◊　ポスタープレゼンテーション要旨

発表番号 1 番（1 年国際コース）
テーマ：　Protecting The Ecosystem ~ Life on Land~
発表者:　横山海音、谷口茜、西村明紗、吉田織月
要　旨
世界の食糧供給にはポリネーターとしての蜂の働きが極めて大きく関係しているが、近年、世界各国で蜂の減少が大きな問題となっている。原因については諸説あるが、農薬が主原因であるという説が有力なようだ。農薬の使用率は年々増加している国が多く、それが原因で蜂が減少している国がある。このような蜂の減少傾向は主にアメリカやヨーロッパで多く見られるが、蜂の減少は私たちの将来と深く関係している事が分かった。私達の住んでいる日本では農薬の認可基準が高く、農薬による蜂の減少は心配ないと言われてきたが、近頃少数ながら蜜蜂への被害が報道されている。私達は農薬による生態系への影響を研究し、食糧問題解決のための施策の提案を行う。

発表番号 2 番(1 年国際コース)
テーマ：　Stop Food Loss
発表者：　平清水麻衣、袖岡佑月、平賀莉咲、町田未來
要　旨
近年、食品ロスの急増が深刻な問題となっている。これは日本だけの問題ではなく、世界的な問題である。私達は食品ロスが、地球温暖化と人口増加の 2 つの問題に大きく関わっていると考えた。この問題を解決することによって、これらの問題や、数々の SDGs の実現にもつながる。先進国では、発展途上国よりも食品ロスが多くみられる。先進国では、品質が悪いだけで安易に食品を捨てがちである事が原因であると考えられる。そこで先進国における食品ロス問題をフードチェーンに当てはめ調べたところ、家庭からの廃棄量が最多であるとわかった。その原因として私達が自ら購入した商品を覚えていないということがあったり、少しでも古くなったものは捨て、買い足す、ことが繰り返される事が考えられる。この問題の対策として、レシートとスマホを活用した解決策を提案する。

発表番号 3 番(1 年国際コース)
テーマ：　Safe Water for the World
発表者：　本城柚希、杉山美晴、朴晃立、三園 愛莉
要　旨
　主な食料である飲料水の衛生面が悪い国は現在沢山あり、世界人口約 70 億人のうち約 20 億人が安全では無い水を飲むことを余儀なくされています。不衛生な水により毎日 4900 万人の子供たちが亡くなっています。さらにマラリアやエイズなどのウイルスによる病気よりも下痢で亡くなる子どものほうが多いことを知りました。その原因が不衛生な水によるものだと分かり、苦しんでいる人々が 1 番多いアフリカに焦点をおきました。そのことから不衛生な水によって苦しんでいる人々を救えるような具体的な解決策を考えました。

発表番号 4 番(1 年国際コース)
テーマ：　What can we do for SDG1 “No Poverty”?
発表者：　桂田美海、出野愛梨、田邊葵彩、林瑠心
要　旨
　サブサハラの貧困率の高さから、そこで行われている自然の力だけによる粗放農業が貧困の主原因であり、その背景には気候の特色による水不足があると仮説を立てました。
　そこで私たちはサブサハラの中でも栄えているが、貧富の差が大きいエチオピアを例にとりその農業の方法について詳しく調べてみました。やはりそこでも自然の力だけによる農業が行われていて、彼らの収入は非常に不安定でした。しかしエチオピアでの雨季、乾季という気候の特色を生かし、各家庭に雨どいを設置して雨の少ない乾季に貯水した水を使い農業用水にするという解決策を見つけ出しました。

発表番号 5 番（2 年特進 ADVANCED コース）
テーマ：　Hole of Milnesium Tardigradum
発表者：　佐野斗哉、佐々木心之助、下村元誉、新川昴汰、松尾知憲
要　旨
緩歩動物門に属しているオニクマムシに関する研究である。普段は水中で暮らしているが、乾燥すると「樽（たん)」と呼ばれる状態になり、あらゆる自然環境に耐えることができるようになる。このような現象になることを「樽化現象」と呼びます。本研究では、樽化現象の知見であった「10 日程の長い時間をかけてゆっ

くりと多湿環境下で樽化していくこと」と「体表面からの蒸発によって体の表面積が徐々に減少しながら樽化が進行していくこと」の矛盾を示した。30 分という短い時間の中で自身の体を伸縮させながら樽化が進行していくことを明らかにした。短時間での樽化を可能にするものは、体内にある空気や水分を機能的に排出することと考え、観察を続けた。その結果、樽化時に気体を吸っている様子、樽化解除時に新発見の穴（Hole A）から気泡を吸収する様子、Hole A からの吸排気に応じて体を収縮させていく様子の観察に成功した。

発表番号 6 番（1 年国際コース）
テーマ：　What is good land?
発表者：　平尾遵弥、上松祐太、才野乃英留、村上純
要　旨
僕たちは SDG15「陸の豊かさを守ろう」というターゲットより、現在世界各地で問題になっている砂漠化現象にフォーカスを当てた。この砂漠化は主に発展途上国で進行しており、その砂漠によって引き起こされる干ばつや土壌劣化などによって食糧危機や、貧困の加速などといった深刻な問題を引き起こしている。そこで僕たちはこの問題を解決するために、発展途上国で起こっている人口爆発に目をつけ、原因を特定し、その原因から解決策まで考えた。

発表番号 7 番（1 年国際コース）
テーマ：　Prevent Ocean Pollution
発表者：　中野伶音、奥村颯太郎、山本成央
要　旨
　世界ではプラスティックゴミが問題になっている。プラスティックゴミは、海洋汚染の主な原因の一つであり、魚が誤って食べてしまうなど海洋生物にも影響を与えている。私たちは、このプラスティックゴミが発生する原因はゴミのポイ捨てだと考えた。この問題の解決策を出すにあたって、私たちは人の持つ”意識”に目を向けた。私達が出す 2 つの解決策はどちらもそれぞれ人に“意識“させることを目指している。この問題は意識一つで解決することができるのだ

発表番号 8 番（1 年国際コース）
テーマ：　How to Solve Hunger
発表者：　尾上沙知保、木村巴南、本田月愛、前田夢乃
要　旨
現在世界では約 8 億人が飢餓で苦しんでいる。このような人はアフリカを中心に多く、2050 年には 20 億人に達すると言われている。私たちは飢餓を引き起こす原因について調べていく上で食糧廃棄と現在のフェアトレードの仕組みが飢餓に大きな影響を与えていると分かり、その現状を変えるための解決策を考えた。まず、食糧廃棄は特に見た目などの問題から規格外の野菜が多く廃棄されていることを知り、それらを普及させるために普通の野菜と規格外の野菜を工夫されたパッケージに一緒に入れるという解決策を考えた。また、フェアトレードの仕組みに関しては現在は経営者にはお金が届いていても労働者まではしっかり届いていないこともあることから、普及率の高い携帯電話を使ったモバイル送金でしっかり労働者までお金が届く仕組みを考えた。

発表番号 9 番（1 年国際コース）
テーマ：　Effects and Recycling of Plastic Waste
発表者: 中村ゆらら、足尾里菜、河邉美羽、田中夢弓、張楓敏
要　旨
　地球の 7 割以上を占め、地球環境に大きな影響力を持つ海であるが、現在大きな問題を抱えている。それは海洋プラスチックごみ問題である。私たち人間の生活、社会が発展していく中で生み出された多くのプラスチック。それらが様々な過程で陸から海に流れ込むことによって海を汚染しているのだ。もちろん海には沢山の生き物が生息している。このプラスチックごみによって、彼らは年間約 8 万トンにもなるごみを誤飲または傷つけられ命を落としている。私たちは今回の SGH 研究発表大会でこの海洋プラスチックごみ問題と私たちが考案した解決策について述べる。

発表番号 10 番（2 年特進 ADVANCED コース）
テーマ：　外部刺激が発芽に与える影響–運動と発芽の関係を探る
発表者: 寺尾皓（リーダー）、粟津晴輝、岡部優希、三田倫太朗、和田敬光
要　旨
植物は動かない。そこで、植物に運動を与えると、生育にどのような影響があるかを研究した。先輩の研究では、スターラーを用いて種子に運動を与えて育てると、発芽率と根の生育を促進させた。しかし、それを

用いたことで、運動以外の要因が生育に影響を与えた可能性が考えられた。考えられる要因は磁界変化、酸素濃度、磁力、温度である。そこで先輩は磁界変化を種子に与えて育てると、発芽率には影響しなかったが、根の生育を抑制したことを確認した。本研究の目的は、運動以外の要因を実験で否定し、運動が促進させたことを確認することである。まず、スターラーによる酸素濃度の変化の測定をした。この実験では撹拌前後の水中の酸素濃度に変化がないことが確認した。次に、種子に磁力を与えて育てた。この実験では、磁力は発芽を抑制したが、根の生育には影響がないことを確認した。これらの実験から運動が種子の生育を促進させた可能性がより高まった。

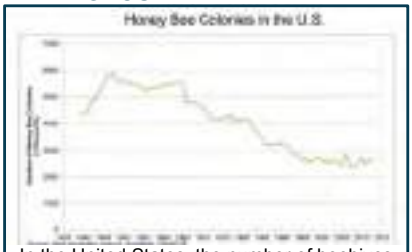
Protecting The Ecosystem ~ Life on Land ~

Asa Nishimura, Akane Taniguchi, Shizuki Yoshida, Kanon Yokoyama

Kyotogakuen International Course 1st year

There are a lot of pollinators in the world, but the best pollinator is **Bees**.
Bees are decreasing now!

BACKGROUND



In the United States, the number of beehives decreased from 6000 in 1945 to 2000 in 2010.

strawberries

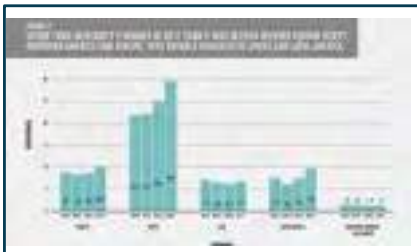
pollination is badly
→ increase of malformed fruits

The market looks like this.

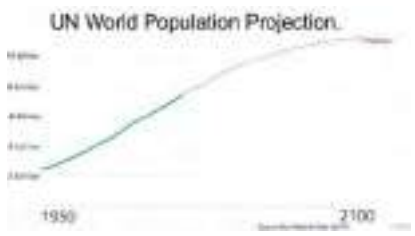
Crops decreased by bee pollination.
For example apples, onions, carrots, eggplants, broccolis and so on.

PROBLEM

If pollination by honey bees is insufficient, pollination will be biased, and the crop will not grow or will have more malformed fruits, making it impossible to sell it as a product.
This means the value of strawberries is rising.



The number of people suffering from food shortages in the world is increasing and has been doing so slightly from 2014 to 2017.



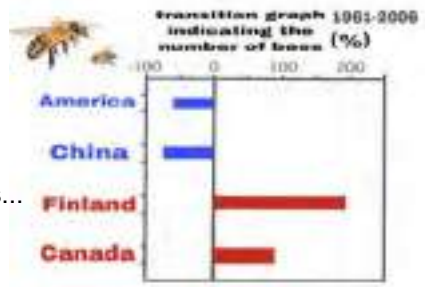
The world population is also expected to increase significantly in proportion.

HYPOTHESIS

One of the major causes of dwindling bee numbers could be “agrochemicals”.....

The countries which come to have dark color increase from 1990 through 2014.

Compare with bees...

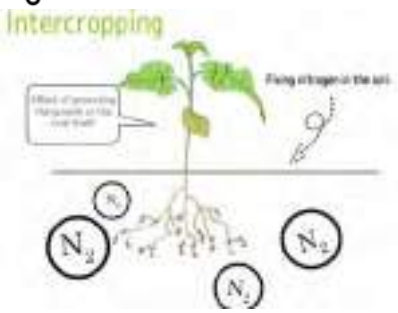


The number of bees decreases as the place with much utilization.

The hypothesis proved by these information.

SOLUTION

Therefore, we came up with an idea for a **new form of agriculture** that use both intercropping and pesticides that are less harmful to living organisms.



- Akari touch emoulsion
- Atablon emoulsion
- Ecopita liquid
- Urara DF
- Colomite emulsion
- Tomado floorable
- Nomalt emulsion etc

We think that such a development is not just about producing food to keep up with population growth, but **protecting and maintaining the food** we have in the first place. So this is our goal, **Life on Land.**

graph
USDA(2019)https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/agricultural-production-and-prices/
Our World in Date(2014) https://ourworldindata.org/pesticides#pesticide-application-across-the-world Our World in Date(2019) https://ourworldindata.org/future-population-growth
NEXT GENERATION SCIENCE STANDARDS(2015)https://www.nextgenscience.org/sites/default/files/HS-LS_Bee_Colony_version2.pdf FAO(2018)http://www.fao.org/3/i9553en/i9553en.pdf
image source
Lingo https://thenounproject.com/search/?q=arrows&i=2070778 SDGs https://sustainabledevelopment.un.org/?menu=1300
alic https://vegetable.alic.go.jp/yasaijoho/senmon/0906/chosa1.html https://sepa100.com/archives/2796
source
alic https://vegetable.alic.go.jp/yasaijoho/senmon/0906/chosa1.html TED(2013) https://www.ted.com/talks/marla_spivak_why_bees_are_disappearing?language=ja
Honeybee Sciense(2010) http://libds.tamagawa.ac.jp/dspace/bitstream/11078/1299/1/28-2_2010_065-072_Yoshiyama.pdf alic https://vegetable.alic.go.jp/yasaijoho/sen
亜熱帯農業センター http://www.soumu.metro.tokyo.jp/07ogasawara/farm/pdf/honeybee.pdf みつばち協議会 (2011) https://web.pref.hyogo.lg.jp/nk13/documents/h24mitubatiii.pdf
AGAMERICA(2017) https://agamerica.com/top-10-pollinators-in-agriculture/ 一般社団法人 https://www.actbeyondtrust.org/whats-neonico/neonico1/
京都大学大学院農学研究科 https://www.mhlw.go.jp/file/06-Seisakujouhou-11130500-Shokuhinanzenbu/0000103767.pdf
一般社団法人 https://www.actbeyondtrust.org/whats-neonico/neonico1/

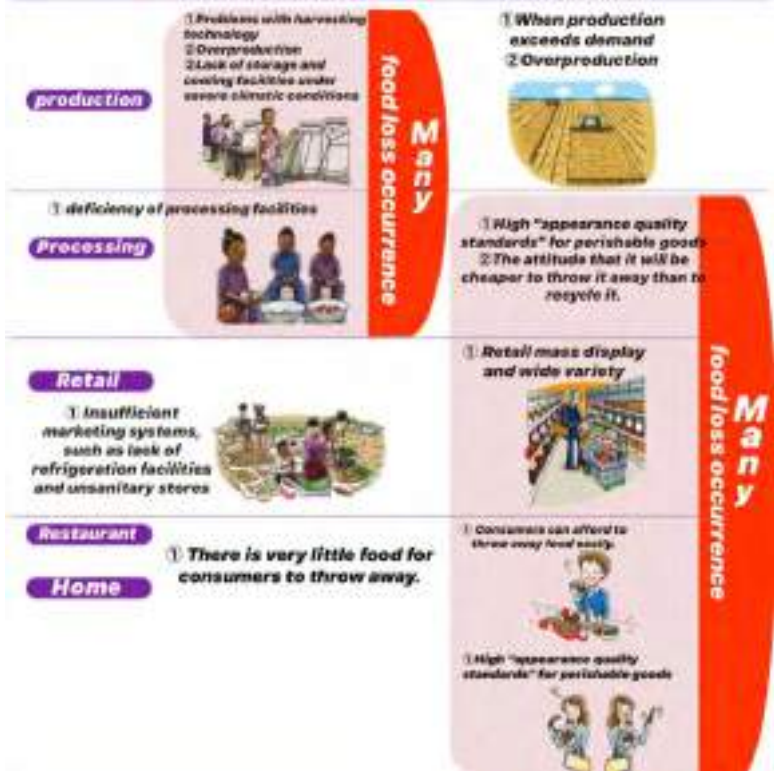
Stop Food Loss

Ultimate Universe
Yuzuki Sodeoka Lisa Hiraga Mai Hirashimizu Mirai Machida
From Kyoto Gakuen High School International Course First year

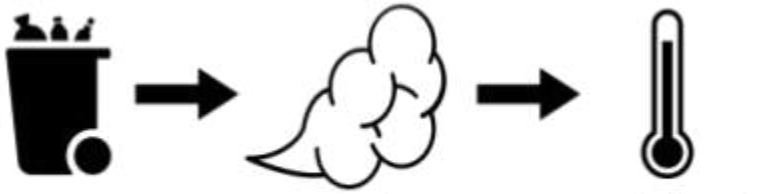
12 RESPONSIBLE CONSUMPTION AND PRODUCTION

No.1

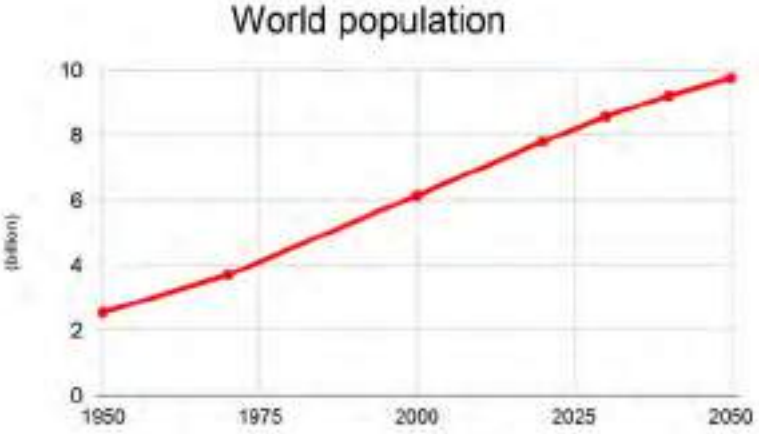
Developing countries	Developed countries



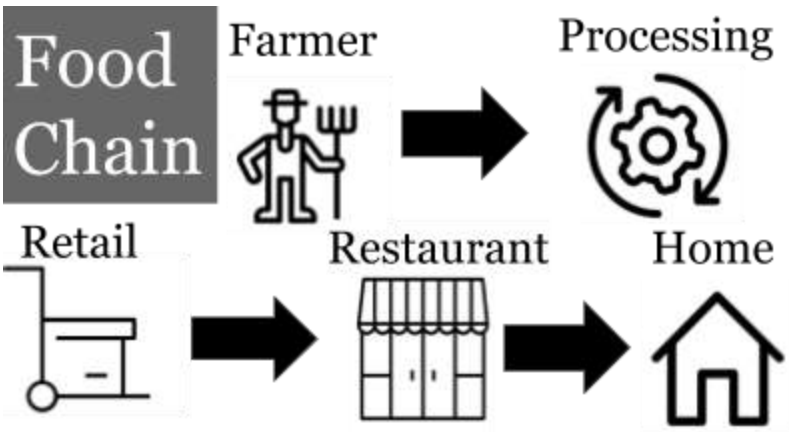
No.2



No.3

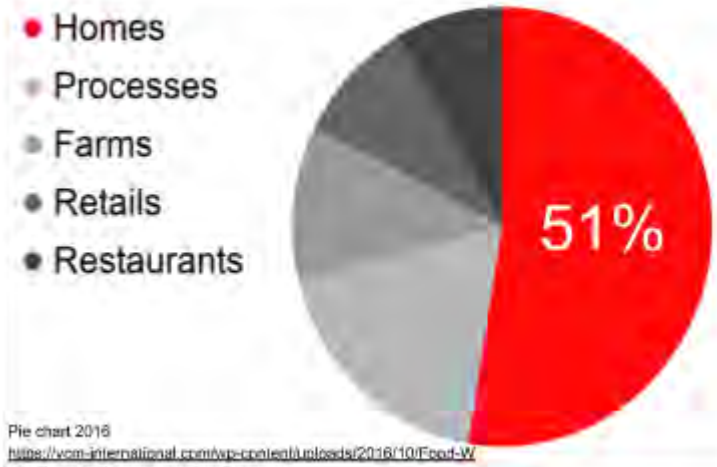


No.4



No.5

Percentage of food waste chain

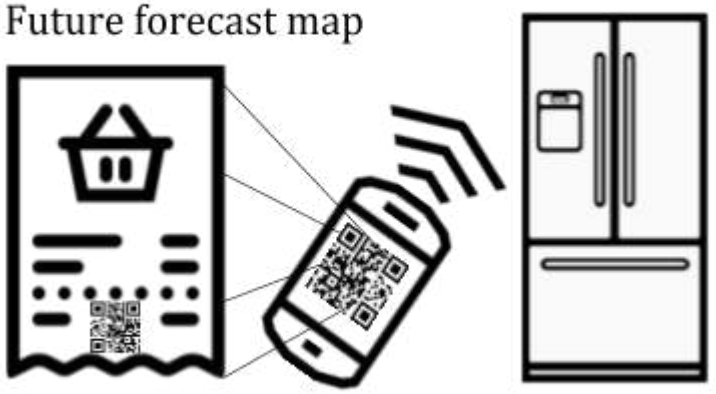


Pie chart 2016
https://vcm-international.com/wp-content/uploads/2016/10/Food-Waste-Aligning-Government-and-Industry

No.6

Our idea

Future forecast map



sources

Pictures
JEMAI 2019 waste area http://www.cjc.or.jp/school/id/id-2-6.html
Zehitomo 2018 refrigerator https://www.zehitomo.com/blog/client/how-to-throw-away-refrigerator
Pie chart 2016
https://vcm-international.com/wp-content/uploads/2016/10/Food-Waste-Aligning-Government-and-Industry
Bar graph 2019 https://www.statista.com/statistics/262875/development-of-the-world-population/
Informations
Consumer Affairs Agency 2018 food loss
https://www.caa.go.jp/policies/policy/consumer_policy/information/food_loss/efforts/pdf/efforts_180628_0001.pdf
TRVST 2019 population
http://www.fao.org/fileadmin/templates/wsfs/docs/Issues_papers/HLEF2050_Global_Agriculture.pdf

Safe water for the world

Kyoto Gakuen High School International Course 1st year
Yuzuki Honjo　Airi Misono　Park Fanni　Miharu Sugiyama

6 CLEAN WATER AND SANITATION

Now situation

<World Population>

source-UNDP/2016-

7billion

<People who cannot drink safe water>

✖ 2billoin

4,900 people ＝ Kyoto Gakuen High School 1,500 people × 3

Source

WaterAidJapan / 2017

Problem of water and GDP's relationship

〈What you can see from this graph〉

Countries with high GDP ➡ Can drink safe water

Countries with high GDP

Can drink safe water

Source<US Center for Disease Control and Preventation>

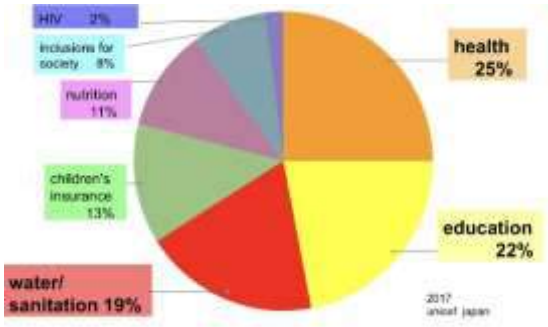
<World we learned from these>

People can't use safe water without financial resources

<Thought result>

Fundraising activities for places without economic power.

What the donated money is used for



Water sanitation percentage is lower than percentage of health and education.

Solution

This graph shows that the number of children under the age of five who have died.

From that, Africa is in the most serious situation, so we focused on Africa and thought about solution.

Source-Naikakufu/2018-

African population → about 1.26 billion people
People suffering from water → about 663 million people

Donation amount from Japan to Africa
→ about 19.2 billion 4.35 million yen
↓
Percentage of infrastructure donations
18% → 36%
Infrastructure donation
3,456 million yen → 6,912 million yen

Sources

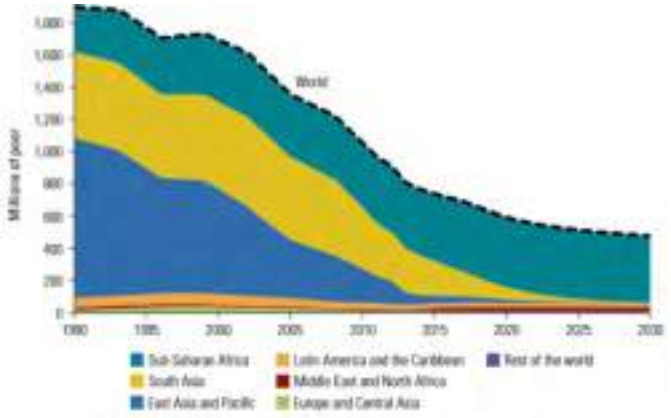
水衛生で命の危機にさらされる子どもを救おう！私たちができる支援とは　2019. 03. 25
https://gooddo.jp/magazine/water-and-sanitation/810
データから考える「驚くべき世界の水」 2017. 10. 10.
ttps://sdgs.tv/goal6/42.html
ユニセフ　水と衛生　2019 年6月
https://www.unicef.or.jp/about_unicef/about_act01_03.htmlhttps://www.unicef.or.jp/kodomo/nani/bokin/bo_bod.htm
ユニセフ募金の行方2018
https://www.unicef.or.jp/about_unicef/about_katudo_bokin.html
水・衛生専門の NGO water aid 2019
https://www.wateraid.org/jp/

What can we do for SDGs1 “NO POVERTY” ?

Kyoto Gakuen International Course 1st grade Miumi Katsurada, Airi Ideno, Aoi Tanabe, Lula Hayashi

As of 2016, there were **767 million** people under the poverty line with less than $1.25 per day.

Number of poor by region 1990-2030



Hypothesis

Our hypothesis is that **the cause of poverty is agriculture** because three in four children under extreme poverty live in mountains or rural areas, so we considered many people must get income from agriculture.

Extensive agriculture

	Persistence	Population support	Profitability	Population pressure	poverty
Africa	low	low	low	high	high
Europe	high	middle	middle	low	low

The features of Extensive agriculture

Means of farming with only power of nature

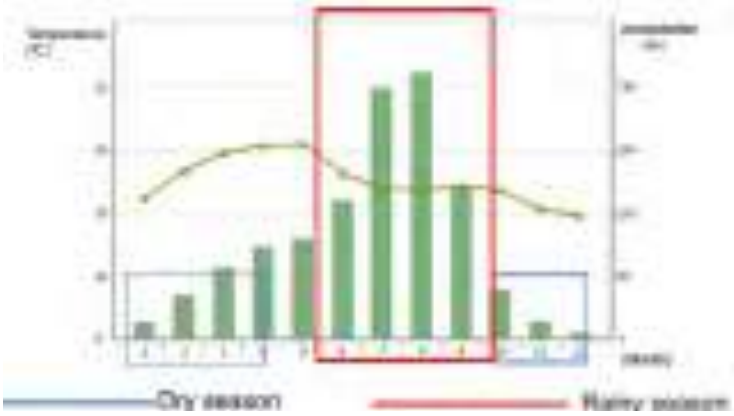
Low productivity and utilization ratio

Less capital and labor force

Ethiopia

- A central country in Africa
- Location of AU headquarters
- GNI is $790
- 1.5 million people and about 81% of them lived in rural areas.

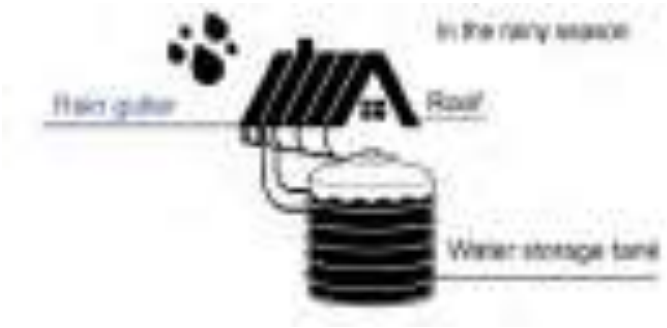
Precipitation



There is a rainy season, and a dry season.
In addition, there is insufficient water in the dry season. Therefore,

the main cause of poverty in Ethiopia is the lack of adequate facilities to mitigate being influenced by the weather.

Our solution



Roof
In the rainy season, we establish a rain gutter on the roof.

Rain gutter
Through the rain gutter and tube,
the rain water flows into a storage tank.

Water storage tank
The collected water is preserved for their farming in the dry season.

Sources

JICA pdf : Extensive agriculture
The world bank (2019) Japan GNI
外務省(2019) Ethiopia GNI

Unicef (2016)
Care : Ethiopia
https://www.data.jma.go.jp/gmd/cpd/monitor/climatview/graph_mkhtml_nrm.php?n=63450&m=1: 気象庁

https://thenounproject.com/search/?q=roof :Noun project
https://thenounproject.com/search/?q=water%20tank :Noun project
https://thenounproject.com/search/?q=rain%20gutter :Noun project
https://www.brookings.edu/blog/africa-in-focus/2018/11/21/figure-of-the-week-understanding-poverty-in-africa/
BROOKINGS(2018)

2年特進ADVANCEDコース　課題研究発表

Hole of Milnesium Tardigradum

Kyoto Gakuen Senior High School

What is Tardigrades?

Tardigrada

Eutardigrada

Milnesium tardigradum

Heterotardigrada

Echiniscus

Tun phenomenon

<Active phase>　<Tun>

(Cryptobiotic)

Transforming into tuns

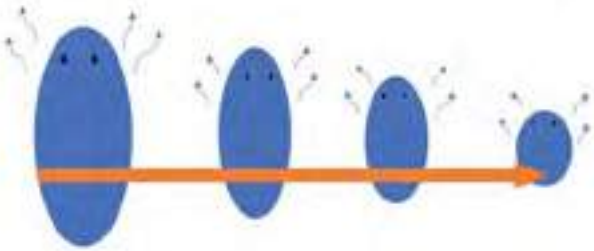
Tolerance in tun state

Envioroment	Time
0.05 K	20 hours
73 K	20 months
7.5 GPa	12 hours
4000 Gy (gamma ray)	7 days

Background : Speed of transforming into tun.

Current knowledge

1. Tardigrades need to be desiccated slowly in a humid surrounding.
2. The body surface area gradually decreases by evaporation. (Horikawa, 2006; Wright, 1989; etc.)



Experiment

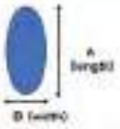
Observed transformation into tun on the wet filter paper in 20 minutes.

Purpose

- Can they transform into tun in a **SHORT TIME**?
- Whether do they transform into tuns **ACTIVELY**?

Three perspectives

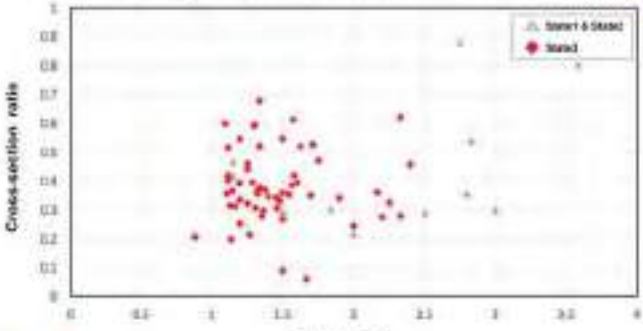
1. Aspect ratio

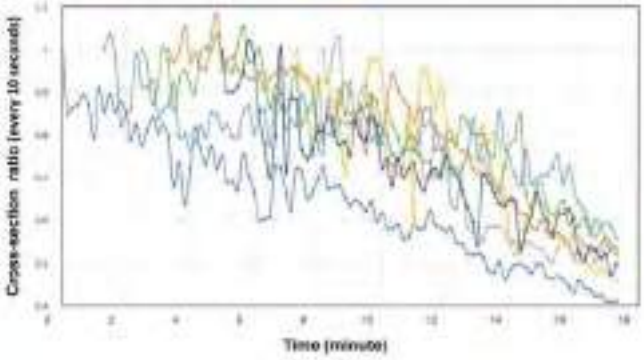


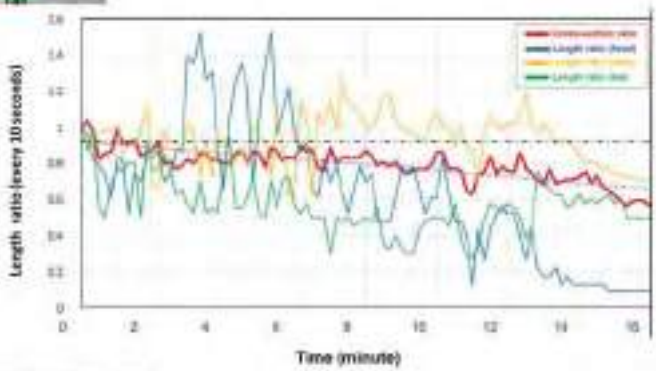
2. Cross-section ratio

3. Activity

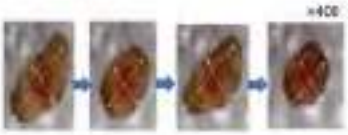
State1 : Not moving
State2 : Only moving their legs
State3 : Moving around freely







Conclusion



- The body surface area does **NOT** decrease gradually.
- Transforming into tuns does not depend on evaporation.
- These results indicate that they transform into tuns **ACTIVELY**.

Discussion

Oxygen and moisture content can be environmental factors which reduce tolerance. (Saigusa *et al.*, 2007)
A very small amount of oxygen and water has a big influence on the revival rate.
A tun phenomenon progresses actively. That is, tardigrades must exhaust oxygen and water **ACTIVELY**.

Hypothesis : Milnesium tardigradum have some kind of hole through which they can adjust intracavitary pressure.

First experimental method

1. Confined one tardigrade in a drop of water on a slide glass.
2. Desiccated it at room temperature.
3. Investigated whether it takes and exhausts fresh air, or not.
   Transformation for a short time = Extreme desiccation stress

Result

Soon after a drop of water disappeared, tardigrade repeated intake and exhaust at the pharynx side about 20 times, and it completed transform into tun in 10 minutes.

Discussion

Consider that they intend to send air into the pharynx side by repeating intake through mouth pipe.

Second experimental method

1. Desiccated tardigrades in the same way as in the first experiment.
2. Added water and released them from tun state.
3. Observed their intake and exhaust of air at the mouth pipe.

Result

Air bubbles emerged at the mouth pipe. These bubbles were absorbed into the pharynx side, and disappeared.

Discussion

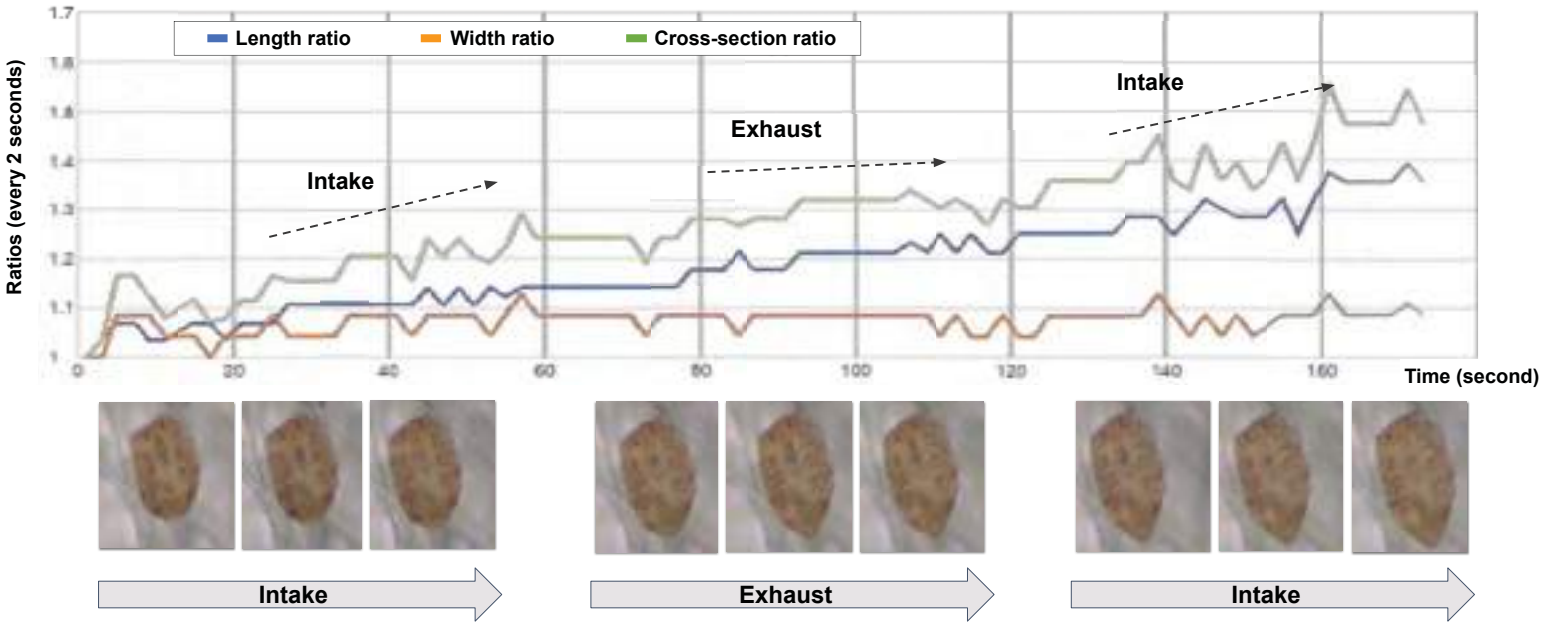
Consider that they absorb external air into their body sucked through hole A.

Third experimental method

1. Released one tardigrade from a tun state on the filter paper.
2. Measured three ratios, "length ratio", "width ratio", and "cross-section ratio", every 2 second for 3 minutes.

Result

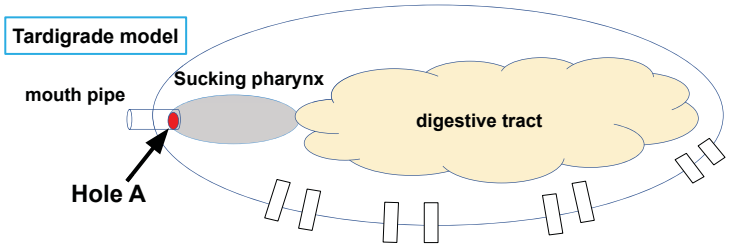
Cross-section ratio increases during air intake, and keeps constant during air exhaust.



Discussion

Consider that :

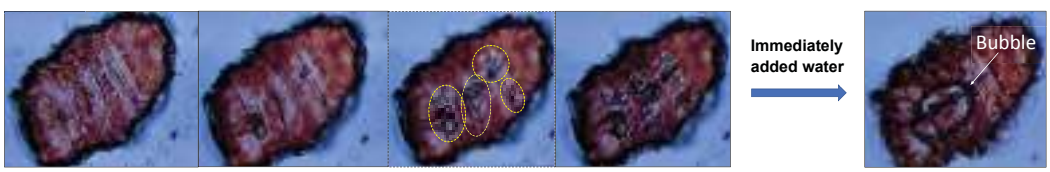
1. tardigrades adjust intracavitary pressure through Hole A.
   Enhance by air intake & reduce by air exhausted.
2. releasing from tun state progresses with intake and exhaust through Hole A.



Conclusions

We discovered that milnesium tardigradum has a hole.

Future Problems



About 30 seconds before completing transformation.

- Observed space just below skin.
- Water entered that space, and big air bubbles were generated in 20 seconds.
- Expect that, for transformation, tardigrades enhance intracavitary pressure by taking air, and they exhaust air all at once just before transformation.
  We will study about a mechanism of transformation so as to confirm our expectations.

References

1. Eibye-Jacobson, J. (2001). A New Method for Making SEM Preparations of the Tardigrade Buccopharyngeal Apparatus. *Zoologischer Anzeiger*, **240** (3–4), 309–319.
2. Ono F. (2017). Search for Lives under Very High Pressure and Extraordinary Strong Pressure-Tolerance of Animals and Plants. *The Review of High Pressure Science and Technology*, **27** (1), 33-39.
3. Miller, W. R. (2011). Tardigrades. *American scientist*, **99** (5) 384.
4. Jönsson K.I. *et al.* (2016). Tolerance to Gamma Radiation in the Marine Heterotardigrade, Echiniscoides sigismundi, *PLOS ONE*, **11**(12): e0168884. doi:10.1371/journal.pone.0168884
5. Saigusa M. *et al.* (2007). Resistibility of Milnesium tardigradum against the ultrahigh pressure in criptobiotic condition. *Space Utiliz Res*, **23**, 402-405.
6. Suzuki A.C. (2006). *Kumamushi?!: Chisanakaibutsu*. Tokyo, Japan: Iwanami Shoten, Publishers.
7. Horikawa D. (2015). *Kumamushi Kenkyunisshi: Shijosaikyoseibutsu ni Koishite*. Kanagawa, Japan: Tokai University Press.

What is good land ?

Kyoto Gakuen International Course 1st year

Junya Hirao Jun Murakami Noer Saino Yuta Uematsu

Introduction
What is the problem?

Desertification is advancing ➡

(the circled areas are red which show increasing desertification)

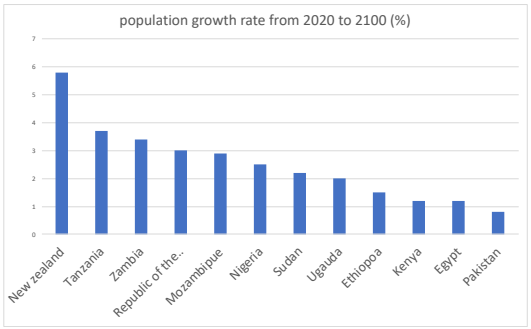
What are the effects of Advancing desertification...?

Drought and soil degradation ➡ poor crop ➡ poverty

https://www.mapsinternational.com/satellite-map-of-the-world.html

Cause

Main cause: increasing population in developing



Source: 国連, World Population Prospects: The 2019 Revision

These countries are the top12 countries that will increase in population in the world, and these countries are all developing countries, excepted New Zealand.

Why is the population growth connected to desertification?

When the population increases, people have to produce food.

⬇

We need to destroy forest , cultivate and set the livestocks out to graze more than now.

⬇

(deforestation, over cultivation and over grazing connect to desertification.)

Why does population increase?

Women who live in developing countries can't work more than men, so women have to marry to survive. Therefore, women have to bear children, and the children need to work for their parents.

The percentage of employment rate of women

Source:World Bank, Wold Development Report 2012 - Gender Equality and Development

Solution

Solution: make more services

Tourist guide ➡ Women in developing countries who can speak English and know about that area can become tourist guide.

Built more facilities such as supermarket ➡ Make more opportunity as clerk.

Sources

Overpopulation Causes, Effects & Solutions | Renewable Resources Co 2016

地球の人口問題を 考える ユニセフT•NET通信 ユニセフより 2011

農地・耕作放棄地面積の推移　国土交通省より 2015

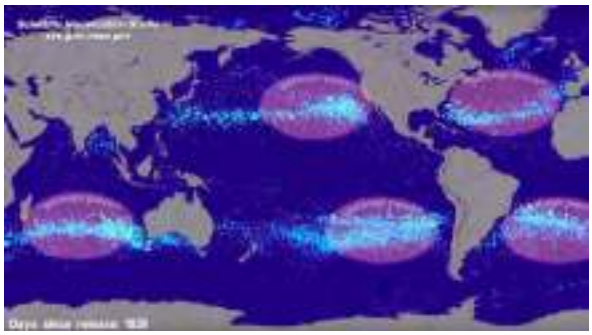
環境省　自然環境局　【砂漠化対策】砂漠化する地球

Prevent ocean pollution

Kyotogakuen International course 1st year
Nao Yamamoto Leo Nakano Sotaro Okumura

The current state of Ocean pollution

The largest cause of ocean pollution is drift garbage.



Almost all this garbage is littering garbages.
Therefore, if we can reduce this littering garbage, we can prevent ocean pollution.

Solution 1

Give students the opportunity to appreciate nature.

Education that allows students to feel close to nature such as sea and mountains in school to let students get interested.
Let the students get to know the current state of the garbage problem.

Solution 2

Set up unique trash cans around town

It is most important to attract people's attention, and making people think that they want to throw garbage away.
In that regard, we thought we should set up voting trash cans around the town.
Voting trash cans have choices connected to citizens interests and encourage citizens to put garbage in the trash cans.
Voting trash cans are, as it were , ballot papers.

Where?

We have to be careful about where to put them.
We need to put them in a place that can attract people's attention.
In fact, this action was carried out in England before, and they could reduce littering by 46%.

Sources

http://www.thinktheearth.net/jp/sp/thinkdaily/news/art-design/1301hubbub.html
https://encrypted-tbn0.gstatic.com/images?q=tbn%3AANd9GcSEPQErNOt737j2DldSqKo8lM8BNEXCTk2suRU1duvw3KFtrxFY

How to solve hunger?

Kyoto Gakuen High School International Course 1st year
Sachiho Onoue, Hana Kimura, Luna Honda, Yumeno Maeda

Basic Data

- 800 million people are suffering from hunger.
- One in nine suffers from hunger
- By 2050, the number of starving people will increase to 2 billion
- Almost all of the starving people live in developing countries such as Africa

Sources :
JAICAF 2018 report,
UN information center 2019,
UN Food Agriculture Organization

Starving people can't eat the food due to poor crop

Hunger

Disasters and Agriculture in developing countries

Malnutrition
↓
Can't work
↓
Little money to live

Global warming
↑
Greenhouse gas
↑
Food waste

3.6 billion tons
=8% of all greenhouse gasses

1.3 billion tons

Income

~Problem~

The people living in develop countries can't work and get money enough to live or eat due to malnutrition of hunger.

↓ To solve this situation

Fair-trade…The trade between companies in developed countries and producers in developing countries in which fair prices are paid to the producers and it enables people who live in developed countries to improve their position and have more control over their lives.

The income from fair trade is sent to developed countries by this diagram.

Fair-trade → Farm owner manager → Worker

However, in this method, the income isn't sent to all of the workers.

Fair-trade → Farm owner manager
Fair-trade → Worker

~Solution~

Changing the structure of fair-trade

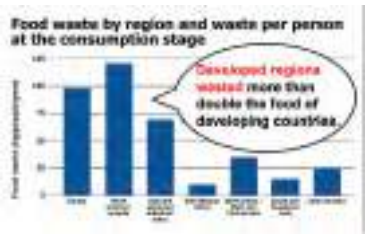
Having done that, we can expect not only national development such as being built new public facilities, but also health security of individuals and solve hunger.

Over 50% of people in developing countries don't have bank accounts, but over 80% of people have mobile phones.
Therefore we could send the income from fair-trade to the workers using mobile remittance.

Sources : フェアトレードとは？,フェアトレードの問題

Food waste

~Problem~



1.3 billion tons…The amount of food waste in the world in 2011.
154 kg…Average annual consumption every year.

If we divided 1.3 billion tons by 154 kg without wastage, we could say that there is a large amount of food that may be able to save 800 million people suffering from hunger is wasted every year.

Food waste is caused by **High appearance quality** and room to throw away.

~Solution~

Promoting substandard vegetables

Substandard vegetables…The vegetables with an unusual or bad form but whose nutrition is no different form from standard vegetables.

↓ Why these vegetables aren't promoted?

- Looks bad
- Difficult to sell regular vegetables

(The balance between supply and demand is disrupted)

↓ To solve this reasons…

- Make the unique packages
- Sell substandard vegetables and normal ones in the same ba

Sources : FAO2011, JAICAF2011, 国際農林業共同協会「世界の食料ロスと食料廃棄」
規格外の野菜が流通しない理由

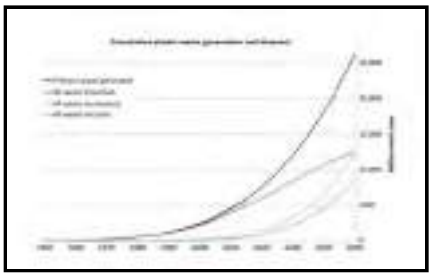
Sources

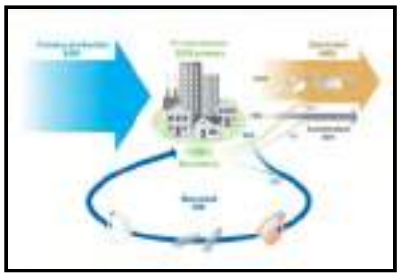
NC state extension Supply Chain Sectors https://localfood.ces.ncsu.edu/food-system-supply-chain/. WFP https://gooddo.jp/magazine/hunger/children_hunger. RAGHU RAI/MAGNUM PHOTOS (BANGLADESH, 1971) https://www.newstatesman.com/culture/books/2015/11/john-gray-world-hunger-result-politics-not-production. FAO JAICAF http://www.fao.org/3/a-i2697o.pdf. United States Department of Agriculture Agricultural Marketing Service March 2012 https://www.ams.usda.gov/sites/default/files/media/MovingFoodAlongValueChain.pdf. unicef https://www.unicef.or.jp/news/2018/0151.html. FAO 2019 http://www.fao.org/home/en/. unicef https://www.unicef.or.jp/news/2017/0202.html. kokocara https://kokocara.pal-system.co.jp/2019/06/24/food-loss/. KAGOME https://www.kagome.co.jp/vegeday/nutrition/201708/6828/. FAP BBnews https://www.afpbb.com/articles/-/3224185. 農林水産省食品ロス統計調査・世帯調査（H26）http://www.maff.go.jp/j/tokei/kouhyou/syokuhin_loss/ 飢餓と発展途上国の農業 https://www.jica.go.jp/mobile/hiroba/program/practice/education/materials/jhqv8b000005wd9w-att/2_5.pdf. 普通の野菜を安く仕入れた事例https://www.e-aidem.com/ch/jimocoro/entry/matsuoka03. 規格外の野菜を売り切れにしたフランスのアイデアhttps://tabi-labo.com/151580/ingloriousvegefruits 規格外の野菜が流通しない理由https://news.goo.ne.jp/article/moneypost/life/moneypost-542648.html. Fair trade https://tm2020.net/fare-trade-challenge/#toc3 https://chiikihyaku.jp/society/726.html#i-5. カット野菜は規格外の野菜を中心にhttps://www.kaku-ichi.co.jp/media/tips/column/cut-vegetables-non-standard-vegetables 自給率http://www.maff.go.jp/j/zyukyu/zikyu_ritu/attach/pdf/013-1.pdf. 国別の銀行口座普及率https://www.soumu.go.jp/johotsusintokei/whitepaper/ja/h27/html/nc123130.html. フェアトレードの問題点https://tm2020.net/fare-trade-challenge/#toc3. フェアトレードについてhttps://www.fairtrade-jp.org/about_fairtrade/

EFFECTS AND RECYCLING OF PLASTIC WASTE

Kyoto Gakuen High School International course 1st Year Team Nakamurakai
Rina Ashio Miu Kawabe Muyu Tanaka Fumin Cho Nakamura Yurara

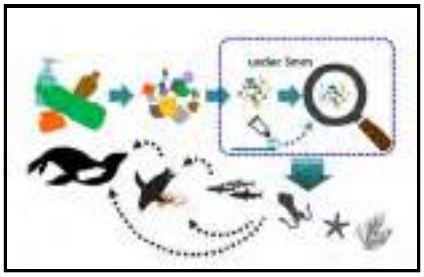
Cumulative plastic waste generation and disposal





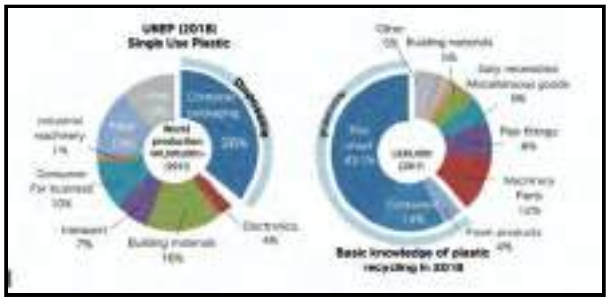
▲According to the Ministry of the Environment, the produced plastic was over 82 million tons and the 63 million tons of that was discarded as garbage. The 79 % of plastic garbage that was collected was sent to landfill or discarded into the ocean and the garbage which was recycled was only about 9 % of the total. If we continued to produce plastic, the garbage that will be sent to landfill or natural disposal would be estimated to go over 12 billion tons by 2050.

Impact of micro plastics processes



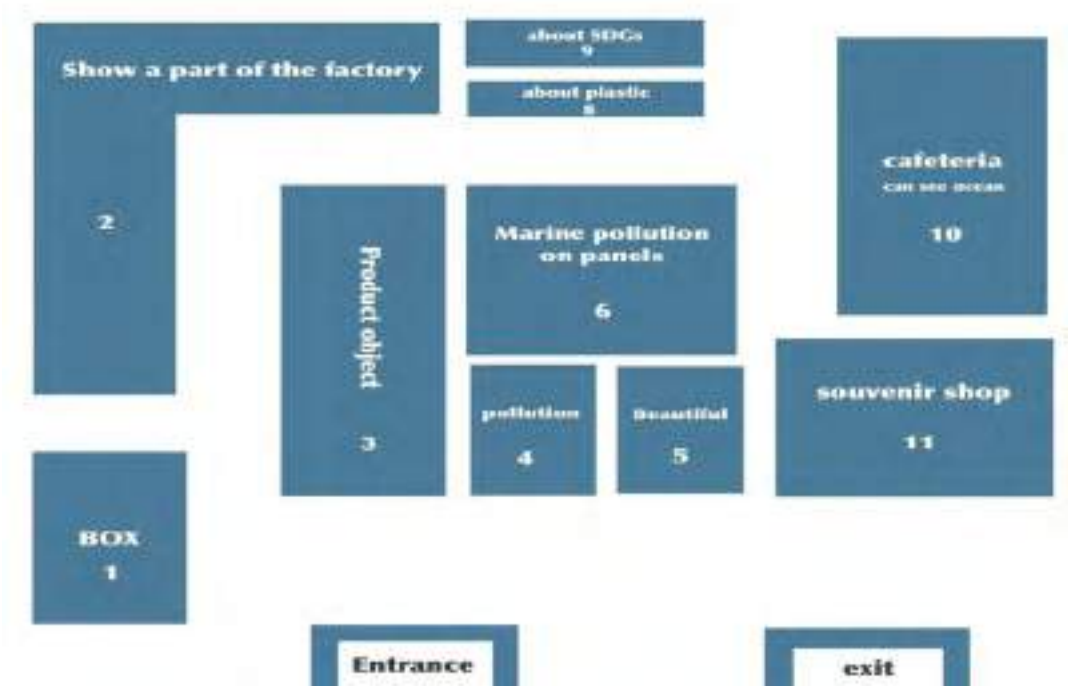
▲According to WWF, when plastic enters the ocean, it affects sea creatures. Small fish eat micro plastic that has become smaller due to the influence of waves,and large fish and birds eat the small fish.In this way, the food chain is carried out with the micro plastic inside the body.

World and domestic plastic production volume and production ratio by application



Material recycling

Sample map of " MARITIME MUSEUM "



(1) This is a **collection box named Recycle Box. Plastic brought by visitors**. The plastic collected is reused as raw material as an object in the museum.

(2) Here is **factory.** Here you can see the factory making things.

(3) This place we will **introduce company and display company product**s. You can see the history about the company.

(4),(5) In this booth **(4)**, there will be a large show window like an aquarium **that recreates the ocean that should be and the ocean that should be aimed for.** On the other hand, the place **(5)** of reeds reproduces the state of the contaminated sea that is now a problem.

(6) Here we will explain about **marine pollution with panel** and the fish that are affected by it. And you will feel a sense of crisis in the world. We provide **English version** of sentences and audio **for overseas customers**.

(7) Here a lot of **children can enjoy playing with plastic toys**. Also, we can **make something with plastic bottles**. Also if custom like that toy, they **can buy it**.

(8) Here is a **video showing how plastic is made and recycled and history**. Also **shows plastic repeatedly turned into heat energy.** You will learn this as a way of recycling. Also We provide **English version** of sentences and audio **for overseas customers**.

(9) Here we will **explain about SDGs14 and SDGs with panel and video.** Also We provide **English version** of sentences and audio **for overseas customers.**

(10) We will set up a cafe in the museum that **does not use plastic**. There, food containers and other items used are all recyclable cardboard, newspaper, recycled paper, and biodegradable Japanese paper tape. Also **you can see the beech** from there.

(11) This is a **shop** that sells company products and souvenirs from this museum.

2年特進ADVANCEDコース　課題研究発表

Effects of External Stimulus on the Seed Growth and Germination

粟津・岡部・寺尾・三田・和田
Awazu・Okabe・Terao・Mita・Wada

Introduction

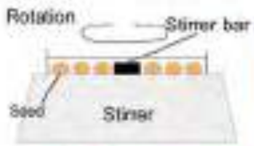
Plants do not move

⇩

How does giving motion to a plant affect its germination?

Introduction

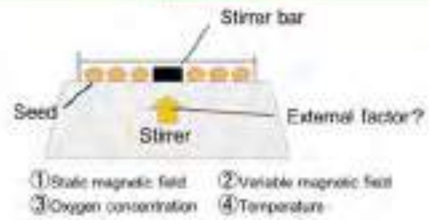
Growing with rotating seeds



- Germination rate 81% → 93%
- Root growth significantly rose

Motion → Promote germination? Promote growth?

Introduction



Previous study by our seniors

Grew seeds with stirrer turned ON, WITHOUT stirrer bar
→Caused time-dependent changes of magnetic field

- Germination rate 90% → 59%
- Root growth significantly declined

Motion may promote seeds germination and growth?

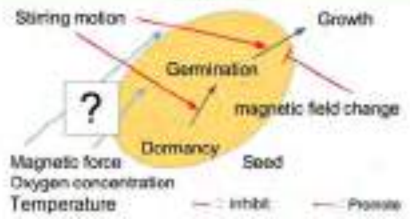
Purpose

Exclude possibilities except motion

⇩

Motion is likely to increase the germination rate

Purpose



Experiment

Measured the changes of oxygen concentration by stirring water

Method

① Stirred the water by a stirrer for 3 hours.
② Measured the oxygen concentration of the stirred water.

Results

Result
There was no significant increase in oxygen concentration.

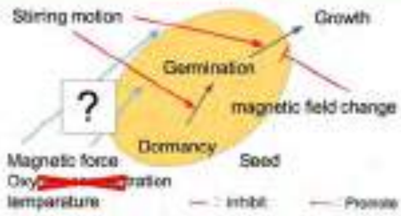
Discussion

Stirring does not significantly increase oxygen concentration.

⇩

It is not considered to have promoted germination.

Discussion



Experiment

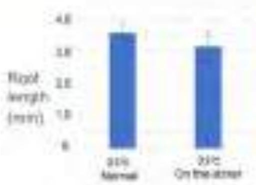
Effects investigation with the magnet of the stirrer

Method

① Grew the seeds on the stirrer keeping the temperature at 23 degrees celsius (However, the stirrer power is off)
② Three days later, we measured the seed germination rate and root length.

Results

Results



Result
There is no significant difference

Discussion

- The magnetic force may inhibit germination.
- The magnetic force may not affect growth.

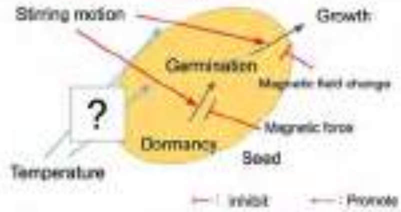
Discussion

Conclusion

- Rotation of the stirrer does not affect the oxygen concentration
- Magnetic force does not affect root growth
- Magnetic force inhibits germination

Motion promotes germination and growth with high probability.

Conclusion



In future

- To confirm a change in temperature rise due to rotation of a stirrer.
- To give motion by using a shaker.

Reference