Environment friendly & socially responsible

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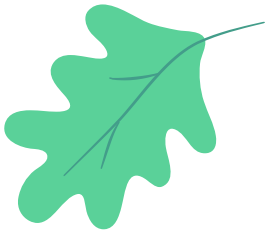
The Green Road
"Environment friendly & Socially responsible"

CONCEPT

Solid waste management is the thrust area. Of this various waste materials, plastic waste and municipal solid waste are of great concern. On the other side, the road traffic is increasing. The traffic intensity is increasing. The load bearing capacities of the road are to be increased. Our proposal has been the answer in taking care of both these aspects.



What is the problem?

Bhutan as a whole produces 100's of tonnes of plastic waste everyday.

- ❑No recycling company.
- ❑Limited technology on the use of waste plastic.
- ❑No proper integrated waste management.
- ❑Lack of advocacy.
- ❑Waste as whole is not considered a lucrative business.

Waste management hierarchy

Source: UNEP, Green Economy Report, 2011.

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THE GREEN ROAD

The Green Road is Bhutan's first recycling company that utilizes waste plastic in construction of durable and environment friendly roads. started in October 2014, the company has blacktopped **130 kilometers** of road and reused **700 tonnes** of waste plastics and replaced the same in the consumption of bitumen.

OUR SOLUTIONS

Proper disposal of waste plastic

Better and durable roads

Import substitution of bitumen

Cost saving in repair & maintenence

COLLECTION FROM MEMELHAKHA LANDFILL

TOWN COLLECTION

SEGREGATION.

SHREDDING PROCESS.

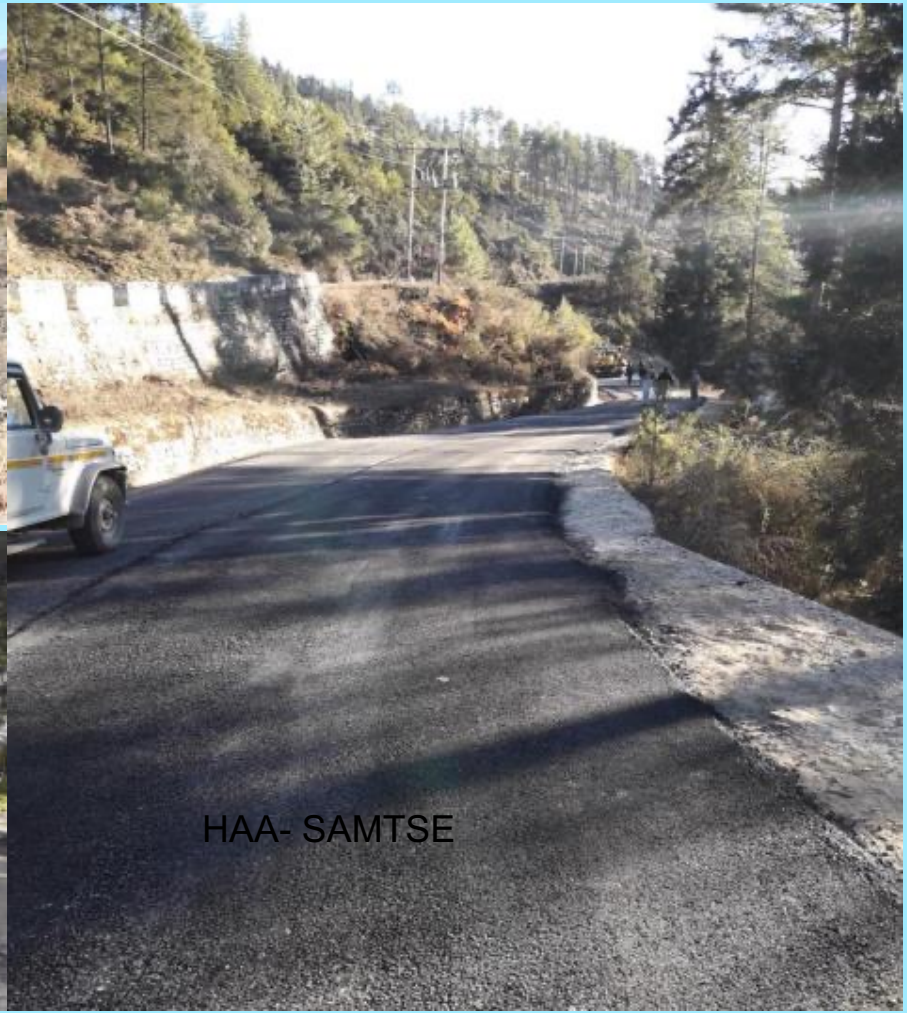
- Waste is shredded between 2 to 4 mm.

This plastics gets coated over the aggregate uniformly.

The mixture is transferred to the road and the road is laid.

Simtokha

Geptay, Paro



Characteristic of plastics coated aggregate

- Easy process without any new machinery
- On site process
- Both Mini Hot Mix Plant and Central Mixing Plant can be used
- Only aggregate is polymer coated and bitumen is not modified
- Use of 60/70 and 80/90 bitumen is possible
- No evolution of any toxic gases like dioxin.
- A gas evolution and thermal degradation of thermoplastics has been indicated beyond 220C by the Thermo Gravimetric Analysis (TGA).

BASIC ADVANTAGES

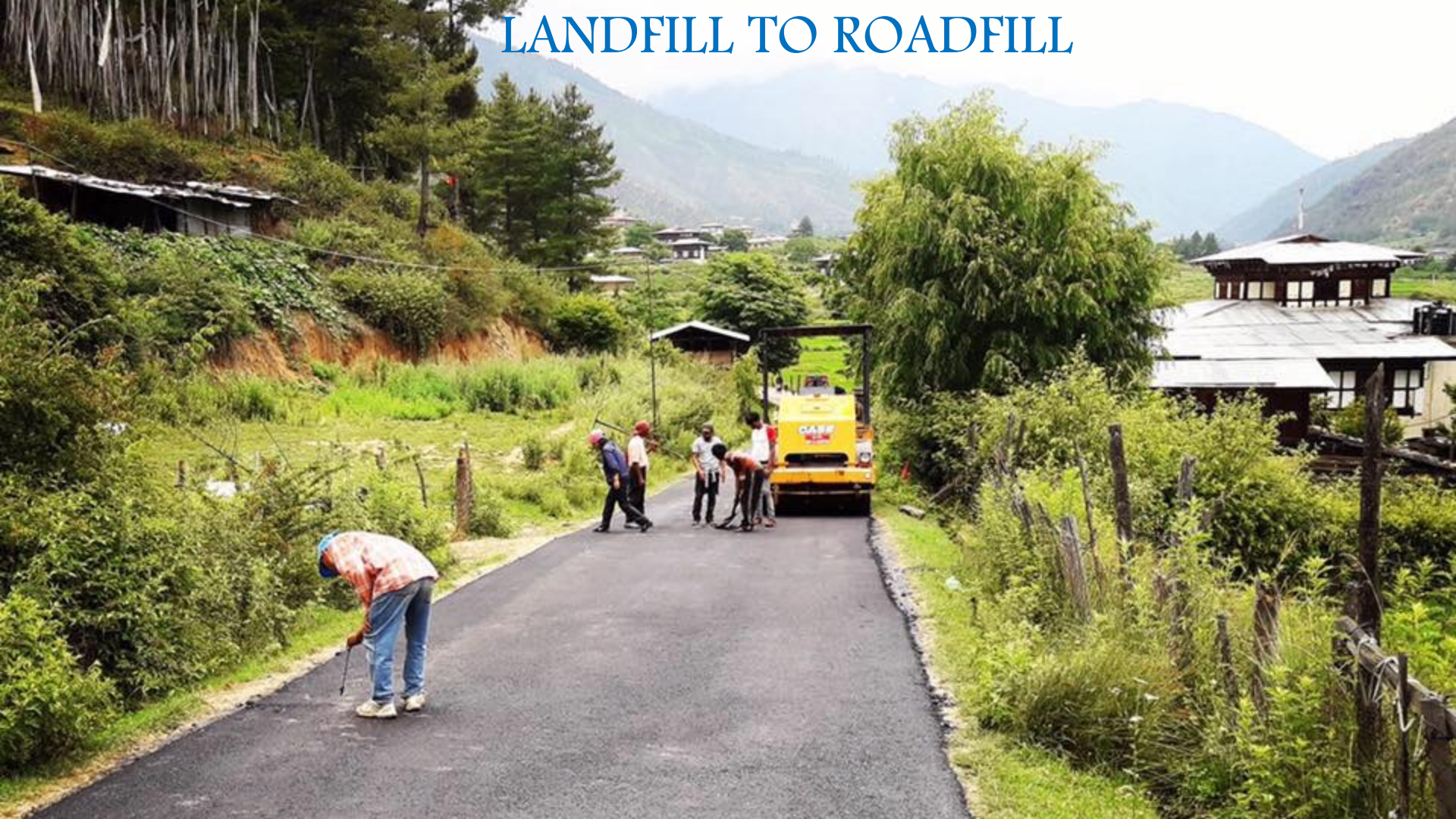
- Marshall Stability Value. IRC-:SP:98-2013
- Better resistance towards rain water stagnation.
- No stripping and no potholes.
- Increase binding and better bonding of the mix.
- Reduction in pores in aggregate and hence less rutting and raveling.
- No leaching of plastics.
- No effect of radiation like UV.
- The strength of the road is increased.
- The load withstanding property increases. It helps to satisfy today's need of increased road transport.
- For 1km × 3m road, 1 ton of plastic is used and 1 ton of bitumen is saved.
- Value addition to the waste plastics.
- The maintenance cost is almost nil up to five years
- Disposal of waste plastic will no longer be a problem.

Comparison between ordinary Bituminous Roads and waste plastic Bituminous Roads:

Sl. No	Properties	Plastic Road	Ordinary Road
1	Marshall Stability Value	More	Less
2	Binding Properties	Better	Good
3	Softening point	less	high
4	Penetration Value	More	Less
5	Tensile Strength	High	Less
6	Rutting	Less	More
7	Stripping (Potholes)	No	yes
8	Seepage of water	No	Yes
9	Durability of Road	Better	Good
10	Cost of pavement	Less	Normal
11	Maintenance cost	Very less	More
12	Environmental friendly	Yes	YES

Present Stock at Factory

LANDFILL TO ROADFILL



ROADMAP & TRACTION.

-Bhutan's Best Entrepreneur award 2017
-Winner of the Lemon Ideas 2020 held in Nagpur, India among 6000 participants.
-Winner of the low Carbon lifestyle challenge of the United Nation Environment program 2020.
-Winner of the first Bhutan-India startup Summit 2020.
-Winner of Asia's No.1 Brand Leadership Excellence Awards Asia's Entrepreneur Awards (TOP HONOURS)
-Global Change makers award – 2020
-Sustainability Entrepreneur award sponsored by P&G and awarded by Enterprise Singapore- 2020
-Entrepreneurship World Cup regional winner 2021, TOP 100 cohort
-Employment for 65 permanent staffs.
-Meaningful Business 100 award recognizing leaders combining profit and purpose to help achieve the UN Global Goals 2021.

TOTAL ROADS WITH WASTE PLASTICS.

SL NO	PLACE	AREA	DATE
1	Olarongchu, above workshop	150 meters 8 meters width	5th October 2015
2	Simtokha highway. Yangkhil Construction pvt ltd.	1 km, 8 meters width	October 2015
3	Simtokha-Hongtsho. Raven Builders.	10km, National highway	March , 2016
4	Geptay and Dotey. CN construction.	12 kms(GC road)	June 2016
5	Commando wing, Shaba, Paro.	8000 sq meters(internal road)	February 2017
6	Dechenchholing Goenpa. Neten Construction pvt ltd.	2.3 kms	February 2018
7	Upper Babesa. Neten Construction pvt ltd.	3 kms	September 2018
8	Jenkhana- Khamina road. With four Contractors.	Haa- Samtse Secondary Highway. (80.5kms)	Commenced on November 2017
9	Thimphu	BBS Road, RO Thimphu 1.3kms	July 2019
10	Thimphu	Taba &Changlimithang. 2 kms	July 2019
11	Paro	Dotey till Ta Dzong 4ms	June 2019
12	Private & AC supply	Private roads, parking, Mowhs parking, supply of AC mix to private contractors 10kms	June 2019till September 2020
13	Chanjiji housing colony, NHDCL	15000 sq meter	September 2020
14	Gedu, NH, Dantak	4.5 kilometers	October 2019

OUR PARTNERS

Department of Roads	Municipal (Thromde)	Private waste managment
The public sector that tender outs road works for private contractors	MoU signed with municipal to manage and collect waste plastics from source and landfills across the country. 1. Thimphu Thromde 2. Phuentsholing Thromde 3. S/Jongkhar Thromde 4. Gelephug Thromde	20% of the waste plastics are purchased from pvt scrap dealers @ Nu.10/kg
PARTNER	**PARTNER**	**PARTNER**

Landfill
Before & After

English | Dzongkha

Thimphu Thromde increases lifespan of Memelakha landfill

Tshering Dendup, Thimphu
May 9, 2019

To increase the lifespan of the Memelakha landfill, the Thimphu Thromde recently carried out a major renovation. The lifespan has now been increased by more than four years.

The dry wastes collected from houses and other sources do not directly go to the landfill. It goes through the waste recovery centre where wastes with values are recycled and segregated.

During the landfill renovation works, The Green Road, a private company, which uses the plastics for blacktopping roads, recovered about 170 metric tons of dry plastics.

The rest of the wastes were compressed and kept at the landfill.

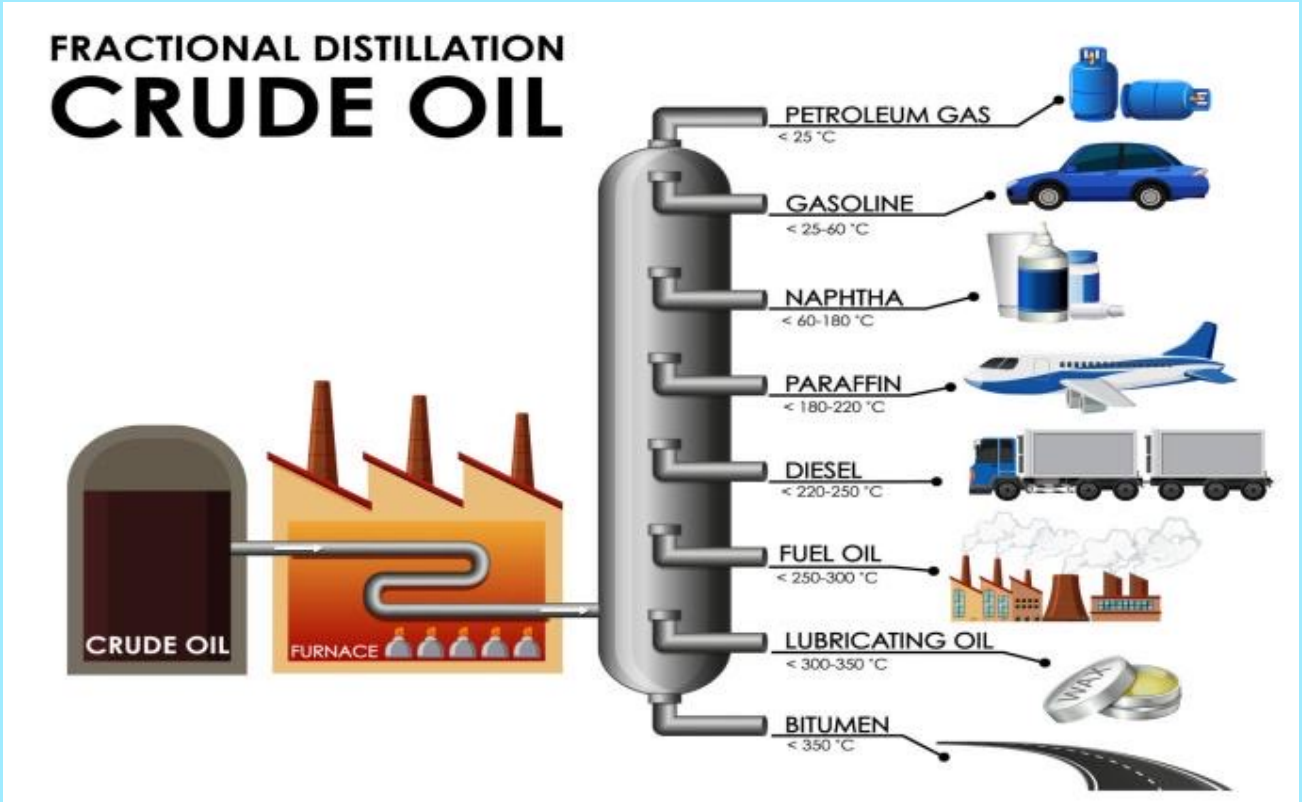
"Last year we conducted a survey in collaboration with the Japan Environment Sanitation Centre to check the life span of the landfill. As we don't have space for constructing other landfills, we manage the best we can and increased the lifespan by 4 and a half years," Tshering Yangzom, the Environmental Officer of Thimphu Thromde, said.

As part of the renovation, bamboos were also planted to enhance the aesthetic beauty of the place. Thimphu Thromde also plans to erect pipes to enhance faster decomposition of the wastes as the pipes let the oxygen in.

The memelakha landfill was first constructed in 1994 with an initial lifespan of 8 years.

Plastics in road.

Plastics used in road are basically hydrocarbons when melted at 170 degrees changes back to asphalt.



KNOW YOUR MICROPLASTICS

MICROPLASTICS ARE PIECES OF PLASTIC 5 MILLIMETRES OR SMALLER.

COMMON MICROPLASTICS:

FRAGMENTS

Small pieces of a larger plastic object.

FIBRES

The most common type of microplastic. Plastic strands from clothing.

FOAM

Pieces of food containers and coffee cups.

NURDLES

Plastic pellets usually used in manufacturing.

MICROBEADS

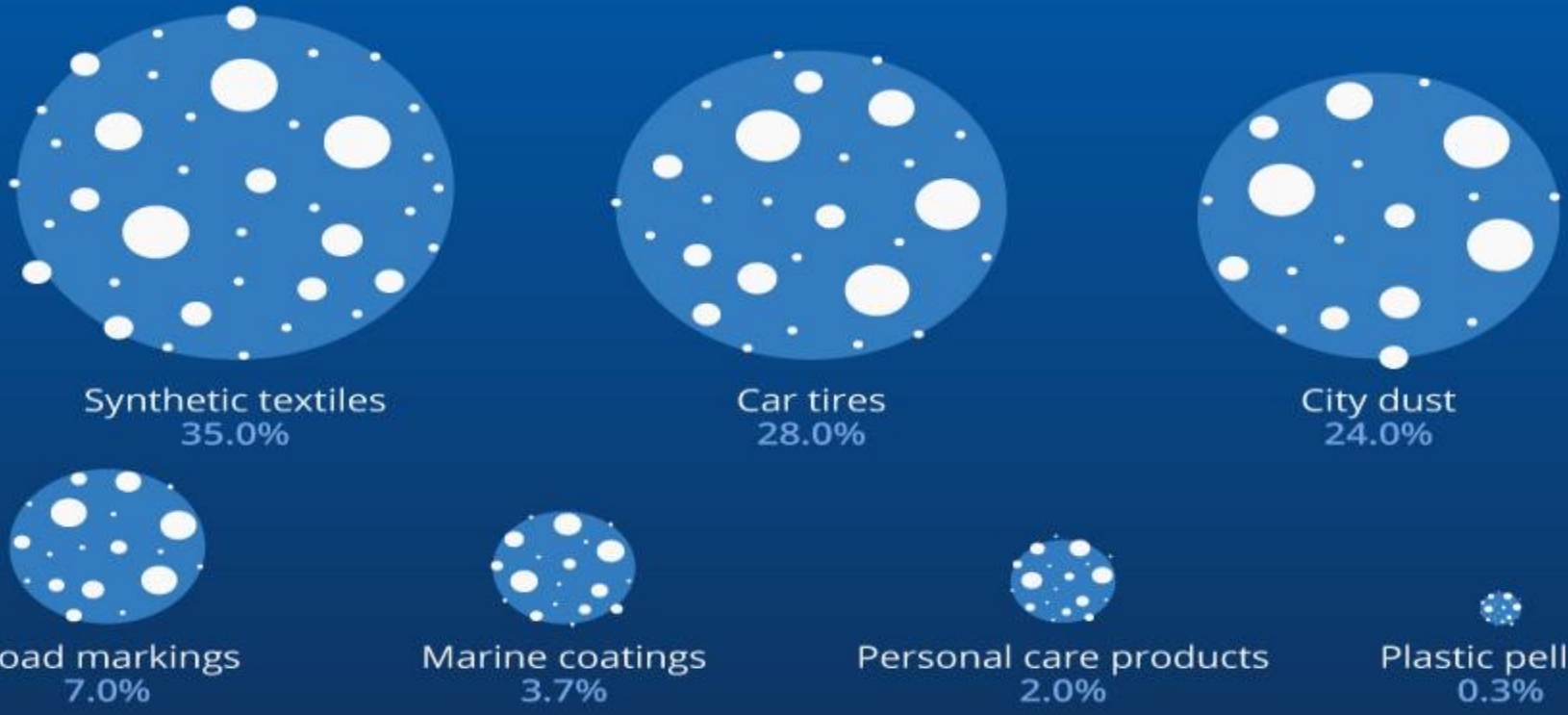
Beads used in soaps and cosmetics. Now labelled "toxic" in Canada, soon to be banned in personal care products. Look for "poly" on the label.

MACROPLASTICS ARE ANY PLASTICS LARGER THAN 5 MILLIMETRES.

Examples: plastics bags, bottle lids, bottles, food wrappers, etc.

Where Do the Oceans' Microplastics Come From?

Distribution of sources of microplastics in the world's oceans



Source: International Union for Conservation of Nature

Training institute

- 65 employment out of which 28 are employed through Build Bhutan Project.
- Training on various machineries like asphalt plant, roller, paver etc.
- Laying of road.
- Applied for an additional of 12 youths through BBP.
- Similar set up of asphalt plant in other Thromdes
- Mechanized plastic through conveyor.
- HL-WAX technology by Mitsui Chemicals, Japan

AWARD

BEST ENTREPRENEUR OF THE YEAR 2017

BHUTAN

In Pictures

THE GREEN ROAD FOR ENVIRONMENT FRIENDLY AND SOCIALLY RESPONSIBLE FUTURE.
THANK YOU.
Email us at:

rikshades@gmail.com
+975 77764476

video: https://www.youtube.com/watch?v=kuMJBoJA-xk&list=LLygtiUE6wYFztKQrgK_v9Ww&index=13&t=0s
Face book: https://www.facebook.com/RICKSHADES/
face book The Green Road: https://www.facebook.com/roadforchange

The Green Road

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Locally made machines that can up cycle hard plastics.

EXTRUSION

INJECTION

COMPRESSION

PLASTIC

The Green Road

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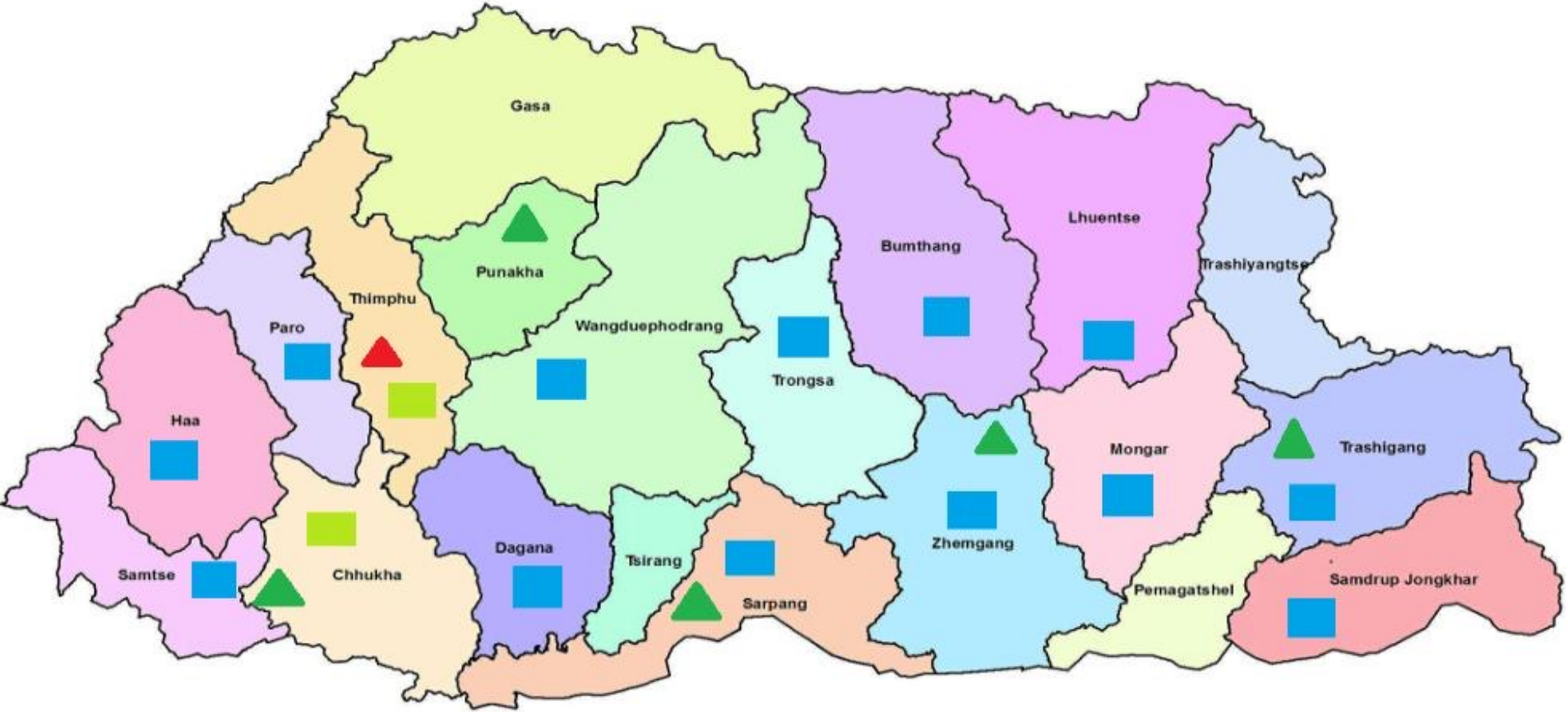
FENCING POLES

Flower pots. Nu. 30 million import annually.

Plans for next 2 years



Asphalt plant installed

Asphalt plant to be installed

Shredding unit installed

Shredding unit to be installed