waste

management issues in Thiruvananthapuram Municipal Corporation has proved itself to be a prototype of the above discussed scenario. The perfect method chosen to tackle the situation and improve the ability of the masses to treat their own waste efficiently is zero landfill decentralised model of waste management. It is high time that waste is to be treated at resource. Such a mentality can generate solutions to utilize waste in a more sophisticated manner. LSGIs in Kerala can improve their waste management techniques by including Kerala Agricultural University into the process as discussed. This seems to be a specific solution particular to the locality. But such initiatives can be replicated in any town after studying suitable potential areas situated in and around the town area. Waste is the sole responsibility of the generator. They should no longer be waiting for the authorities to find a solution to dispose the same. Such a mind-set will itself lead to source processing of waste and the same venture should be reinforced with policy regulations and assistance from the authorities.

The Swachhata App and Portal is used by citizens to help municipal corporations identify unclean areas in 4,041 cities throughout India. When a citizen spots a cleanliness-related issue in the city, he or she can use the app to take a picture, chose a category and file a complaint, which is immediately monitored by a municipal corporation's designated officials. Complaints are then assigned by the nodal officers to the relevant field official who gets a notification on the SBM Engineer App installed on his or her phone. The assigned official then goes, resolves the complaint and takes a picture as a proof that the complaint is resolved. The status of the complaint being resolved and the picture is then sent back in the citizen app as a notification to the citizen that the situation has been rectified. The citizen can then give feedback on how the municipal corporation performed on the complaint lodged by giving a "happy, neutral or sad" response and can also re-open the complaint if the citizen feels the complaint was not resolved at all.

Forming Youth Groups are implementing pilot projects with the goal of reducing plastic pollution by 30% in the areas in the local community as pilot areas. Social Entrepreneurships and NGOs together with local authorities can hatch projects that establishes a community-based waste management system, one that could prevent the community's waste from polluting the coastal environment, waterbodies, agricultural lands, plains, etc. an environment that not only supports the livelihoods of residents and other living beings, from fishing to aquaculture, but also harbors many marine species, including the rare and vulnerable communities. The aim of such community level interventions should be to establish a system in which solid waste would be segregated at the household level, valuable items would be utilized on-site, organic waste would be composted

and trash would be collected and transported to a treatment site by a public collection service. An agreement should be reached between the local authorities and the community members of the society, leading to the launch of the community-based waste management program in the region. The project should provide equipment, waste separation training, and technical support to the residents, equipping them with the resources to not only establish the program, but also to run the program independently.

Public awareness about the dangers of plastic pollution to the ocean environment should be provided in Kerala, with residents even participating in beach cleanup events, local cleaning and segregation and educating the students and youngsters. The habit of throwing trash into the ocean will fade away.

Kudumbashree members will collect inorganic waste door to door twice a week, and advocates for waste separation and onsite organic waste treatment. Since the pilot starts, the waste pickers will gain stable income from waste collection fees and from recyclables collected from participating households. Together with these waste pickers, another local female or youngsters and / or students should also be employed to monitor and audit the local waste stream.

This community-based pilot will be a lesson which are being learned on the ground, which will be used to not only improve on the community-based model, but will help to expand across other communities in the region.



# 7. WAY FORWARD

## 7.1. KEY FINDINGS OF THE STUDY AND POSSIBLE SOLUTIONS

**1. Alternatives in the market are often misinterpreted and that further lead to mismanagement of plastic waste.**

**Possible Solutions:**

- 1.1. Release of list for proper alternatives which have been identified to have no harm or less harm caused to our nature compared with its counterpart plastic products.
- 1.2. Policy interventions in the manufacturing, selling, usage and management of “compostable/ biodegradable” plastics in order to prevent mismanagement of waste or complete ban of such alternatives.
- 1.3. Establishing a system for proper testing, analysing, certification and management of plastics labelled as “compostable”/ “biodegradable” if the Government allows manufacturing of such plastics.
- 1.4. Carbon footprint analysis of alternatives such as biodegradable plastics and cotton bags sourced from virgin cotton to know whether the alternatives are really sustainable.
- 1.5. Well-structured campaigns to introduce affordable and sustainable alternatives

**2. The vegetable and fish vendors are still searching for better alternatives.**

**Possible Solutions:**

- 2.1. Encourage consumers to bring vessels from home to buy fish and meat.
- 2.2. Encourage reusable materials for carrying fruits, vegetables, fish or meat.

**3. SUP carry bags are a major problem in most shops even though a state-level plastic ban exists.**

**Possible Solutions:**

- 3.1. Strengthening the existing Waste Management System and following a circular economy.
- 3.2. Promote and ensure the availability of alternatives.

**4. Shop owners are the one who has to pay the fines for carry bags most of the time during inspections and they are concerned about the large scale production and selling of these SUPs and the irresponsibility of consumers.**

### **Possible Solutions:**

4.1. Inspections and monitoring should be carried out at manufacturing level.

4.2. Understanding the issues faced by the shop keepers and producers in serving the huge demand of alternatives for SUP products

**5. SUP ear buds, candy sticks and SUP packaging films are still available in every concerned shops**

### **Possible Solutions:**

5.1 Restrictions should be made at the manufacturing level in case of wrapping films, earbuds and other plastic packaging

**6. Availability and affordability of SUP alternatives are major concerns for both shop owners and consumers.**

### **Possible Solutions:**

6.1. Providing robust infrastructure, encouraging local entrepreneurship and innovation.

6.2. Subsidising or helping the market for alternatives reach price matching or less with SUP counterparts already practised in the shops.

**7. While enforcing such bans the issue being missed out is the convenience and finances of both consumers and shopkeepers. The losses they have to bear on the transition without suitable replacements is one of the major reasons for failures of bans.**

**8. SUP cutleries are not much a problem in restaurants and juice shops across Kerala, most of them switched to alternatives. Also the survey shows a clear change in the usage of SUP straws after lots of campaigns carried out across Kerala.**

## 7.2. SUGGESTIONS AND RECOMMENDATIONS

1. Know the baseline (SUP inventorization, assessment of their impacts)
2. Strengthening waste minimization through effective implementation of Extended Producer Responsibility (EPR)
3. Strengthening the existing Waste Management System and following a circular economy.
4. Inclusion of informal sector and youth organizations in the process of Plastic waste management.
5. All the important stakeholders should be consulted before making and implementing a SUP ban policy, as it is important to identify and resolve the limitations of previous single-use plastic ban policies.
6. Understanding the issues faced by the shop keepers and producers in serving the huge demand of alternatives for SUP products.
7. Release of list for proper alternatives which have been identified to have no harm or less harm caused to our nature compared with its counterpart plastic products.
8. Alternatives which are convenient to the consumers. Convenience is a strong subject in today's market and consumers demand the same from everywhere.
9. Regular inspections and awareness programs should be conducted by the authorities both in urban and rural areas.
10. We have seen many campaigns conducted by various organizations to phase out SUP straws and that made an impact in the markets. Such well-structured campaigns should be done in a wide spectrum by engaging youth and children along with LSGDs.
11. Life Cycle Assessment should be carried out for plastic products.
12. Carbon footprint analysis of alternatives such as biodegradable plastics and cotton bags sourced from virgin cotton.
13. Availability and affordability of alternatives is a problem; possible solutions are: providing robust infrastructure, encouraging entrepreneurship and innovation.
14. Subsidising or helping the market for alternatives reach price matching or less with SUP counterparts already practised in the shops.
15. Encourage Research and Development on new plastic alternatives
16. Alternatives can be produced from natural fibers (cotton, coir, hemp, jute etc.), which in turn provide an essential source of income to farmers and helps to improve agricultural economy

17. Policy interventions in the manufacturing, selling, usage and management of compostable/ biodegradable plastics.
18. Establishing a system for testing, analyzing, certification and management of biodegradable/ compostable plastics.
19. Inspection and monitoring should not be restricted to the market level. Regular monitoring system at manufacturing and management level, in order to ensure the implementation of EPR and proper management of plastic waste.
20. To sustain the good results achieved through effective Waste management, it is key to identify the main sources of pollution and take action to resolve the issue at source.

# ANNEXURE

The category of shops taken for the survey

1. Medical store
2. Restaurants and roadside eateries
3. Bakery/ sweet shop
4. Juice shops/ cafe
5. Stationary/ provisional/ fancy shops (where toys, flags and decorative items available)
6. Shops where cigarettes available
7. Fruits/ vegetable/ meat/ fish shops
8. Flex and invitation card printing shops

Questionnaire used for the survey (for each category of shops)

Medical store

1. Are SUP ear buds available? (Yes/ No/ Both SUP and alternative available)  
Type of alternative available
2. Are banned plastic carrybags available?

Restaurants and roadside eateries

1. Are banned plastic carrybags available?
2. Are SUP sheets available for wrapping the parcel food?
3. Are SUP plates available?
4. Are SUP cups/ glass available?
5. Are SUP spoons/ forks available?
6. Are SUP trays available?
7. Are SUP straws available?
8. Are plastic coated paper cups available?
9. Are PET bottles (drinking water) less than 500 ml available?

Bakery/ Sweet shops

7. Are banned plastic carry bags available?
8. Are SUP wrapping or packing films around sweet boxes available?

9. Are SUP boxes available?
10. Are SUP trays available?
11. Are SUP candy sticks available?
12. Are SUP ice cream sticks available?

Juice shops/ cafe

13. Are SUP straws available?
14. Are SUP spoons available?
15. Are SUP glasses available?
16. Are plastic coated paper cups available?

Stationary/ provisional/ fancy shops (where toys, flags and decorative items available)

2. Type of store
3. Are banned plastic carry bags available?
4. Are SUP balloon sticks available?
5. Are SUP flags available?
6. Are SUP flag sticks available?
7. Are plastic wrapping films available?
8. Are thermocol decorative items available?

Vegetable/Fruits/ Meat/ Fish shops

2. Type of shop
3. Are banned plastic carrybags available?
4. Are plastic packets or wrappers used for packing fruits and vegetables?

Shops where cigarettes available

2. Are wrapping films on cigarette packet available?

Flex/ invitation card printing shop

2. Are PVC banners below 100 microns available?
3. Are plastic wrapping/ films on invitation cards available?

- Does anyone from the authority (PCB/Panchayat/Corporation/ Municipality) come to the market for inspection? If yes, how often? (common question for all the shops)

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