

Utilization of Job's Tears as rice substitute

for Disaster/Emergency Food in Asia

Team Adlai, Sweden

Nawapan Boonchum

Lukas Luggin

Nalaputi Basoeki

Roxanne Targa





Team Adlai



Lukas
Italy

Food Innovation
and Product Design

Experience with
gluten free bread



Nawapan
Thailand

Food Innovation
and Product Design

Experience in pastry
and bakery



Roxanne
Philippines

Food Innovation
and Product Design

Experience with
gluten free cookies



Nalaputi
Indonesia

Food Innovation
and Product Design

Experience with
starches



Karla
Philippines

PhD Candidate &
Lecturer at Lund
University

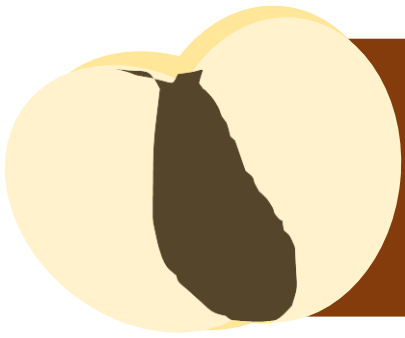


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FAO challenges: Food sector

World population
will be **10 Billion**
people by 2050



Food insecurity
arising from conflicts
and disaster



650 Million
undernourished
people in 2030



One third of
food loss





FAO challenges: Agricultural sector

33% Farmland
degradation
globally



Reduced
agricultural yield



Farm pests



Urbanization of
farmers





Challenges in Asia

- Water stressing among agricultural countries
- Climate change due to greenhouse gas emissions from nitrogen-based fertilizer
- Natural disasters such as intense precipitation, floods, droughts, storms
- Poor working condition in agricultural sector resulting to migration
- Food insecurity due to disasters and reduced agricultural productivity





Ancient grain for modern society

Reduced external
input



Adaptable to natural
environment and
biodiversity

Linked to culture
and tradition



Reduced carbon
footprint



Job's tear or Adlai



Could grow in
infertile soil

Nutritious rice
substitute

Requires less
resources as
compared to rice

Coix lacryma-jobi L.

Anti-cancer,
Anti-oxidant,
Anti-allergy

resistant to prolonged
drought and common
pests



Job's tear or Adlai

Adlai grow better in infertile soil in rainfed upland ecosystem as compared to improved variety of rice and maize

Table 1. Description, soil properties and grain yields of three upland crops in eleven environments in Nameuang village

	S1*	S2*	S3	S4	S5	S6	S7	S8	S9*	S10	S11
Elevation (m)	449	447	392	322	305	314	453	499	432	472	299
Slope gradient (%)	8%	13%	50%	32%	24%	19%	28%	29%	11%	10%	21%
Cropping history	More than 20yrs fallow	Upland rice in wet season 2013	More than 20yrs fallow	Upland rice in wet season 2013	Upland rice in wet season 2011-2013	3yrs fallow	4 yrs fallow	Upland rice in wet season 2013	More than 20yrs fallow	More than 20yrs fallow	2yrs fallow
Year of cropping	2014					2015					
Sowing date	15-Jun	16-Jun	14-Jun	14-Jun	13-Jun	13-Jun	15-Jun	16-Jun	14-Jun	14-Jun	13-Jun
Days to flowering	101	106	94	95	99	97	95	95	110	98	101
pH (H ₂ O)	5.7	5.8	4.5	5.3	4.3	4.6	5.3	5.6	5.6	6.0	4.7
Total C (g kg ⁻¹)	30.3	29.1	16.9	16.2	18.3	18.5	24.4	25.8	30.5	34.1	17.2
Total N (g kg ⁻¹)	2.5	2.7	1.5	1.5	1.6	1.6	2.3	2.4	2.7	2.9	1.5
C/N	12.3	10.8	11.1	10.8	11.2	11.3	10.5	10.9	11.3	12.0	11.5
Avail P (mgP kg ⁻¹)	6.8	2.9	18.6	39.7	25.9	23.6	5.9	19.0	17.7	11.1	23.3
Exc. Al ³⁺ (cmol kg ⁻¹)	0	0	0.5	0.0	1.3	1.0	0.0	0.0	0.0	0.0	0.7
Exc. Ca (cmol kg ⁻¹)	2.4	1.4	0.4	3.9	1.0	1.0	7.2	8.0	4.5	2.1	0.9
Exc. K (cmol kg ⁻¹)	1.0	0.4	0.6	0.9	0.5	0.9	0.3	1.1	0.5	1.0	0.8
Exc. Mg (cmol kg ⁻¹)	2.5	2.4	0.3	0.8	0.4	0.6	2.3	2.0	1.7	2.5	0.5

Mean grain yield (g/m ²)	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11
Upland rice	114	56	205	301	95	161	360	583	62	284	170
Maize	13	12	57	154	48	56	684	1079	13	319	57
Job's tears	141	124	204	491	186	185	125	387	131	278	203

(Asai and Soisouvanh, 2017)



Application of Job's Tears



“Ready-to-eat processed
job's tears as emergency food”

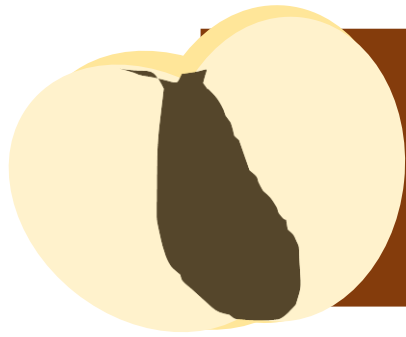
Ambient storage

Commercial
sterilization process

Long shelf life

More nutritious
than noodles or
bread

Packaged in a
retortable carton
(recyclable)



Application of Job's Tears; Processing



Harvesting of Adlai



Dehusking



Soaking and
Steaming



Packing in a
retortable carton



Addition of water



Sealing



Thermal and
Pressurized processing



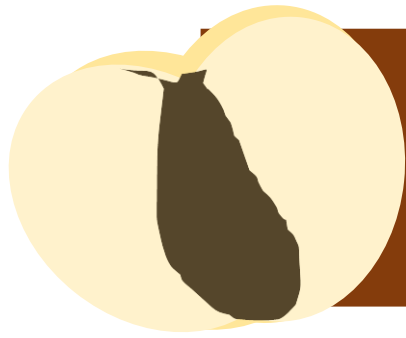
Cooling



Drying



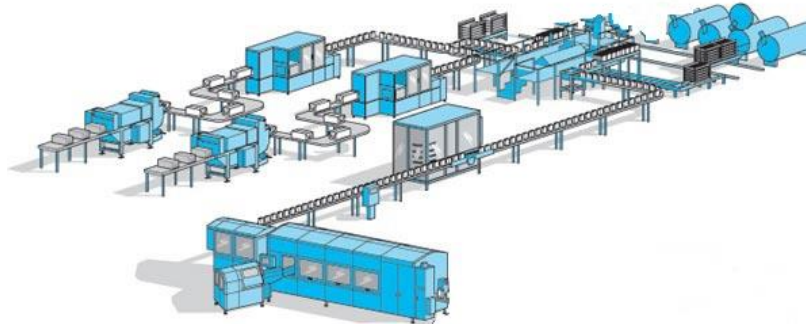
Packaging in
corrugated box



Application of Job's Tears

Equipment Needed

- Steamers
- Filling/packing machine
- Retorts
- Cooling and drying conveyor



“Ready-to-eat processed
job's tears as emergency food”

Sensorial Properties

- Acceptable results of 1:0.9 rice-adlai mixture (Peñaflor et al, 2014)





Benefits: Direct Impact

No need for refrigeration



More nutritious products for disaster or calamities



Flexible product which can be paired with other food

Can also be marketed as RTE food



Lower cost



Benefits: Indirect Impact

Reduced dependence on high environmental impact crops like rice



Increased income and morale of farmers



Increased resilience of crops to different climate conditions



Reduced migration of farmers to urban cities

Thank you for your attention!

with Support from





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