

Development of handmade environmentally friendly container for Cambodia using sugarcane fiber and traditional Japanese paper making technique

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Background

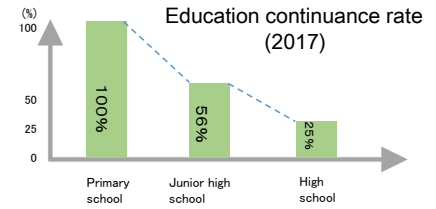
Can sugar cane and Japanese paper save Cambodia?!



No garbage box
No Garbage collection
No public wastes disposal facility

→ **The garbage issue in Cambodia is an environmental issue to be solved**

Collaboration



Purpose of research

Papermaking → education

Papermaking and forming containers using only plants

Children produce and sell them to the food stalls

They become interested in environmental problems and earn school administration fund

Research method

To achieve the initial research purpose

Searching Literatures From Books, and reports

Conduct an interview with Japanese traditional expert papermaker, Mr. Tsukahara

Papermaking with Bagasse



Result

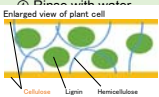
Developed method of making bagasse paper

3 important materials



Bagasse

- ① Removing knots
- ② Boil in boiled water | 3h
- ③ Boil in alkaline liquor | 3h



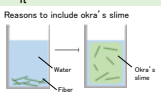
Paper pack

- ① Boil for 20min
- ② Peel the printed surface, label and coated inner side
- ③ Tear up strips of it

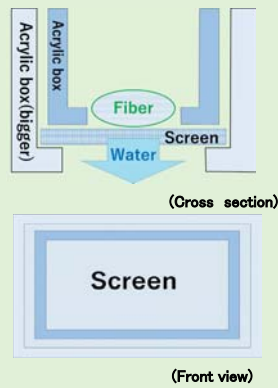


Okra's slime

- ① Chop okras
- ② Soak in water (5okra:30cc):1h
- ③ Put them in cloth bag and squeeze it



The construction of papermaking implement



Procedure for papermaking

- ① Put the 3 materials in box with water
- ② Stir them
- ③ Put the implement in ② and skim fiber off
- ④ Hold it horizontally until water stop dripping
- ⑤ Take out the screen slowly, reverse it and put on newspaper
- ⑥ Push ⑤ with a cloth to absorb its moisture
- ⑦ Remove the screen and dry the fiber sheet



Consideration

Advantages of bagasse paper

Paper made with only plants (Bagasse and Okra)

they do not remain on the ground unlike plastic container.

it would be nutritious for crops.

It may be possible to make it with fewer steps

If we used squeezed fresh sugar cane, we will not need to boil it for such a long time.

Conclusion

What we propose

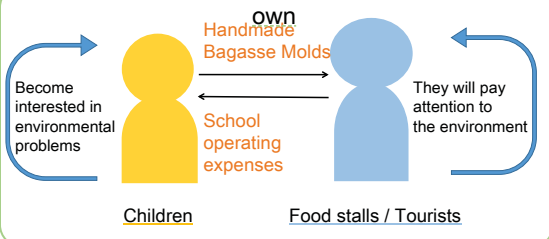
We were able to make paper with sugarcane fiber

It is possible to recycle and effectively utilize sugarcane thrown away as wastes in Cambodia

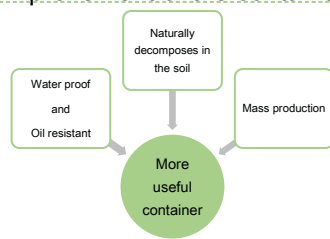
Future research

Improvement of the container and its application

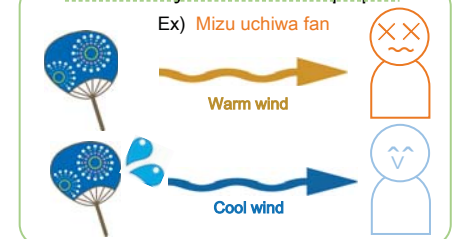
Mechanism to solve garbage problem on its



Improvement of the container



Other ways to use the paper



In Bayon Junior High School.....

In the morning	2 nd grade students	3 rd grade students
Evening	1 st grade students	Supplementary Classes

Teacher's hourly wage | \$10/h
Number of teachers required | 4 teachers
Length of the class | 2h
Frequency of the class | 3times/week

The necessary expense
1 container \$1000/total (\$0.25) × 960/week

What is the purpose of the supplementary classes?

→ To increase the rate of Education continuance

Bibliography

- Tokushima Prefectural Museum Official website Section exhibit "Paper making with familiar plants" <http://www.museum.tokushima-ec.ed.jp/ogawa/kami/tenji2013/index.html>
- The 3rd National Youth Environmental Activity Presentation Competition Environment Minister's Award Iwate prefecture Tono RYokuho high school activity detail http://www.erca.go.jp/ifge/youth/challenge/ear_03.html
- Japanese Ministry of Foreign Affairs HP www.mofa.go.jp/mofaj/
- Japanese Ministry of the Environment <https://www.env.go.jp/earth/coop/lowcarbon-asia/region/cambodia.html>