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[Study on E-waste: Bangladesh Situation]

Electronic wastes might can cause environmental and health hazards. At present, there are lack of awareness and adequate information gap on e-waste hazards in Bangladesh. “Do we know what happens when we throw out our old electronic devices? Probably not, but considering they contain both toxics chemicals and heavy metals we'd think someone would know”?

Study on
E-waste: Bangladesh Situation

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Acronym and Abbreviation

Acronym / Abbreviated Term	Full Meaning
Cd	Cadmium
CFL	Compact Fluorescence Light
Cr	Chromium
DoE	Department of Environment
ESDO	Environment and Social Development Organization
E-waste	Electronic Waste
Hg	Mercury
Pb	Lead
POPs	Persistent Organic Pollutant
UNDP	United Nations Development Program
IPEN	International POPs Elimination Network
UNEP	United Nation Environment Program
MoEF	Ministry of environment and Forest

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1. Introduction

Bangladesh indicates a rapid economic growth with emerging market for consumers of electric, electronic gadgets, home appliances. These demands have created a circumstance of increasing amounts of locally produced electronics products and increasing demand for re-using these products. Equipment is largely refurbished and recycled in semiformal and informal sectors. Re-use or recycling or of equipments and as well as dumping are creating risk these days. These electronic wastes might can cause environmental and health hazards. At present, there are lack of awareness and adequate information gap on e-waste hazards in Bangladesh.

ESDO has been conducted a research survey in order to address this problem and to create mass awareness and learning initiative on e-waste through a project focusing Dhaka and Chittagong city. This research report has been written based primary data as well as based on the secondary sources of information. This report will give an idea of present situation analysis, gaps and recommendations for way forward.

“Do we know what happens when we throw out our old electronic devices? Probably not, but considering they contain both toxics chemicals and heavy metals we'd think someone would know”?

1.1. What is E-waste?

"Electronic waste(E-waste)" may be defined as all secondary electronic goods including computers, entertainment device electronics, phone sets / mobile phones, and other items such as television sets and refrigerators, whether sold, donated, or discarded by their original owners. E-waste is a popular, informal name for electronic products nearing the end of their "useful life." Computers, televisions, VCRs, stereos, copiers, and fax machines are common electronic products. Many of these products can be reused, refurbished, or recycled. Unfortunately, electronic discards is one of the growing segments of our nation's waste stream.

E-waste containing products	Heavy metals & toxic substance release from e-waste
<ul style="list-style-type: none">• Televisions and computer monitors,• Computers and computer peripherals (e.g. monitors and key boards),• Audio and stereo equipments	<ul style="list-style-type: none">• Mercury• Lead• Cadmium• Zinc• Chromium

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<ul style="list-style-type: none">• VCRs and DVD players,• CFL bulbs,• Video cameras,• Telephones, cellular phones and other wireless devices,• Fax and copy machines,• Video game consoles,• Medical and dental equipments etc.	
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2. Study

ESDO commenced a study focusing Dhaka city, to examine the trend of usage of electronic devises /gadgets and what's been done during end of these equipments, what hazards are been created from these e-waste, what are the current practice of dumping and what rules are there for dumping these sludge. Finally this study has tried to identify the level of awareness regarding these e-waste and way forward to reduce environmental hazards.

2.1 Objective of the study

1. To identify the total volume of e-waste which has been generated in Bangladesh from 1971 to 2010(June).
2. To analyze the management system of dumping of e- waste.
3. To describe the impact of e-waste on environment and health in Bangladesh.
4. To stop e-waste generation through a policy and law.
5. To educate and aware the users about the hazards of e-waste associated with computer technology.

2.2 Methodology of the Study

ESDO has conducted survey in (September 2009-June 2010) in Dhaka, capital of Bangladesh on the volume of e-waste generation of six products among at least four target groups of each one. Each group consisted of 10 members except mobile set.30 members there due to large number. Six products are Television, computer, mobile, CFL bulb, medical and dental equipments. Target groups were importers, retailers, repairers and users or each product.

3. Findings of the study and analysis: Snap shot of present practices of these six products

3.1 Brief Findings

In every year Bangladesh generated roughly 2.8 million metric tons of e-waste. But without knowing the harmful effect of the e-waste these has dumped in to the open landfills, farming land and in the open sources of water bodies.

- Health impact: Cancer, Asthma, Nerves breakdown, Hearing problem, Visual problem, Infant-mortality, disable baby birth.
- Environmental impact: Air pollution, Water pollution, Land pollution and life threat for wildlife
- In Bangladesh every year more than 15% child worker died during and after effect of e-waste recycling and more than 83% are exposed by toxics substances and become sick and live with long term illness. According to ESDOs recent study and available information, approximately (50,000) fifty thousand children's are involved in the non-formal e-waste collection and recycling process, amongst them about 40% are involved in ship breaking yards.
- E-waste generated from ship breaking yards alone about 2.5 million metric tons of toxics e-waste in a year.
- Bangladesh has generated 10,504 metric tons of toxics e-waste by cell phone sets within last 21 years.
- Every year around 296302 TV sets become scrape and generated 0.17 million metric tons of e-waste.

3.2 Television

ESDO conducted survey in stadium market, the largest market of television amongst 10 importers as sample.

Volume of E-waste from Television

In Bangladesh there is no manufacturer of television. They are all assemblers. Basically who are involved in television business either they are importers or retailers or repairers. While surveying, most of the importers introduced themselves as retailers and repairers as well. They do not confess that they are assemblers but varieties of television sets are stored insides the shops though they hang brand name signboards.

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First of all, to understand the present scenario of e-waste estimation has been needed to measure the total volume of e-waste since 1971 to June 2010. To make a simple estimation 10 years have been considered.

Up to 1981 the urban population rate of Bangladesh was 18% of total population. In our country television (Black and White) was introduced in 1964. Color television was in 1984. The TV users of that time were urban dwellers. Remarkable, TV license holders were 7% of urban population. Since the longevity of a television is 5 to 10 yrs, so we can easily say after 1971 to 1981 around 50% television (estimated) would be counted as rejected sets which had been produced e-waste. So, we can easily guess up to 1981 the volume of e-waste is 8,500 Metric tons (@ of 1 set = 15 kg) from television sets was around 566,445 of total television sets (11,32,891).

In 1991 the growth rate of urban population wasn't increased, i.e. 18% like last 10 yrs. But



naturally TV users and rejected TV sets rate were enhanced. The volume of e-waste was 962,973 in numbers (approximately 14,500 M.T) deliberately after 10 yrs i.e. in 2001 and up to June 2010 the volumes of e-waste of TV sets are respectively 3258582 and 733455. These figures have been counted based on growth rate of urban population and TV users per yearly. So total volume of e-waste is 181,834 Metric Tons from television sets after the birth of Bangladesh up to current time is 1, 21, 22,255.

Re-use or re-cycling rate

ESDO's survey report shows that 8 Importers out of 10, import parts for non-brand television sets. Namely- Walton, My One, Konka, G. Hanzs, Esquire, TCL, Haier from China and Malaysia. 60% assembler assembles these parts in their factories and produce above mentioned local brand sets. The warranties of the most of the TV sets are 5 to 10 years. 8 importers sell around 670 TV sets in a year.

8 retailers, most of the time they sell some unknown television to the customers such as –SMY, Walton, Tristar, Nova, My One, China, Esquire, TCL, Haier which are low cost. 20% retailers sell around 1500 TV sets in a year.

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Based on the income capacity customers' use non- brand televisions and lifetime of these sets are not more than 3-5 yrs. Most of the time about 60% repairer repair non-brand sets and about 20% repairer repair around 170 brand TV sets in a year. So these non brand TV sets are mainly liable to produce e-waste.

Assemblers, repairers and customers don't know which heavy metals contain in a television set. And thus they are unaware of e-waste and dumping of it.

Rejection reuse and dumping practice

About 50% assembler companies are sold out the generated waste, 30% are dumped, 20% are stored for long while. 30% repairers stored the old and damage TV sets for repairer and farther uses, 15% dumps it, 5% didn't want to inform. Among the customers 40% sold rejected sets to the repairers, 10% through away and 20% reuses it after repairing.

Survey gives us can easily illustrate the dumping management scenery of total Dhaka city.

3.3. Computer set (Laptop, Desktop):

ESDO conducted survey in IDB Bhaban, the largest market of computer amongst 10 importers as sample. Besides, from some institutions (office, cyber center) information has been gathered to identify the using and reusing rate of computer.

In Bangladesh there is no manufacturer of computer. They are all assemblers. Basically who are involved in computer business either they are importers or retailers or repairers.

Volume of E-waste from Computer

Up to 1990 the urban population rate of Bangladesh was 18% of total population. In Bangladesh computer was introduced in 1980s. The computer users of that time were urban dwellers. Since the durability of a computer is 3 to 5 yrs, it can be easily said after 1980 to 1990 around 50% computers (estimated) can be counted as rejected sets which had been produced e-waste. So, we can easily guess up to 1990 the volume of e-



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waste from computer sets was around 100,309. In 2000 the growth rate of urban population was 27%. Naturally computer users and rejected sets rate were enhanced. The volume of e-waste was 399010. Deliberately after 10 yrs i.e. in June, 2010 the volumes of e-waste of computer sets (desktop, laptop) is 1604368. These figures have been counted based on growth rate of urban population and computer users per yearly. So total volume of e-waste from computer set after 80 decades up to current time is 21,03,687.

ESDO's survey report shows that 20% Importers, import non-brand devices of computer set (e.g. Mercury and Havit from China and Taiwan.) Warranties of the most of the devices of the sets are 3 to 5 years. 10% cyber café use mercury brand.

40% assemblers buy different parts of a computer from used computers. 90% assembler buy used computers. After assembling 80% assemblers ensure 1 year warranty of a set.

Dumping practice

Assemblers buy different devices from used computers and reuse after repairing and ensure warranty for 1 yr.

Assemblers, repairers don't know which heavy metals contain in a computer set. And thus they are unaware of e-waste and dumping of it.

None of the institution under the survey done by ESDO does not buy used computers. Total 60% assemblers dump the e-waste in storage and dustbin and 40% repairer and 50% institution dump e-waste anywhere and everywhere.

3.4 Mobile /cell phone

In Dhaka city ESDO conducted survey at Eastern Plaza one of the largest markets of mobile set.



In Bangladesh, those who introduce themselves as company of mobile sets are basically retailers. They hang signboards in the name of companies namely Nokia, Sony Erickson, and Samsung but inside the shops they keep varieties of sets.

Most of the retailers sell the sets of Nokia, Sony Erickson, and Samsung from Singapore, Dubai, Hungary. They also prefer to sell sets from China. They don't distinguish between brand and non-brand sets.

Volume of E-waste from mobile phone sets

In Bangladesh mobile phone was introduced in 1989. There are six companies in Bangladesh. Such as Citycell, Grameen, Banglalink, Robi, Teletalk (Govt.) and Warid telecom. From 1990 to 2009 the total subscribers of six companies are 4,72,20,000. Till to June 2010 it may be increased 10% of total. Now subscribers are 5,19,42,000. Each subscriber use more or less 2 sets. So total sets will be 10,38,84,000. Since the lifetime of a mobile set is not more than 1 year so, it can be said that in last 10 years sets had been used

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31165200.80% mobile (estimated) would be counted as rejected sets which had been produced e-waste. Therefore, it can be estimated till June 2010 the volume of e-waste from mobile sets is around 2,49,32,160 .

ESDO's survey report shows that 9 Importers out of 30, import phone sets from China. 6 importers of 30 ones import from 150- 1200 mobile sets in a month. 6 importers sell in a month from 150-1000 sets. The warranty of these set is 1 year. 50% retailers sell china sets. 20% retailers sell 2700 non-brand mobile sets in a year.

Both sets (brand and non brand) are warranted for 1 year and especially non brand sets are generating e-waste

Dumping practice

Repairer and customers don't know which heavy metals contain in a mobile set and thus are unaware of e-waste and dumping of it. 73% repairer dump their rejected mobile sets in storeroom .40% consumer dump rejected sets anywhere and everywhere of home.

3.5 CFL and Mercury Bulb

ESDO conducted survey among the different customer of CFL bulb to get dumping management system of it.

In Bangladesh, CFL bulb set was introduced at least five years back by Transcom Electronics Ltd. Till 2010 the production of CFL by the Transcom Ltd. was 3200000 bulbs. It has been increased 35% of total year to year. The lifetime of a CFL bulb is not more than 1 year to 18 months. Therefore, it can be said that in last 5 years the number of rejected bulbs of Transcom were 5253313 pieces. There are also six other companies produce CFL bulbs in Dhaka city (e.g. Energy pac, Osaka, Onik, Delta, SKS and Rangs.)



Table-1: CFL Bulb

Name of the companies	Yearly production (2009-2010, up to June) combined with last five year production (in per unit)	Yearly generated e-waste (2009-2010, up to June) combined with last five years production (In metric ton)
Transcom	3200,000	314.95
Energy pack	1600,000	157.47
Other companies(Osaka, Onik, Delta, SKS, Rangs)	960,000	94.48
Total	57,60,000	566.90

Table-2: Mercury /Tub bulb

Category	No. of used mercury bulb 2001 - 2010 (June) (In per unit)	No of generated e-waste 2001-2010 (June) (In metric ton)
Household	1453810	286.17
Industrial sector	80,02,114	1575.15
Total	9455942	1861.32

Volume of E-waste by CFL and mercury bulb

According to the census of 2001 the number of household in municipalities were 19,34,000. In last 10 years each household used at least 3 mercury bulbs. So in last 10 years the volume of generated e-waste from CFL and Mercury bulbs is 2428.22 metric ton.

Dumping practice

To consumers are more or less unknown regarding containing mercury of CFL bulb. 50% of the customers dump the rejected bulbs to dustbin.

3.6 Thermometer

In Bangladesh thermometer is widely used as medical equipment in each household. Especially in urban area more or less each family or household has a thermometer in a year.

Since 1971 to 2010(June) urban households are 61,02,95,237. Since the longevity of a thermometer is 1 year, so from 1971 to 2010 about 61,02,95,237 pieces thermometers have already been rejected after using. So, the volumes of E-wastes are 8513.59 metric tons (10 years)



Table-3: Thermometer

year	Used thermometer (ten years) (In per unit)	E- waste (ten years) (in metric ton)
1971	3,3615,120	497.06
1971-81	8,0920,800	1194.64
1981-91	10,0309,667	1296.88
1991-2001	16,6254,182	2357.43
2001-2010	22,9195,469	3167.64
Total	61,02,95,238	8513.59

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3.6.1 Others Medical and dental equipments:

The availability and access to health services in Bangladesh is poor and less than 40% of the population receives primary health care. According to the World Health Organization, in 2000 there were just 29,746 doctors in Bangladesh or just one doctor per 4,521 people. (Reference: Country Health Profile, Bangladesh, WHO Regional office for south-east asia, w3.who.sea.org) In 2003, total expenditure on health was just 1.1% of GDP.

The government has made efforts to improve the health system by implementing initiatives such as the Primary Health Care approach, adopted by the Ministry of Health and Family Welfare in 1988. Due to limited government funds, the Primary Health Care system covers just 12 areas, reaching 48 million people which are less than 40% of the population.

Sources: Human Development Report 2006, UNDP, World Health Organization, UNEP, ESDO baseline survey

According to the census report 2001 the registered physician of Bangladesh is 32278. And according to Bangladesh Medical and Dental Council report last 10 years it can be increased 30% i.e. 41961. If each doctor used 10 medical equipments, therefore since 1971 to 2010 medical equipments are used 4,19,610. Since the lifetime of these equipments are not more than 5 years, so last 10 years rejected equipments have been 1,67,844 (estimated) for each doctor.

According to census report 2001 government hospitals are 660. So it may be 726 till 2010. Each government hospital uses at least 30 equipments, so till 2010 the number of used equipments was 21780. In last 10 years rejected equipments are 13068. Last 10 years the rejected equipments in private clinics were 12870. So we can say last 10 years in medical sector the volume of e-waste is 1,93,782. In dental sector e-waste may be 5813. In total the volume of medical e-waste is 199,595.

Dumping practice

According to the survey report of ESDO about 30% doctors, 90% clinic and hospital and 50% dentist dump the e-waste in store.

Among the all above mentioned electronic elements most of the e-waste generated from medical equipments with thermometers. The volume of e-waste of it is including thermometer 61,04,94,832.

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3.7 Analysis of the findings:

From the total working process including data gathering and data analysis, calculation of production of E-wastes in Bangladesh per year can be summarized like this;

Ship Breaking Yard =	2.5 million metric ton/yr (250000 metric ton/yr)
Television =	0.17 million metric ton/yr (26000 metric ton/yr)
Computer =	0.035 million metric ton/yr (35000 metric ton/10yrs)
Mobile Phones =	0.005 million metric ton/yr (10504 metric ton/21yrs)
CFL Bulb =	0.0005 million metric ton/yr (566.90 metric ton/6yrs)
Mercury Bulb =	0.001 million metric ton/yr (1861.32 metric ton/10yrs)
Thermometer =	0.009 million metric ton/yr (8513.59 metric ton/10yrs)
Other Medical & Dental Wastes =	0.09 million metric ton/yrs (93478.25 metric ton/10yrs)

Total = 2.81 million metric tons/yr

According to per year generation, proportion of E-wastes can be showed by the following graphical representation, where it is too clear that ship breaking yard occupied highest position. This sector poses us to be an alarming state. Wastes from television sets have taken the second highest position with an exponentially increasing rate.

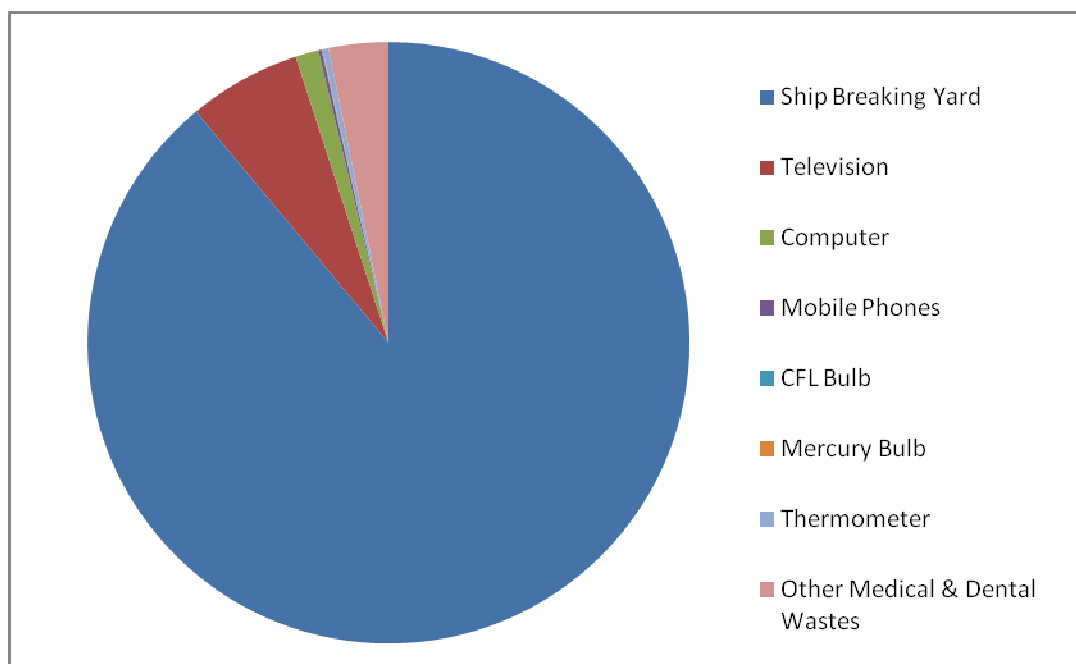


Figure-1: Graphical presentation of E-waste scenario of Bangladesh (per year)

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3. 7.1 Overall trend of consumption of electronic goods and disposal practice in Bangladesh
Bangladesh is developing with the increasing of technology usage. Sustainable and safe use of technology can drive an economically developed country. But the wastes from these electronic goods come to us as curse. We consume and dump the useless products without any consideration of environmental benefits and sustainability. From the survey report, it is clear that Bangladesh is improving in IT, media and telecommunication sectors. These lead us to the contamination due to the heavy metals and other hazardous chemicals.

3.7.2 Electronic products, consumption and trade in Bangladesh:

- Country's electrical manufacturers are now producing 80 per cent of electrical products against the total demands in local markets worth about BDT 30 million.
- According to BEMMA consumption of electronics products in Bangladesh are 3.2 million tons per years.

In every year Bangladesh generated roughly 2.8 million metric tons of e-waste. The safe disposal of these products is not being followed strictly and without knowing the harmful effect of the e-waste these have been dumped in to open landfills, farming land and in the open water bodies. Unfortunately the fate of millions of tons of e-waste generated each year is largely unknown. The amount of old electronics or e-waste such as computers, phones and TV's being discarded every year is growing rapidly.



4. E-waste status in Bangladesh

When the earlier mentioned heavy metals and trash electronic items are dismantled without following effective controls in place, the hazardous compounds get released which affects human health and the environment adversely. Components which are not bio0degradable or cannot be recycled are dumped or burned in open those release toxic substance into the environment.

More than 30 millions of children, women and non-formal workers are exposed by heavy metals lead, mercury, cadmium, zinc and chromium, PCB, Dioxin and furan by these e-wastes.

4. 1 E-waste generated in Bangladesh

No inventory has been made to assess the extent of E-waste problem in Bangladesh. The good bellow generates E-waste in Bangladesh;

- Total number of PCs, TVs and Refrigerators in the year 2006 was 600,000, 1,252,000 and 2,200,000.
- The total number of TV sets users is roughly 10.3 million at the end of the year 2008. Every year around 59,85,000 TV sets become scrape and generated 88,357.14 metric tons of e-waste.
- The total number of mobile phone active subscribers in Bangladesh was 58.36million at the end of May 2010.
- Each year more than 2.8 million tons of electronic waste (it includes e-waste from 'ship breaking 'yard) generated in Bangladesh.
- E-waste generated from ship breaking yards about 2.5 million metric tons in a year.
- POPs: from ship breaking sites, PCB, Dioxin, Furan
- 10,504 metric tons of toxic e-waste by cell phone sets within last 21 years.
- Within the last 10 years IT sector generated 35,000 metric tons of e-waste in Bangladesh
- Our country's mobile phone penetration touched a record mark. Still a big market is untapped. We are creating a noticeable mobile phone density compared to those countries whose economic condition is better off than ours. We can easily guess on the basis of the number of subscribers that there are more than three core mobile phone sets in our country. Average longevity of a set is about one year. So every year we are dumping over one core mobile phone sets. Expectation of the mobile phone companies is to make five core subscribers before the end of this decade. Thus very soon we will dump two and half core mobile phones annually.

4.2 Specific Mercury containing product in Bangladesh:

<u>Consumer products:</u>	<u>Commercial products:</u>
<p>1. Home items: Antiques, barometers, clothes irons, electronics, jewelry, lamps/light bulbs, light switches, paint(Latex),pesticides, security system, shoes, sporting equipment, television sets, thermometers, mirrors, washing machines, calculators, hearing aids, toys, pacemakers, watches, cloth irons, desktop liquid crystal display(LCD) monitor, laptop LCD monitors, neon lights, sewer pipes, sink traps, fire alarm boxes, television sets,</p> <p>2. Medical pharmaceutical products: Antibiotics, contact lens solution, dental amalgam, sphygmomanometers, ear and eye drops/eye ointment, nasal spray, skin cream.</p> <p>3. Automotive parts:</p> <p>Convenience light switches, heated car rear windows, some anti-lock braking system.</p>	<p>1. Medical products:</p> <p>Antibiotics,batteries(medical use),alarms, blood analyzers, sphygmomanometers,pacemakers,pumps,scales,ultrasound,ventilators,gastrointestinal tubes, vaccines, hearing aids.</p> <p>2. Electric products:</p> <p>Building security system, fire alarm box switches, laptop LCD monitors, pressure control, light switches, thermometers, generators, sphygmomanometers, computer monitor.</p> <p>3. Chemical products:</p> <p>Acetic acid, ammonium, chloride, enzyme, sulfuric acid, ethanol</p>

4.3 E- waste concentration areas

In Dhaka the concentration or highest disposal /storage of E-waster are in Islampur, Kamrangirchar, Gingira, Mirpur (11, 12) and Mohammadpur etc.

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5. Recycling and disposal of E-waste:

The process of recycling in Bangladesh is very injurious and hazardous; there is no proper waste management guideline or regulation. Reuse of e-equipment is a common practice in Bangladesh. E-equipment recycling and dismantling is a growing business. No e-waste dismantling facility in formal sector. All the recycling is being carried out by the informal sector. 120,000 urban poor from the informal sector are involved in the recycling trade chain of Dhaka city. 15% of the total generated waste in Dhaka (mainly inorganic) which amounts 475 tones are recycled daily. Within this amount of waste only 20 to 35% recycled and rest laid in to landfills ,rivers, ponds, drains, lake ,cannels and open spaces.

6. Impacts due to the E- waste hazard:

6.1 Environment pollution:

Disposal of these E-wastes without appropriate measures can cause environmental pollution. Lack of awareness or lack of cautionary information for handling or re-using of these expiry products can leave people expose to health hazards. E-waste is threatening the soil contents and causing land less productive to produce crops.

Problems begin if this E-waste dumped in landfill sites or if they are dumped illegally. Either the law is not in place or not enforced to take proper disposal measures as well as the lack of system or institutions to monitor the dumping of electronic goods. The country is blessed by many rivers, rainwater is reaching the underground. If the substances dumped are seeping into the soil the aquifer of water can be contaminated with lethal chemicals.

6.2 Health hazards: (from e-waste containing mercury, lead, cadmium)

Mercury	Lead	Cadmium
<ul style="list-style-type: none">• *Brain disorders,• *Kidney, renal and neurological damage,• *Leading to even death.	<ul style="list-style-type: none">• *Learning disabilities,• *Mental retardation,• Behavioral problems,• Hearing impairment.	<ul style="list-style-type: none">• Lung damage,• *Fragility of bones,• High blood pressure,• *Nerve and brain damage,• *Kidney and liver disease.

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6.3 E-waste retailers and recycling in Dhaka city



7. Policy regime:

7.1 Law:

- ❖ Bangladesh adopted its National Environment Policy in the year of 1992 highlighting the regulating all activities that pollute and destroy the environment.
- ❖ No specific law or ordinance for e-waste management and recycling. But we have Bangladesh Environment Conservation Act, 1995, The Environmental Court Act, 2000, and The Environmental Conservation Rules, 1997.
- ❖ The Environment conservation act, 1995 authorize the Director General to undertake any activity necessary to conserve and enhance the quality of environment and to control, prevent and mitigate pollution.
- ❖ Medical Waste Management Rules, 2008 addresses the waste management issues for the medical sector including E-waste.
- ❖ No regulations specifically dealing with E-waste in Bangladesh.
- ❖ Government already prepared draft National 3R (Reduce Reuse and Recycle) Strategy and in that draft e-waste issues were addressed.
- ❖ Hazardous Waste Management Rules is under preparation and still time to incorporate E-waste management issues for proper management of E-waste among others.
- ❖ The Department of Environment prepared draft solid waste management rules which is now in consultation stage and still time to include E-waste management issues in that rule.
- ❖ Bangladesh is a signatory to Basel convention prohibiting trans-boundary movement to hazardous waste.
- ❖ Import of any kind of waste requires Government permission.
- ❖ The High Court of Bangladesh has directed the Department of Environment to ensure that all ship- breaking yards operating without environmental clearance shut down their operations. The court gave ruling in March'90.
- ❖ The High Court also directed the government to ensure that no ship with hazardous wastes enter the country without being pre-cleaned at source or outside the territory of Bangladesh.
- ❖ The court observed that none of ministries had co-operated to ensure conformity to the environmental laws. The order said the government had to ensure that ships were only broken after guaranteeing safe working conditions for the laborers and having in place appropriate disposal arrangement for hazardous wastes and protection of environment.

8. Conclusion and Recommendation:

Till now no effective steps to stop generating e-waste or strict disposal of this sludge. Following actions can be taken as part of way forward:

1. Inventory of E-waste in large cities of Bangladesh.
2. Develop E-waste policy and guideline with consultation with the relevant stakeholders.
3. Establish efficient collection system at least for selected electronic waste.
4. Registration and capacity development of E-waste recyclers.
5. Introduction of Environmental Management System in E-waste sector.
6. Establish E-waste tracking mechanism in order to update the inventory.
7. Awareness raising and development of communication material (poster, leaflets, brochure, TV spot).
8. Monitor e-waste trafficking and shipment

9. Acknowledgements

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Field survey findings data tables:**CFL BULB:**

Name of the companies	Yearly production/ per unit (2009-2010, up to June)	Yearly generated e-waste/ per unit (2009-2010, up to June)
Transcom	3200,000	31,58,400 (98.7%)
Energy pac	1600,000	15,83,840 (98.99%)
Other companies(Osaka, Onik, Delta, SKS, Rangs)	960,000	956,160(99.6%)
Total	57,60,000	= 56,98,400

Name of the companies	Last five year production/ per unit	Last five years generated e- waste/ per unit
Transcom	5253,313	52,00,254.538 (98.99%)
<u>Energy pac</u>	<u>2626,657</u>	<u>26,16,150.372 (99.6%)</u>
<u>Other companies(Osaka, Onik, Delta, SKS, Rangs)</u>	<u>1575,994</u>	<u>15,59,446.063 (98.95%)</u>
Total	94,55,964	93,75,850.973

Mercury /tub bulb:

Category	Number	No. of used mercury bulb up to 2010 June	No of generated / per unit e-waste up to 2010 June
_Household	2,6785,715	8,0357,145	78476787.807(97.66%)
Industrial sector		4,0178,572	<u>38925,000.553(96.88)</u>
Total		4,82142,866	11,74,01,788.36

*Note: All figures indicate single unit***Thermometer:**

year	Urban household/ per unit	Used thermometer (ten years)/ per unit	E- waste(ten years)/ per unit
1971	3,3615,120	3,3615,120	3,3615,120
1971-81	8,0920,800	8,0920,800	8,0920,800
1981-91	10,0309,667	10,0309,667	10,0309,667
1991-2001	16,6254,182	16,6254,182	16,6254,182
2001-2010	22,9195,469	22,9195,469	22,9195,469
Total		61,02,95,238	61,02,95,238
Within 39 years	(-3,36,15,120)	57,66,80,118	57,66,80,118

Note: All figures indicate single unit

Collective Samples of Questioners

Annex-B

Questionnaire for E- waste (In English)

Television Set

Importer (companies):

1. Which brand television set do you import?
2. From where do you import?
3. How many sets do you import in a year?
4. What's the warranty of a television set?
5. How many sets are sold in a year?

Assembler:

1. From where do you collect the parts of a television set?
2. How do you assemble these parts?
3. Where do you assemble these parts?
4. What will the warranty of a TV set be?
5. Where do you dump the rejected parts?

Retailer:

1. Which brand television set do you sell?
2. How many sets do you sell in a year?
3. What's the warranty of a television set?
4. Which brand set is more sustainable in using?

Repairer:

1. Which brand television set do you repairer more?
2. How many set do you repair in a year?
3. Do you know what types of heavy metals are in a TV set?
4. Where do you dump the rejected parts/sets

Computer

Importer:

1. Which brand computer set do you import?
2. From where do you import?
3. How many sets do you import in a year?
4. What's the warranty of a computer set?
5. How many sets/parts are sold in a year?

Retailer:

1. Which brand computer do you sell?
2. How many sets do you sell in a year?
3. Do you buy used computer?

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4. How many used computer do you buy in a year?
5. What's the warranty of a computer set?
6. Which brand set is more sustainable in using?

Assembler:

1. From where do you collect the parts of a computer set?
2. What will the warranty of a computer set be?
3. Where do you dump the rejected parts?

Repairer:

1. Which brand computer set do you repairer more?
2. How many set do you repair in a year?
3. Do you know what types of heavy metals are in a computer set?
4. Where do you dump the rejected parts/sets?

Institutions(Cyber café/ bank/office/Training centre):

1. Which brand is used in your organization?
2. How many years are you using these computers?
3. Are there computer here which have no warranty more?
4. Do you buy used computers for your organization?
5. From where do you buy used these sets?
6. How many used sets do you buy in a year?
7. Where do you dump the rejected parts of computer?

Mobile phones

Companies:

1. Which brand mobile set do you import?
2. From where do you import?
3. How many sets do you import in a year?
4. What's the warranty of a mobile set?
5. How many sets are sold in a year?

Retailer:

1. Which brand mobile set do you sell?
2. How many sets do you sell in a year?
3. How many non brand sets do you buy in a year?
4. How many non brand sets do you sell in a year?
5. What's the warranty of a mobile set?
6. Which brand set is more sustainable in using?

Repairer:

1. Which brand mobile set do you repairer more?

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2. How many set do you repair in a year?
3. Do you know what types of heavy metals are in mobile sets?
4. Where do you dump the rejected sets?

CFL Bulb

Owner of the Company

1. CFL bulb stands for ____?
2. When have you started marketing of it?
3. What's the yearly production of CFL bulb in your company?
4. What's the total rate of selling of CFL bulb in a year ?
5. How many days does a CFL bulb sustain?
6. What's the consumption rate of it in a year in total Dhaka city?
7. What is your safety measure during production of CFL bulb?
8. From where do you import the raw materials of CFL one?
9. Where do you dump the waste of CFL bulbs?

Retailer

1. CFL bulb stands for-----?
2. When have you started marketing of it?
3. From which company do you buy CFL bulb?
4. How many bulbs do you buy in a year?
5. What's the total rate of selling of CFL bulb in a year?
6. How many days does a CFL bulb sustain?
7. What's the consumption rate of it in a year in total Dhaka city?
8. Where do you dump the waste of CFL bulbs?

Consumer

1. CFL bulb stands for-----?
2. Why do you use this bulb?
3. How many bulbs do you use in a year?
4. How many days does a CFL bulb sustain?
5. Do you know which elements are used to produce a CFL bulb?
6. Where do you dump the waste of CFL bulbs?
7. Do you know the impact of dumping of CFL bulb on environment?

Questioner for E-waste (In Bangla)

Annex-C

CFL Bulb

এনার্জি সেভিংস বাল্ব:

সময়: ১০মিনিট

উৎপাদনকারী:

১. CFL বাল্ব সম্পর্কে আপনার ধারণা কি?

ক.বিদ্যুৎ অপচয় রোধ করে খ.দীর্ঘস্থায়ী গ. ধারণা নাই ঘ.অন্যান্য.....

২. কবে থেকে এ বাল্বের বাজারজাতকরণ শুরু করেন?

.....

৩. আপনার কোম্পানি বছরে কতটা CFL বাল্ব উৎপাদন করে?

.....

৪. এক বছরে কতটা CFL বাল্ব বিক্রি হয়?

.....

৫. একটি CFL বাল্ব কতদিন টেকসই হয়?

ক.৬ মাস খ.১ বছর গ.২ বছর ঘ.অন্যান্য....

৬. এক বছরে ঢাকা শহরে CFL বাল্বের মোট চাহিদা কত?

.....

৭. CFL বাল্ব উৎপাদনের সময় কি নিরাপত্তা ব্যবস্থা গ্রহন করেন?

ক. মাস্ক ব্যবহার করেন খ. আবর্জনা ছড়িয়ে ছিটিয়ে রাখা হয় না গ. অন্যান্য....

৮. কোথায় থেকে CFL বাল্ব তৈরির কাঁচামাল আমদানি করেন?

ক. ইসলামপুর খ. জিজিরা গ. মিরপুর ১১ ঘ.অন্যান্য....

৯. উৎপাদনের সময় CFL বাল্বের আর্বজনাগুলো কোথায় ফেলেন?

ক. ডাস্টবিন খ.গুদাম গ.যত্রতত্র ঘ.অন্যান্য.....

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খুচরা বিক্রেতা:

সময়: ১০মিনিট

১. CFL বাস্ব সম্পর্কে আপনার ধারণা কি?
ক.বিদ্যুৎ অপচয় রোধ করে খ.দীর্ঘস্থায়ী গ. ধারণা নাই ঘ.অন্যান্য.....
২. কবে থেকে এ বাস্বের বাজারজাতকরন শুরু করেন?
.....
৩. কোন কোম্পানি থেকে CFL বাস্ব ক্রয় করেন?
.....
৪. ছরে কতটা বাস্ব ক্রয় করেন?
.....
৫. এক বছরে কতটা CFL বাস্ব বিক্রি হয়?
.....
৬. একটি CFL বাস্ব কতদিন টেকসই হয়?
ক.৬ মাস খ.১ বছর গ.২ বছর ঘ.অন্যান্য....
৭. এক বছরে ঢাকা শহরে CFL বাস্বের মোট চাহিদা কত?
.....

ভোক্তা :

১. CFL বাস্ব সম্পর্কে আপনার ধারণা কি?
ক.বিদ্যুৎ অপচয় রোধ করে খ. দীর্ঘস্থায়ী গ. ধারণা নাই ঘ.অন্যান্য.....
২. কেন এ ধরনের বাস্ব ব্যবহার করেন?
ক.বিদ্যুৎ অপচয় রোধ করে খ.দীর্ঘস্থায়ী গ. খরচ কমায় ঘ.অন্যান্য.....
৩. বছরে কতটা CFL বাস্ব ব্যবহার করেন?
.....
৪. একটি CFL বাস্ব কতদিন টেকসই হয়?
ক.৬ মাস খ.১ বছর গ.২ বছর ঘ.অন্যান্য....
৫. আপনি জানেন কি CFL বাস্ব কি কি উপাদানের সমন্বয়ে তৈরি?
.....
৬. বাস্ব গুলো নষ্ট হলে কোথায় ফেলে দেন?
ক. ডাস্টবিন খ.স্টোররুম গ.যত্রতত্র ঘ.অন্যান্য.....
৭. পরিবেশের ওপর CFL বাস্বের ক্ষতিকর দিক সম্পর্কে আপনি কি জানেন?
.....

Television

সময়: ১০ মিনিট

১. কোন ব্র্যান্ডের টেলিভিশন সেট আপনি আমদানি করেন?

ক) খ) গ) ঘ) অন্যান্য

২. কোথায় থেকে আমদানি করেন?

ক. ভারত খ. তাইওয়ান গ. চীন ঘ. জাপান ঙ. মালয়েশিয়া

৩. এক বছরে কতগুলো সেট আমদানি করেন?

.....

৪. সাধারণত কত বছরের জন্য একটি টেলিভিশন সেটের ওয়ারেন্টি দেওয়া হয়?

ক. ২ থেকে ৫ বছর খ. ৫ থেকে ১০ বছর গ) আরো বেশী

৫. এক বছরে কতগুলো সেট বিক্রয় করেন?

.....

সময়: ১০ মিনিট

১. কোন ব্র্যান্ডের টিভিসেটে আপনি বিক্রয় করেন?

ক)খ)গ)

২. এক বছরে কতগুলো সেট বিক্রয় করেন?

.....

৩. একটি টিভিসেটের ওয়ারেন্টি কত বছরের হয়?

৪. ক.২ থেকে ৫ বছর খ. ৫ থেকে ১০ বছর গ) আরো বেশী

সময়: ১০ মিনিট

১. একটি টিভিসেটের বিভিন্ন যন্ত্রাংশ কোথায় থেকে সংগ্রহ করেন?

.....

২. আপনি কিভাবে যন্ত্রাংশগুলোকে একত্রিত করেন?

.....

৩. আপনি কোথায় এ কাজটি করেন?

.....

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৪. একটি টিভিসেটের ওয়ারেন্টি কত হয়ে থাকে সাধারণত?

ক. ২ থেকে ৫ বছর

খ. ৫ থেকে ১০ বছর

গ) অন্যান্য

৫. বাতিল যন্ত্রাংশগুলো কোথায় ফেলে দেন?

ক. ডাস্টবিন

খ. গুদাম

গ. যত্রতত্র

ঘ. অন্যান্য.....

মেরামতকারী:

সময়: ১০ মিনিট

১. কোন ব্র্যান্ডের টিভিসেট আপনি বেশি মেরামত করেন?

.....

২. এক বছরে কতগুলো সেট মেরামত করেন?

.....

৩. আপনি কি জানেন টিভিসেটগুলোতে কি কি ভারী পদার্থ থাকে?

.....

৪. বাতিল সেটের অংশ/সেটগুলো কোথায় ফেলে দেন?

ক. ডাস্টবিন

খ. গুদাম

গ. যত্রতত্র

ঘ. অন্যান্য.....

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Computer

প্রতিষ্ঠান (সাইবার ক্যাফে/ ব্যাংক/অফিস/ প্রশিক্ষণ কেন্দ্র):

সময়: ১০ মিনিট

১) কোন ব্র্যান্ডের কম্পিউটার সেট আপনার প্রতিষ্ঠানে ব্যবহার করেন?

.....

২) কত বছর ধরে কম্পিউটার সেটগুলো ব্যবহার করছেন?

ক. ৩ থেকে ৫ বছর

খ. ৫ থেকে ১০ বছর

গ. অন্যান্য... ..

৩) আপনার প্রতিষ্ঠানে ওয়ারেন্টি বিহীন কম্পিউটার আছে কি না?

ক. হ্যাঁ

খ. না

৪) আপনি কি ব্যবহৃত কম্পিউটার ক্রয় করেন?

ক. হ্যাঁ

খ. না

৫) কোথা থেকে ক্রয় করেন? (প্রযোজ্য হলে)

.....

৬) এক বছরে কতগুলো ব্যবহৃত কম্পিউটার ক্রয় করেন?

.....

৭) বাতিল সেটের অংশ/সেটগুলো কোথায় ফেলে দেন?

ক. ডাস্টবিন

খ. গুদাম

গ. যত্রতত্র

ঘ. অন্যান্য.....

আমদানিকারক(কোম্পানি) :

সময়: ১০ মিনিট

১. কোন ব্র্যান্ডের কম্পিউটারসেট/ যন্ত্রাংশ আমদানি করা হয়?

ক)

খ)

গ)

২. কোথায় থেকে আমদানি করেন?

ক. তাইওয়ান

খ. চীন

গ) অন্যান্য

৩. এক বছরে কতগুলো সেট আমদানি করেন?

.....

৪. সাধারণত কত বছরের জন্য একটি কম্পিউটারসেট ওয়ারেন্টি দেওয়া হয়?

ক. ৩ থেকে ৫ বছর

খ. ৫ থেকে ১০ বছর

৫. এক বছরে কতগুলো সেট বিক্রয় করেন?

.....

খুচরা বিক্রেতা :

১. কোন ব্র্যান্ডের কম্পিউটারসেট/ যন্ত্রাংশ বিক্রি করা হয়?
.....
২. এক বছরে কতগুলো সেট বিক্রি করেন?
.....
৩. এক বছরে কতগুলো ব্যবহৃত কম্পিউটার ফ্রয় করেন?
.....
৪. সাধারণত কত বছরের জন্য একটি কম্পিউটারসেট ওয়ারেন্টি দেওয়া হয়?
ক.৩ থেকে ৫বছর খ. ৫ থেকে ১০ বছর
৫. ব্যবহারের ক্ষেত্রে কোন ব্র্যান্ডের কম্পিউটার সেট অধিক টেকসই হয়?

১. একটি কম্পিউটার সেটের বিভিন্ন যন্ত্রাংশ কোথায় থেকে সংগ্রহ করেন?
.....
২. আপনি কি ব্যবহৃত কম্পিউটার ক্রয় করেন?
ক. হ্যাঁ খ. না
৩. সাধারণত একটি কম্পিউটার সেটের ওয়ারেন্টি কত বছরের হয়ে থাকে ?
.....
৪. বাতিল সেটের অংশ/সেটগুলো কোথায় ফেলে দেন?
ক. ডাস্টবিন খ. গুদাম গ. যত্রতত্র ঘ. অন্যান্য.....

১. কোন ব্র্যান্ডের সেট আপনি বেশি মেরামত করেন?
.....

২. এক দিনে কতগুলো সেট মেরামত করেন?
.....

৩. আপনি কি জানেন সেটগুলোতে কি কি ভারী পদার্থ থাকে?
.....

৪. বাতিল সেটের অংশ/সেটগুলো কোথায় ফেলে দেন?
ক. ডাস্টবিন খ. গুদাম গ. যত্রতত্র ঘ. অন্যান্য.....

Study Report; E-waste: Bangladesh Situation,

Mobile phone sets

মোবাইল সেট:

সময়: ১০মিনিট কোম্পানি :

১. কোন ব্র্যান্ডের মোবাইল সেট আপনি আমদানি করেন?

ক. নকিয়া

খ. সনি এরিকসন

গ. স্যামসাং

ঘ. অন্যান্য.....

২. কোথায় থেকে আমদানি করেন?

ক. চীন

খ. হাঙ্গেরী

৩. এক বছরে কতগুলো সেট আমদানি করেন?

.....

৪. সাধারণত কত বছরের জন্য একটি মোবাইল ফোনের ওয়ারেন্টি দেওয়া হয়?

ক. ১ বছর খ. ২ বছর গ. ৩ বছর ঘ. অন্যান্য....

৫. এক বছরে কতগুলো সেট বিক্রয় করেন?

.....

খুচরা বিক্রেতা:

১. কোন ব্র্যান্ডের মোবাইল সেট আপনি বিক্রয় করেন?

ক. নকিয়া

খ. সনি এরিকসন

গ. স্যামসাং

ঘ. অন্যান্য.....

২. এক বছরে কতগুলো সেট বিক্রয় করেন?

.....

৩. আপনি বছরে কতটা নন ব্র্যান্ড মোবাইল সেট ক্রয় করেন?

.....

৪. আপনি বছরে কতটা নন ব্র্যান্ড মোবাইল সেট বিক্রয় করেন?

.....

৫. সাধারণত কত বছরের জন্য একটি মোবাইল ফোনের ওয়ারেন্টি দেওয়া হয়?

ক. ১ বছর

খ. ২ বছর

গ. ৩ বছর

ঘ. অন্যান্য....

৬. ব্যবহারের ক্ষেত্রে কোন ব্র্যান্ডের মোবাইল সেট অধিক টেকসই হয়?

ক. নকিয়া

খ. সনি এরিকসন

গ. স্যামসাং

ঘ. অন্যান্য.....

Dental Equipments

পাইকারি বিক্রেতা:

১. কোন ধরনের মেডিকেল যন্ত্রপাতি আপনি আমদানি করেন?
.....
২. কোন কোন দেশ থেকে আমদানি করেন?
১. যুক্তরাষ্ট্র ২. জার্মানি ৩. জাপান ৪. অন্যান্য.....
৩. এক বছরে আমদানি হার কত?
.....
৪. এক বছরে আপনি কত যন্ত্রপাতি সরবরাহ করেন?
.....
৫. কোথায় কোথায় সরবরাহ করেন?
ক. ক্লিনিক খ. হাসপাতাল গ. ডাক্তারের প্রাইভেট চেম্বার
৬. যন্ত্রাংশগুলো কত বছর ধরে ব্যবহার করা যাবে?
ক. ২ থেকে ৫ বছর খ. ৫ থেকে ১০ বছর গ. অন্যান্য
৭. যন্ত্রাংশগুলোর গ্যারান্টি কত বছরের?
ক. ২ থেকে ৫ বছর খ. ৫ থেকে ১০ বছর গ. অন্যান্য.....

ডাক্তার:

১. চিকিৎসা প্রদানের সময় আপনি কোন ব্র্যান্ডের যন্ত্রপাতি ব্যবহার করেন?
.....
২. কত বছর ধরে যন্ত্রপাতিগুলো ব্যবহার করেন?
ক. ২ থেকে ৫ বছর খ. ৫ থেকে ১০ বছর গ. অন্যান্য.....
৩. আপনি কি মেয়াদউত্তীর্ণ যন্ত্রপাতি ব্যবহার করেন?
ক. হ্যাঁ খ. না
৪. বাতিল যন্ত্রপাতি কোথায় ফেলে দেন?
ক. ডাস্টবিন খ. গুদাম গ. যত্রতত্র ঘ. অন্যান্য.....

Medical Equipments

আমদানিকারক:

১. কোন ধরনের মেডিকেল যন্ত্রপাতি আপনি আমদানি করেন?
.....
২. কোন কোন দেশ থেকে আমদানি করেন?
যুক্তরাষ্ট্র ২.জার্মানি ৩.জাপান ৪.অন্যান্য.....
৩. এক বছরে আমদানি হার কত?
.....
৪. এক বছরে আপনি কত যন্ত্রপাতি সরবরাহ করেন?
.....
৫. কোথায় কোথায় সরবরাহ করেন?
ক. ক্লিনিক খ. হাসপাতাল গ. ডাক্তারের প্রাইভেট চেম্বার
৬. যন্ত্রাংশগুলো কত বছর ধরে ব্যবহার করা যাবে?
ক.২ থেকে ৫বছর খ. ৫ থেকে ১০ বছর গ. অন্যান্য.....
৭. যন্ত্রাংশগুলোর গ্যারান্টি কত বছরের?
ক.২ থেকে ৫বছর খ. ৫ থেকে ১০ বছর গ. অন্যান্য.....

খুচরা বিক্রেতা:

১. কোন ধরনের মেডিকেল যন্ত্রপাতি আপনি ক্রয় করেন?
.....
২. কোন ব্র্যান্ডের যন্ত্রপাতি আপনি ক্রয় করতে আপনি পছন্দ করেন?
.....
৩. এক বছরে কত যন্ত্রাংশ ক্রয় করেন?
.....
৪. এক বছরে আপনি কত যন্ত্রপাতি সরবরাহ করেন?
.....
৫. কোথায় কোথায় সরবরাহ করেন?
ক. ক্লিনিক খ. হাসপাতাল গ. ডাক্তারের প্রাইভেট চেম্বার
৬. যন্ত্রাংশগুলোর গ্যারান্টি কত বছরের?
ক.২ থেকে ৫বছর খ. ৫ থেকে ১০ বছর গ. অন্যান্য.....

