

Life Cycle Assessment of Rice Farm Considering Plastic Pollution Aspects

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Introduction

Problem of marine plastic has been paid off entire in the world. Especially Microplastics(The size is smaller than 5mm) cause serious problem. because It effects noticed internal organs of animal and it also adsorbed chemical substances.

Pirika.inc noticed that artificial grass and CRF were found a lot in Japanese river. CRF mainly used paddy-field in Japan. This is widely applied for the purpose of conditioning soil and reduction amount of spread fertilizer.



↑CRF at paddy-field



↑CRF at river mouth

Methodology

I surveyed at 13 places by Tone-river and Ara-river at august in Japan. 3 places also has survey bottom.

I note survey procedure.

- 1:Lowering the albatross by surface river from bridge.
- 2:Keep at surface river 3minits. 3:Raise the albatross.
- 4:Remove the net equip with albatross. 5:After bringing back the contents of net, I analyzed it about thickness, width, material.

After collecting floating CRF data at target river, I try calculate amount of discharge CRF to sea from land(paddy-field).

I note calculate procedure.

- 1:calculate CRF number concentration(number/L-flow at 3 minutes) in August.
- 2:Using result of existing research¹⁾, I estimated CRF number concentration in river monthly.
- 3:monthly number concentration multiple monthly flow rate at target basin.

Conclusion & Discussion

- Using CRF, GHG emission 10%-20% than only use chemical fertilizer in rice farming. Meanwhile, It can estimate 8g-capsule are discharge to sea per year.
- This research's result (amount of capsule) is 8million times than existing research¹⁾. Because Fewer Corrected fertilizer points and late survey schedule.

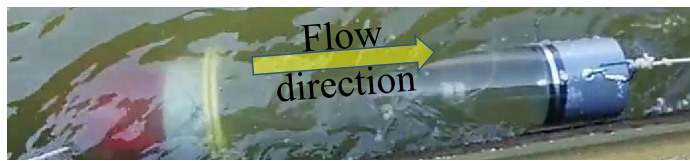
Material

- Environmental research

I used "Albatros" productid by Pirika.inc. This is developed to collect micro plastic efficiency. This machine enables us to collect a river water by motor better than conventional net correction system.

- Evaluation to lice farm

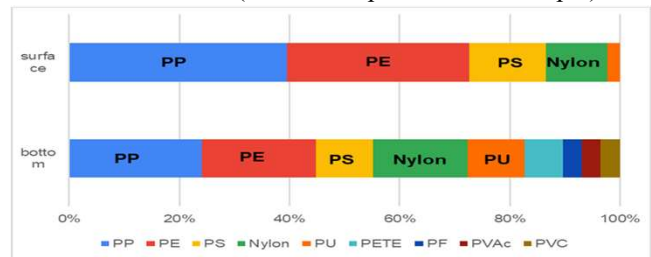
We carried out comparative evaluation about rice farming in Japan, conventional system(without CRF) and reduction of fertilizer(With CRF). We used Simapro for the evaluation of environmental performance of life cycle of rice.



←Albatros

Results

- I could find 5 CRF(total micro plastics : 201 sample).

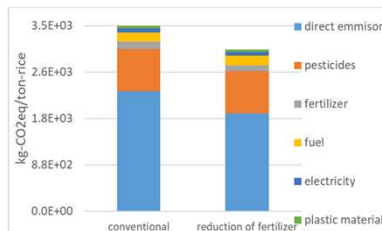


↑material concentration surface vs bottom

- Material concentration of surface-water is mainly PE,PP(60%)
- Bottom is accumulated at material(SG over 1) and PE,PP(40%).

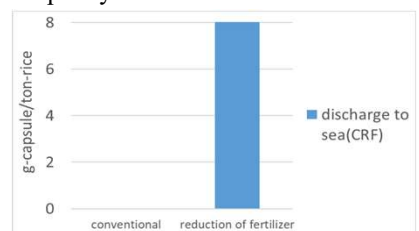
GHG emission

- Using CRF, GHG emission Reduced by 10% than Conventional system.



Discharge to sea(CRF)

- Using CRF, It can estimate that discharge 8g-capsule to sea from basin paddy-field.



Future work

- It should be survey about CRF at May-July and shoreline and drainage from paddy-field and soil in farmland.
- It should consider basin area above survey point.

Reference

- 1)Katsumi N et al. (2021), Chemosphere,Vol279

