

*Microbial fuel cells  
~The life everyone can  
use for electricity~*

*SGHN099*

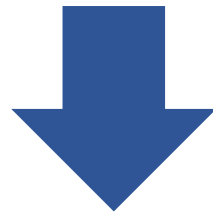
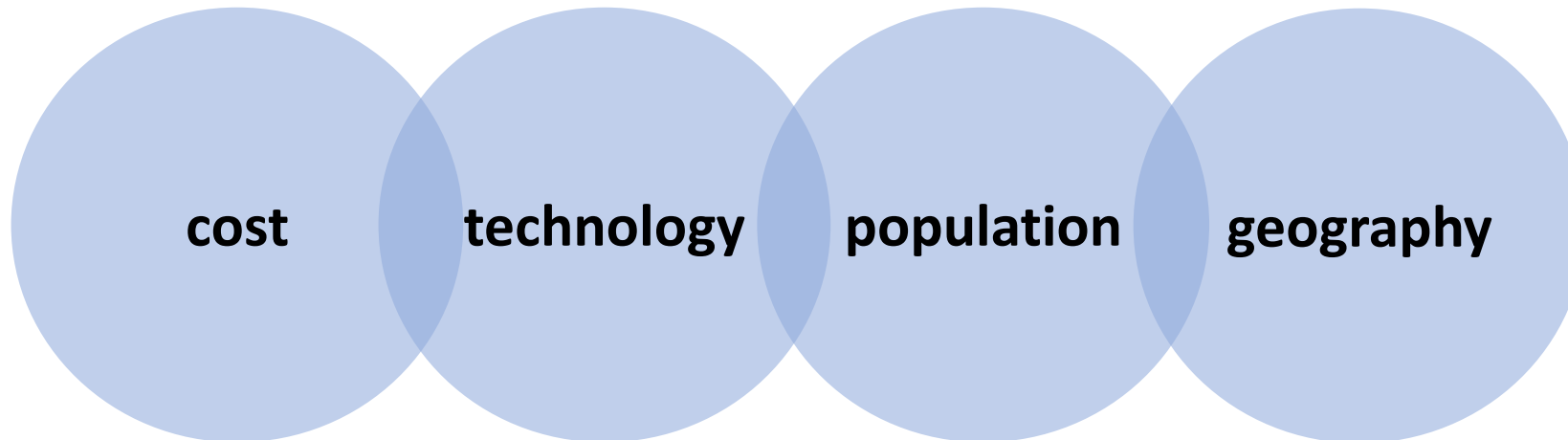
*Wakayama Prefectural  
Hidaka High School*



# *Motivation*

Some places still don't have electricity...

Because of various facts;

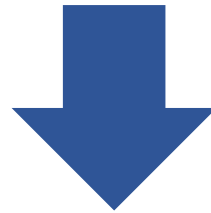


**Let's create batteries  
for local people so they can use it easily!**

# *Purpose*

「 To make electricity available  
for everyone in the world!! 」

❓ How can we to make electricity easily?



**Try to conduct an experiment of MFC (Microbial fuel cell)**

# Experiment

We conduct the experiment by using a **MUD WAT**.

**?** What is a MUD WAT?

**A simple MFC!**

- ① Microbes eat up nutrients.
- ② Microbes release the chemical energy stored in these foods as waste electrons outside their bodies.
- ③ By repeating this, electric current flows.



# *Consequent*

We could produce about 150  $\mu\text{W}$ !!



40W electric light bulb



About **27 thousand** kits...

# *Points to improve*



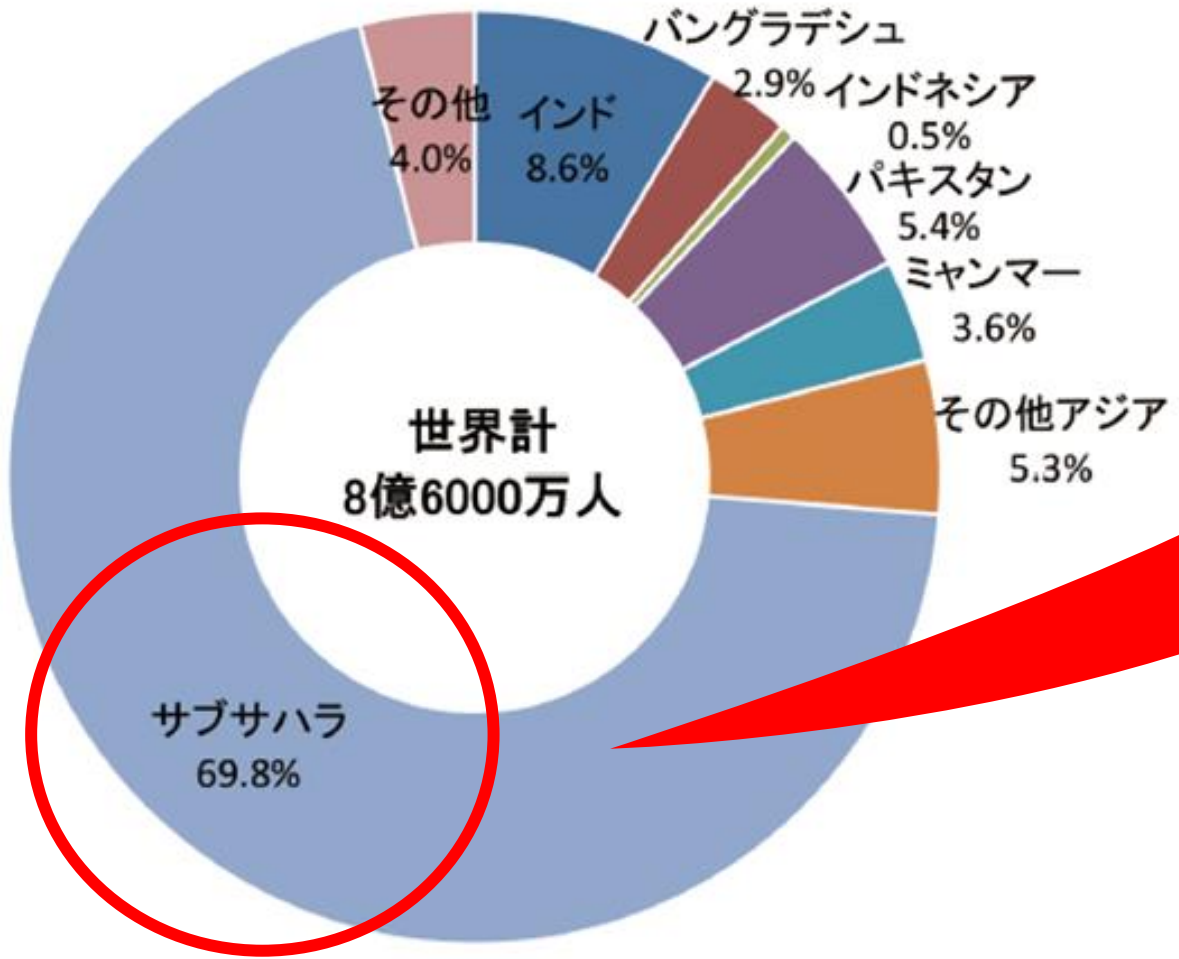
Now we're looking for  
the best condition.

For example...

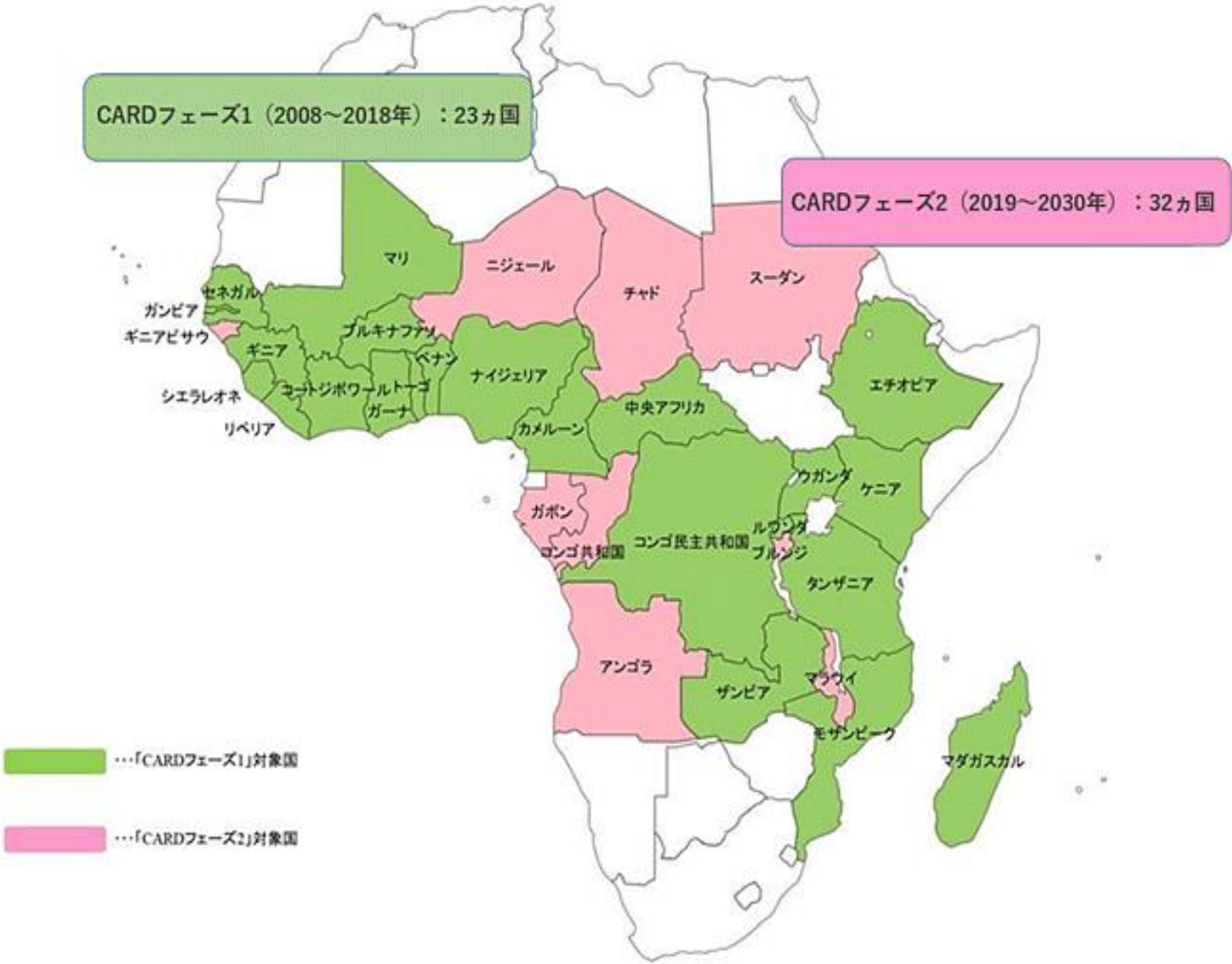
- Types of mud
- Types of nutrients
- Saturation with muddy water

...etc.

# Areas in the world that have no electricity

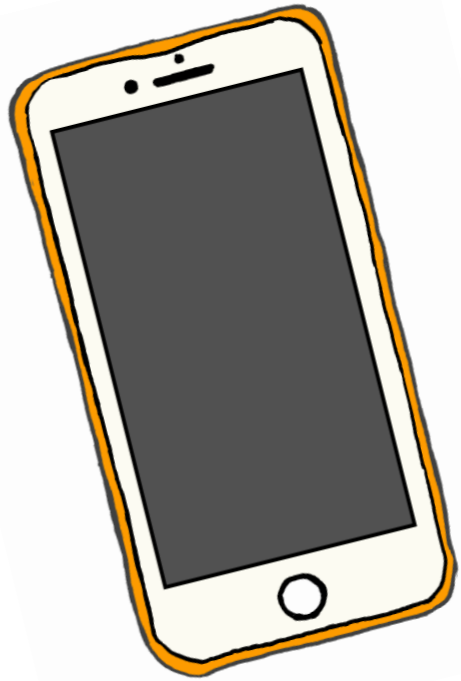


# Member Nations of CARD





# Conclusion



Generally smartphone is 20-30w

It takes 3-4 hours to charge

Electric power(Wh) =  $30(W) \times 4(h) = 120Wh$

Paddy fields 48ha are needed to generate

Japan : Sub-Saharan (amount of rice)

1ha : 5tons = 5.6million ha : 28 million tons

$5.6 \text{ million ha} / 48ha(1 \text{ phone}) = \text{about } 116,000 \text{ phones}$

# Reference

[マッドワット:泥からクリーンエネルギー!-魔法の微生物 \(magicalmicrobes.com\)](http://magicalmicrobes.com)

[【第223-1-4】世界の未電化人口（地域別、2018年） | 白書・審議会データベース検索結果一覧 \(tsuda.ac.jp\)](http://tsuda.ac.jp)

アフリカ稲作振興のための共同体（CARD），事業プロジェクト，JICA  
<https://www.jica.go.jp/activities/issues/agricul/approach/card.html>

*Thank you for your listening!*