



UNITED NATIONS
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Fisheries Training Programme

ENHANCING THE VALUE OF SMALL FISH SPECIES FOR FOOD AND NUTRITION SECURITY THROUGH IMPROVED DRYING AND PACKAGING



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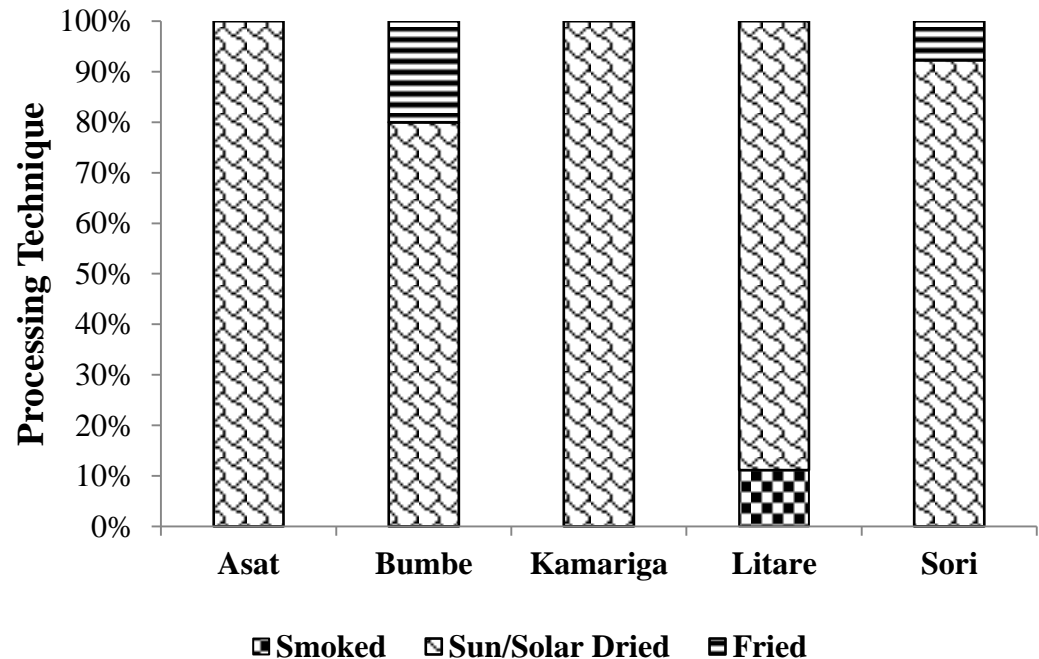
19th JULY, IIFET 2018 Seattle Conference



Introduction

- In East Africa, post-harvest losses occur (i.e. small pelagic species fishery), various preservation methods are use:

- ✓ Drying
- ✓ Smoking
- ✓ Frying etc.



Introduction cont...

● Drying still artisanal & results to contaminations:

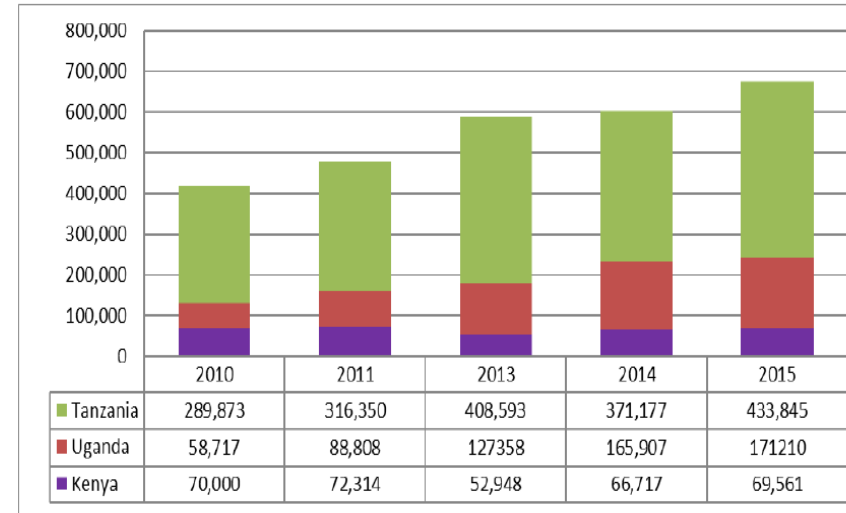
- With soil
- Droppings from birds and rodents
- Infestation with flies



Introduction cont...

■ Dagua is important small pelagic fishery

- Annual catch half a million tons
- >60% utilized as human food in dried form
- Short-lived sp. with high rate of regeneration/ turnover



Source: LVFO, 2015

	Value (2015, "USD")
Lake Victoria, Kenyan side	135,761,050
Dagua	21,721,770
Proportion of Dagua	16%

Introduction cont...

Small fish with a big potential for women's business

It would be difficult to imagine the diet of the local population around Lake Victoria without the silver cyprinid. The small fresh water fish also plays an important role in women's participation in Kenya's fisheries sector. However, in spite of intensive efforts, there is still a long way to go before they have played an equal role in the value chain.



Women and children sun-drying omena on nets at Lake Victoria's seashore, Kenya.

**Fish consumption per capita in Kenya: 3-5 kg/person/year.
Dagaa accounts for 35% of the total fish consumption**

Introduction cont...

Change in the Global food system

Chain reversal



Previous

- **Product push**
- **Short term**
- **Linkage oriented**



Present

- **Market pull**
- **Long term**
- **Chain oriented**

- The middle income groups is growing:

- High sensory quality products
- Accessible in retail stores

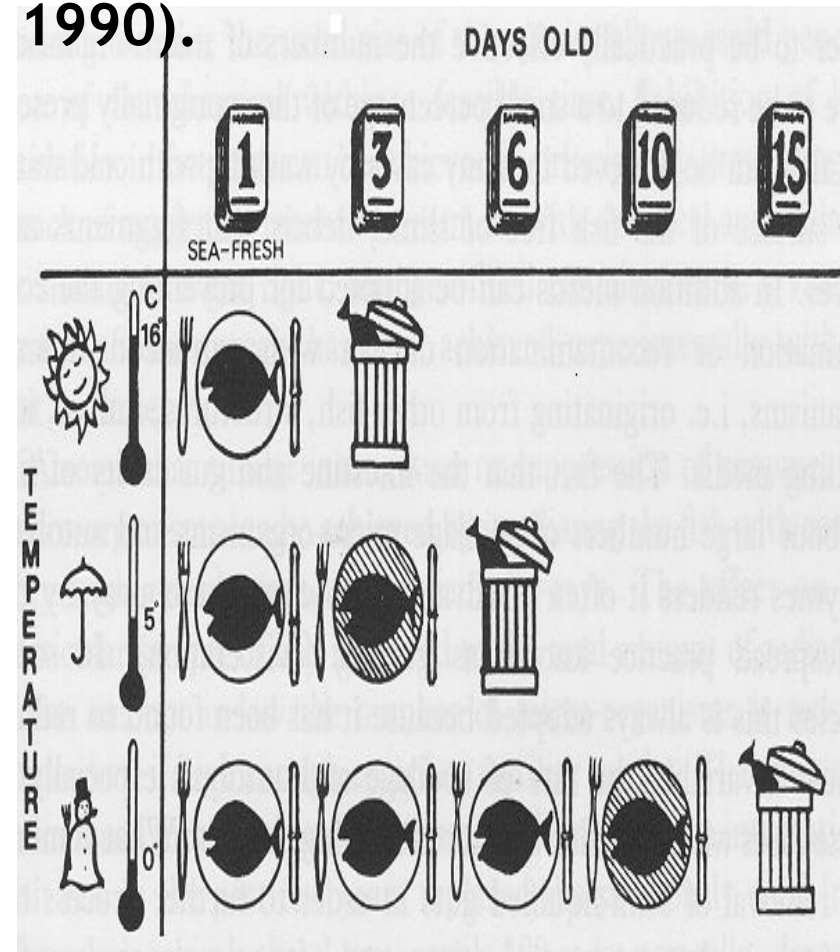
- Cereals and roots supply >half of the diet, with meat <10%

Results and discussion

Typical example of a landing site



The effect of temperature on storage life of fresh temperate fish (Connell 1990).



The quality of raw materials will effect on the quality of products

Better raw materials

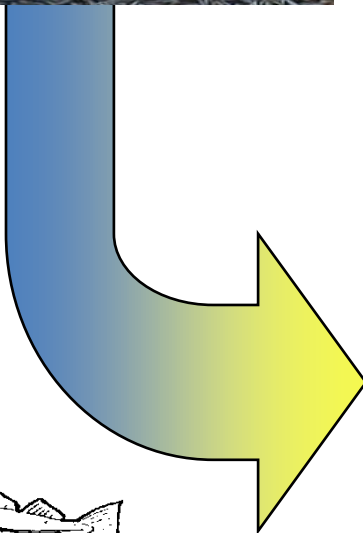


Gives better products

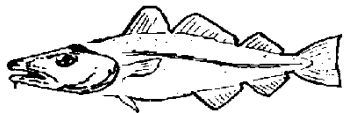
Sundried products



Fried products



A delicacy



No artificial additives or preservatives
100% Natural

INGREDIENTS:
Omena, vegetable oil & Salt

INSTRUCTIONS:
1. Warm to eat, or
2. You could prepare it like stew if you so desire

Manufactured in Kenya by: **Umo Sawa,**
P.O. Box 9722, Nairobi
Tel: 8725 00465

Distributed by: **WFP**
P.O. Box 9722, Nairobi

 Net. Wt. 100gms
Batch No. Mfg Date:

Freedom From Diseases
Starts with Eating Healthy Foods.

Fried Omena
Ready to Eat

Omena Health Benefits
-Low fat high quality protein
-High in calcium, phosphorus
-A great source of essential acids at low cost.
-Inhibits hypertension & cholesterol
-Low in Cholesterol



Expiry Date: _____

STORE IN A COOL DRY PLACE

YOUR HEALTH OUR CONCERN

No artificial additives or preservatives
100% Natural

INGREDIENTS:
Omena, vegetable oil, fennel, Rosemary leaves, Garlic, Cumin & Salt

INSTRUCTIONS:
1. Warm to eat, or
2. You could prepare a little stew if you wish

Manufactured in Kenya by: **Umo Sawa,**
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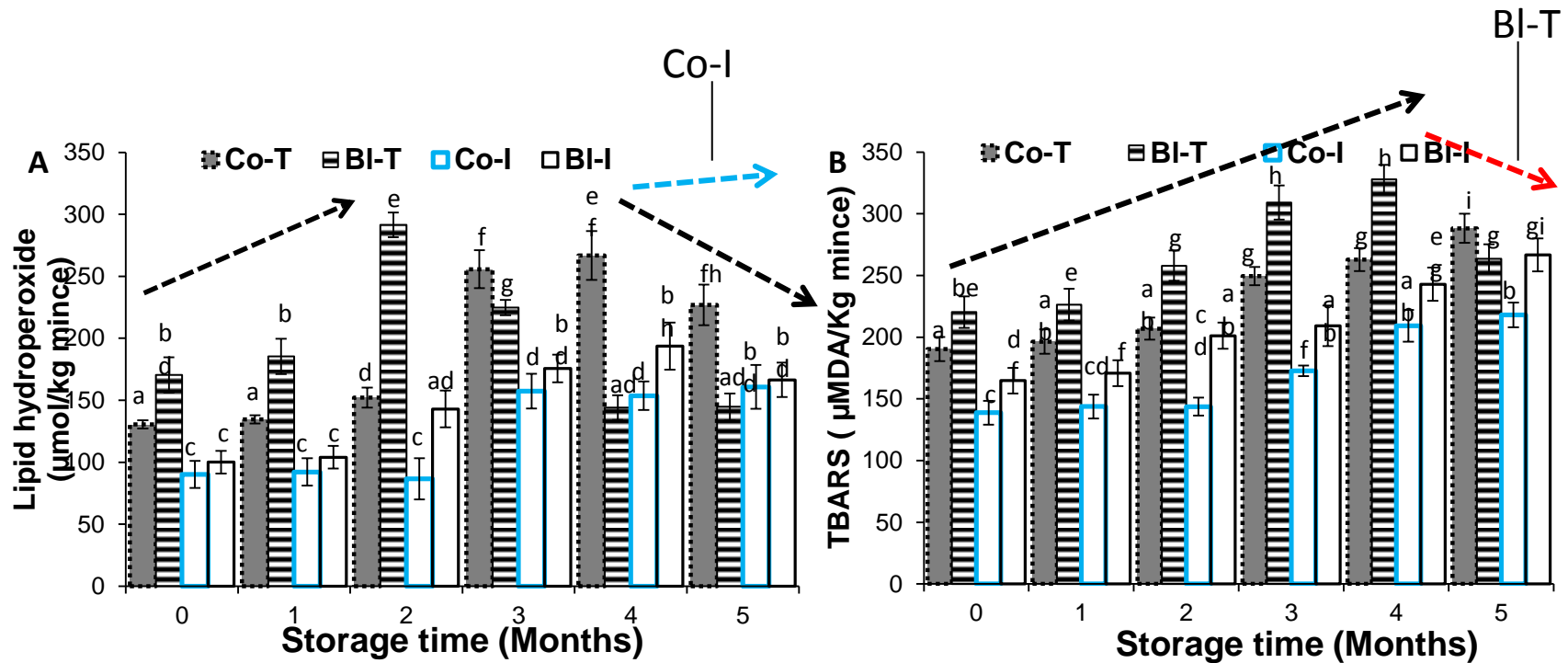


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STORE IN A COOL DRY PLACE

YOUR HEALTH OUR CONCERN

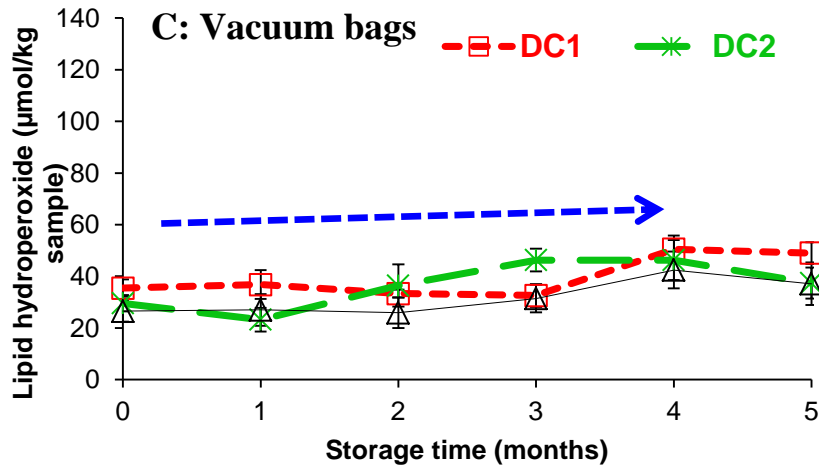
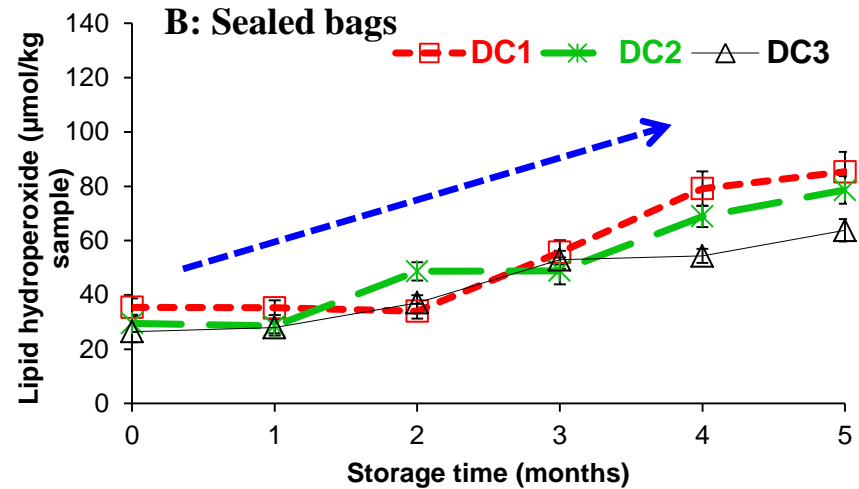
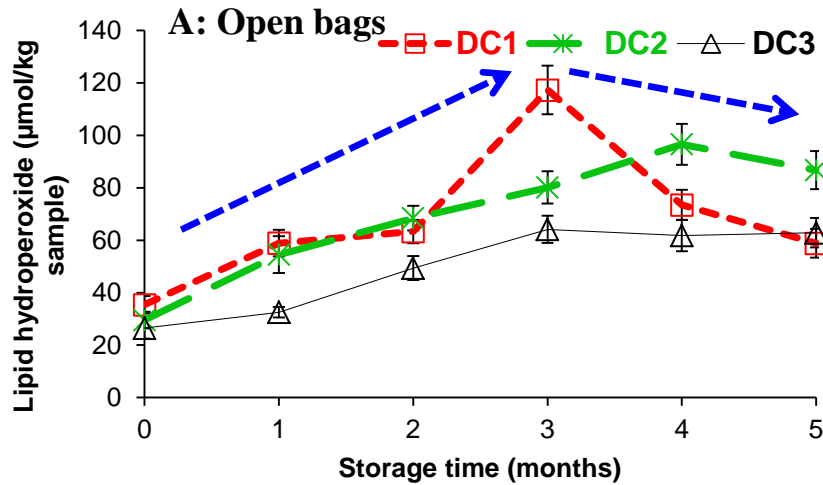
Drying methods effects on quality



Changes in PV (A) and TBARS (B) in control (Co) and blanched (Bl) sardine dried under industrial (I) and traditional (T) conditions as a function of storage time (n=3)



Packaging effects on quality



PV development in packaged dried capelin (A,B & C) during 5 of months storage at ambient temperature (n=4)

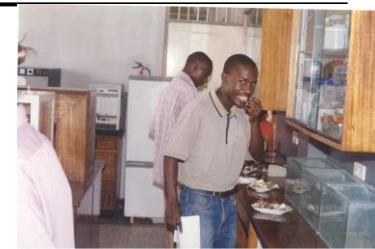


Packaging effects on quality cont..

Influence of packaging method

Mean sensory scores (scale 0-100) of rancid odor (A) and stock-fish odor (B) of dried capelin (n=2)).

Group	Packaging (bags)	A	Storage time (months)					B	Storage time (months)						
			0	1	2	3	4		5	0	1	2	3	4	5
DC1†	Open	***	4.5 ^a	8.4 ^b	10.9 ^b	15.3 ^c	14.8 ^c	16.5 ^c		45.7	44.6	47.5	48	46	45
	Sealed	***	4.5 ^a	6.6 ^a	7.5 ^a	7.4 ^a	10.3 ^b	13.6 ^c		45.7	45.2	47.4	41.9	40.5	42.7
	Vacuum	**	4.5 ^a	4.9 ^{ab}	4.6 ^a	6 ^c	5.7 ^{bc}	7.3 ^c	*	45.7 ^a	45.2 ^a	43.2	36.7 ^b	38.1	37.1
DC2	Open	***	3.6 ^a	5.8 ^b	3.4 ^a	5.4 ^b	9.1 ^c	10.8 ^c		50	48.7	45.7	45.9	45.9	48.1
	Sealed	**	3.6 ^a	4.7 ^a	4.5 ^a	4.6 ^a	7.2 ^b	7.3 ^b	*	50 ^a	48.9 ^a	47.7	49.7 ^a	42.3 ^b	47.5
	Vacuum	**	3.6 ^a	3.8 ^a	2.8 ^a	3 ^a	3.6 ^a	6.5 ^b	**	50 ^a	42.2 ^b	51.3 ^a	48.2 ^{ac}	44.9 ^{bc}	38.8 ^b
DC3	Open	**	3.2 ^a	4.1 ^a	6.2 ^b	5.5 ^b	6.8 ^b	6.3 ^b	**	57.8 ^a	46.6	45.6	49.7 ^a	45.8 ^b	46.6
	Sealed		3.2	4	5.1	4.4	4.4	4.3		57.8	49.1	48.2	46.6	48.6	46.9
	Vacuum	**	3.2 ^a	3.2 ^b	3.5 ^b	3.3 ^b	2.8 ^b	3.9 ^b	*	57.8 ^a	53.3	49.5 ^b	51.1	52.6	51.6



Dried fish acceptability

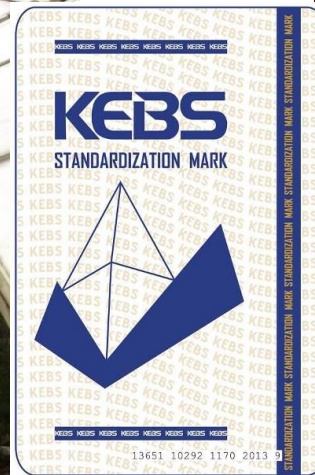
Dried fish consumption pattern among respondents in Kenya divided by shopping location and education level

Education level/shopping location	% respondents consumption frequency					
	Less than once a month	Once a month	2-3 times a month	Once a week	2-3 times a week	More often
Elementary education	4.3	6.4	14.9	10.6	29.8	34
Secondary education	22.2	5.6	38.4	11.1	11.6	11.1
University degree	25.6	20.9	18	18.2	8.2	9.1
Village markets	1.7	8.3	10	16.7	30	33.3
Supermarkets	30	8.3	33	11.7	11.7	5



Costing and pricing

Product & Quantities	Production Cost (USD)	Beach 40% Markup	Wholesale/bulkers 20% Markup	Retail 20% Markup
Sundried				
400gms	0.77	1,08	1.30	1.56.
100gms	0.20	0.27	0.32	0.39

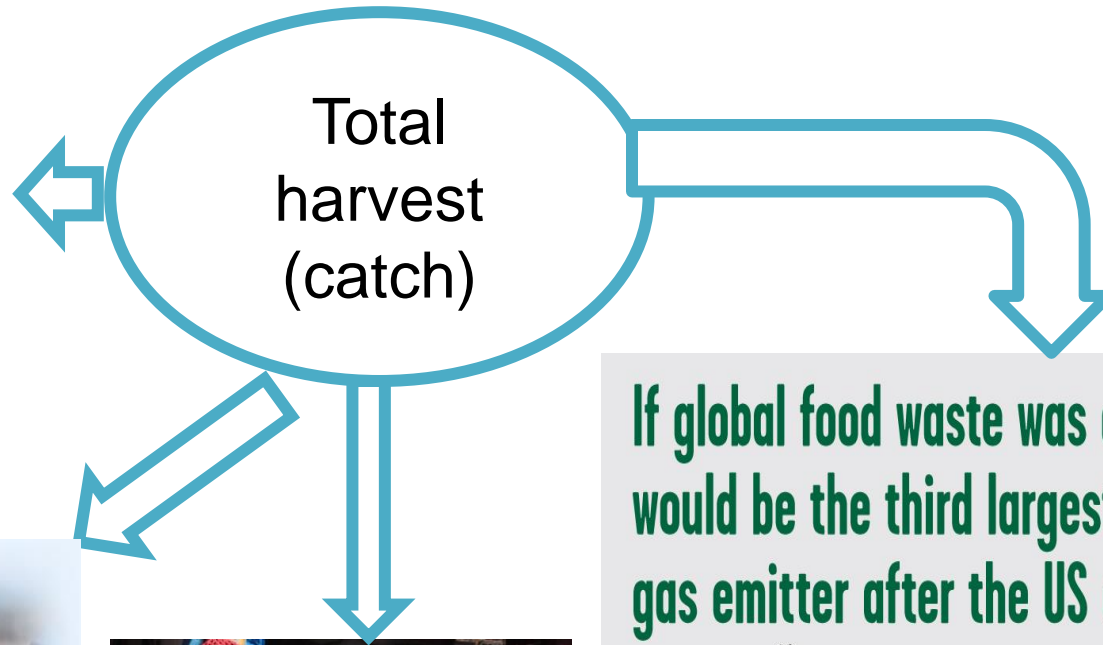


Conclusions

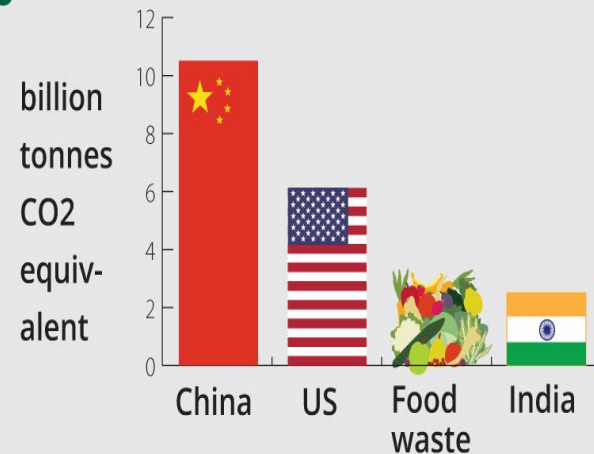
- A stable dried nutritious product of improved quality can be produced from fish dried under controlled conditions.
- When oxygen was excluded by vacuum packaging dried fish became more stable.
- The consumers are willing to buy packaged improved dried fish as the products were well received.

Prospects

The contest: using Dagua to feed fish or human?



If global food waste was a country, it would be the third largest greenhouse gas emitter after the US and China



Possible areas of intervention

1

- Appropriate Technology

2

- Policy implementation

3

- Cultural Change



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THANK YOU FOR YOUR ATTENTION!

