

Food Security Cluster Conference



Edible Insect Agriculture: For Nutrition, Livelihoods, Resilience, Circular Economy & Climate Sensitive Agriculture

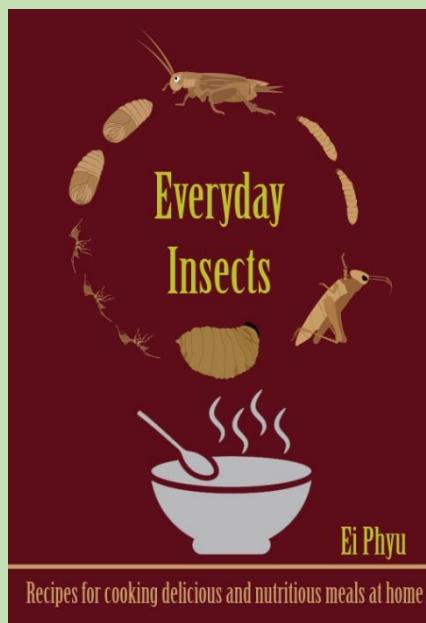
Assoc. Prof. (adj.) David Allan OAM
djallan7@gmail.com

OVERVIEW



- Focal Areas
- Edible Insects in Myanmar
- FCV Suitability & Cases
- Work Program Overview
- Interventions Tried
- Food & Feed Sector Status
- Social Media, TV, Promotions
- Training & Resources
- Summary / Next Steps

Delicious, Nutritious Food & Livelihoods Promotion!!!



Edible Insects (Entomophagy) in Myanmar



Initial Spectrum survey (2018):

- 85% eat insects – as snacks
- 45% eat as a main meal
- 10 main species, 30+ eaten.

Myint Thu Thu Aung further studies (2022):

- 37% eat 1-2 times per year
- 44% eat 3-6 times per year
- 14% eat 7-12 times per year
- 5% eat > 12 times per year.

INSECT FARMING GIVES FCV BENEFITS

AGRICULTURE AND FOOD SERIES

Insect and Hydroponic Farming in Africa

The New Circular Food Economy



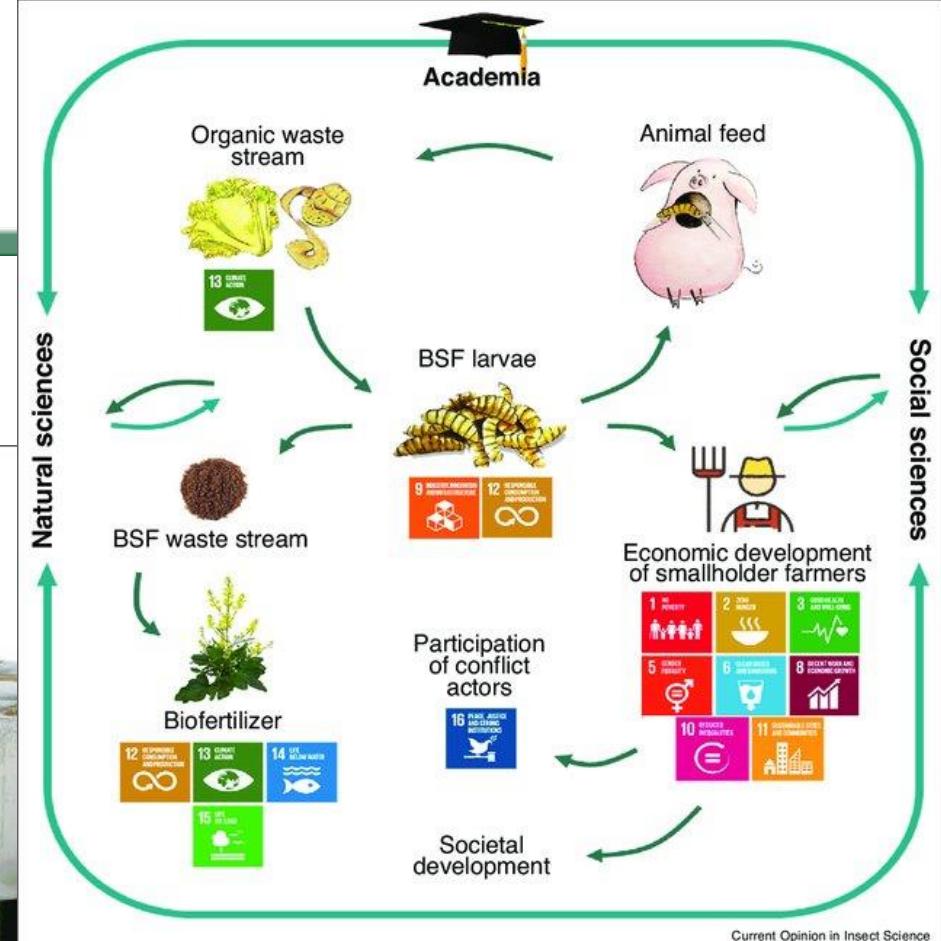
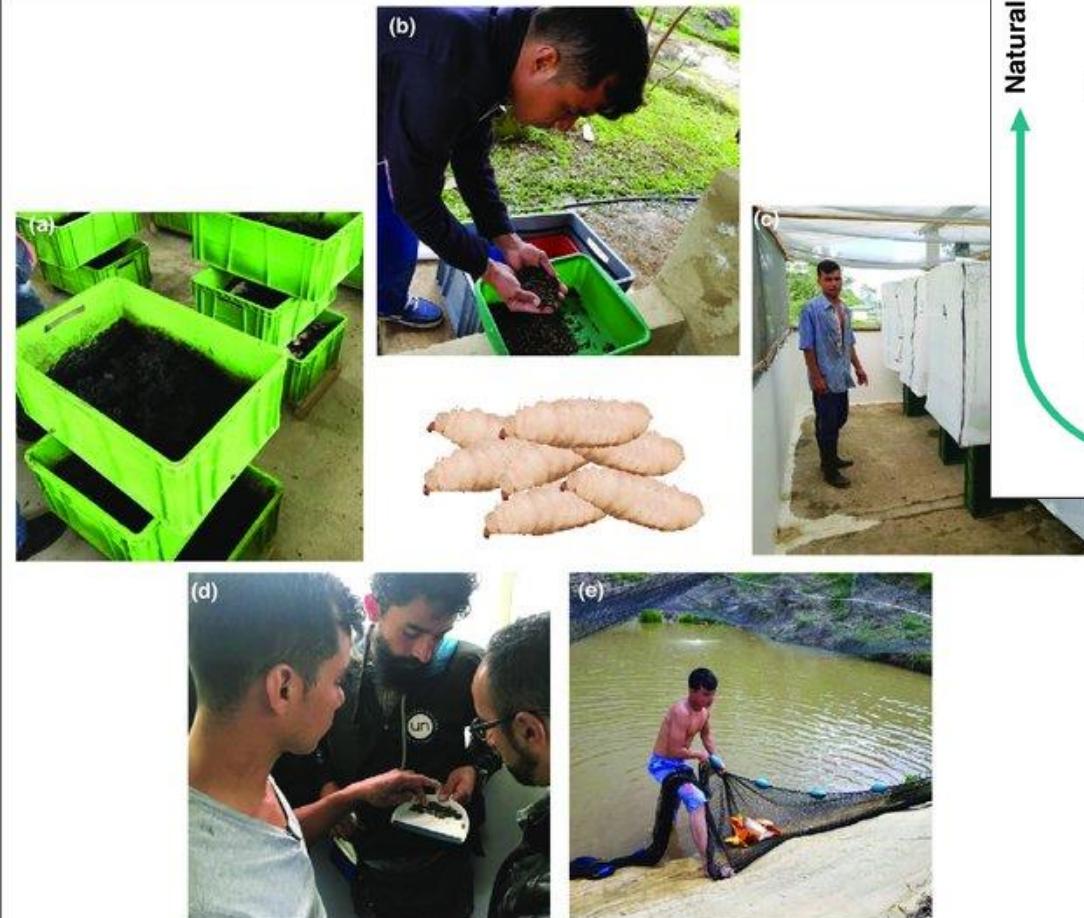
- WBs' identifies strong FCV (fragility, conflict, violence affected) location applicability for benefits identified from insect farming.

- English DL: 509
- 3rd highest globally!!!
- Translate???

- [US 1044, France 575, MM 509, SA 347, Haiti 305, UK 238, Kenya 227].
- See also Colombian ex-combatant case studies for integrated agriculture.⁵

COLUMBIA

“INSECTS FOR PEACE”



- ex combatants
- waste → BSF + fertiliser
- circular agriculture, economic development
- aquaculture + poultry
- extensive documentation



In 13 African countries, 850 insect farms are producing insects for food, feed & fertilizers.

Imagine collecting 30% of agriculture waste of the top five crops in the top 10 African agriculture economies and feeding it to Black Soldier Flies. This would result in:

- **replacing 60 million tons** of traditional fish and soy-based-animal **feed**
- creating **15 million** direct and indirect **jobs**;
- **incomes, and livelihoods**, along the value chain, and
- **reducing greenhouse gas emissions** by the equivalent of taking 18 million cars off the road annually

Other benefits include:

- **Improved sustainability of local food systems and natural resources** because of little water requirements and no arable land is needed
- **Improved soil health** through application of organic fertilizers consisting of the insect manure (frass) produced during the insect farming process
- **Improved peacebuilding and resilience to fragility, conflict, and violence** through the creation of more stable and sustainable food system that provide economic opportunities and require fewer natural resources.

Edible Insect Sector Areas of Work and Studies:

- National Species and Cultural Practices Survey
- Existing Value Chains (Crickets + 2 minor) Study
- Edible Insect Local Market Studies
- Sustainability Hotspot Analysis of Cricket Sector
- Feed Substrate Options Study
- Waste Circularity for Feed Study
- Cricket Farming Economics Study
- Aquaculture Feed Sector Overview
- Insect Aquafeed Trials
- Feed Sector Market Overviews
- Small Farmer Support & Grants
- BSF Farming Trials
- Industry Association Engagement / Support
- International Sector Engagement
- Regulatory Overview
- Policy Needs Assessment
- Nutritional Benefits Assessment
- Food Safety Issues Overview
- Local Market Practices Study
- Recipe Book Creation
- Insects as Food Promotion (Recipes / TV / FB)
- Facebook Community Development
- Edible Insect Tourism Potential Promotion
- Snack Developments

Interventions Supported / In Process



- Micro grants supported (various insects / markets)
- Small / Medium scale farming grants (all were cricket farmers)
- Integrated circular insect farming for aquaculture / poultry feed (mostly Black Soldier Fly larvae)
- Decentralised & Modular approaches (waste + BSF pilots)
- Large scale farming (BSF – design, economic modeling, investor disc.)

Success Story – Medium Scale Cricket Farming

Play 2 minutes of
farm video here...

ဦးအိမ်တောက်မောင်

(ပုဂ္ဂန်မွေးမြှောက်ခြံ ဖိန်ရှင်) ကရင်ပြည်နယ်၊ ဓမ္မမြေားစုနှင့်

U Eain Tauk Maw

(Crickets Farmer) livestock Zone , Kayin State

In the future, wild catch crickets populations may be threatened.
Farming insects has great potential for the future market.

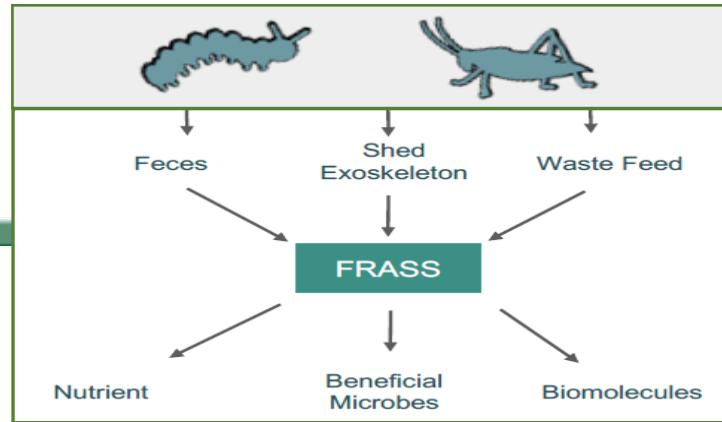
Medium Pilot – waste fed BSF => compound feed, oil + fertiliser

Spectrum Insect Feed Systems

ရောင်စည်လိုင်း အင်းဆက်နှင့် စွဲးမြှော်း
အတာထုတ်လုပ်ရေး



Insect Frass



ASPIRE
FOOD GROUP

Frass as Biofertilizers

Top 2 benefits include yield improvement and plant growth promotion

Yield Improvement

- Increased yield of several field and horticultural crops
- Increased nutrient uptake and/or use efficiency
- Increased fresh weight of vegetables

Plant Growth Promotion

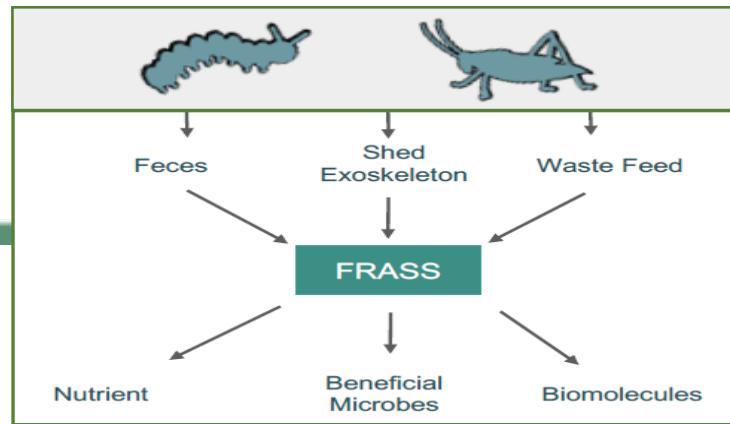
- Increased germination and seedling growth
- Reduced seedling mortality

Soil Health Improvement

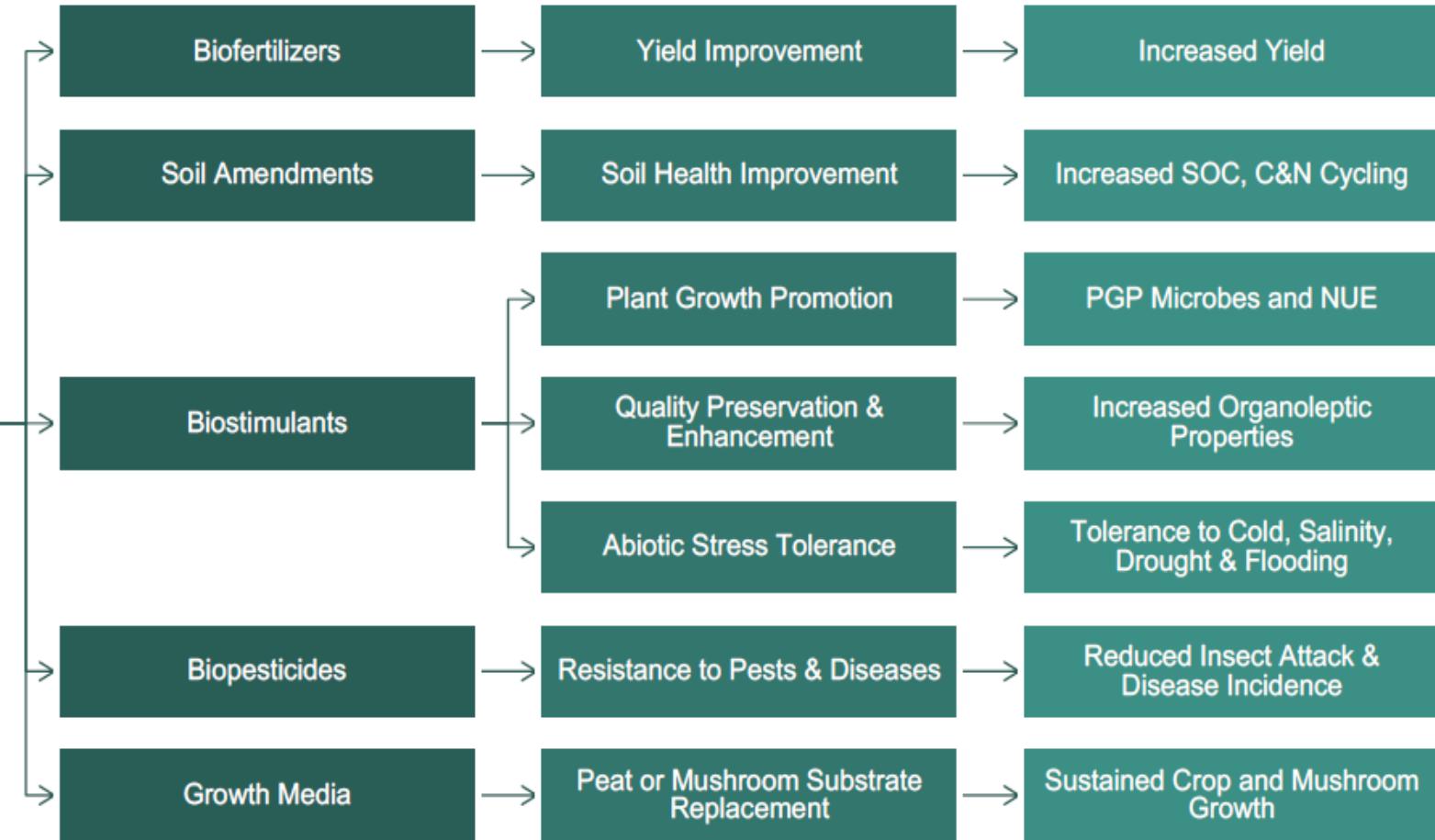
- Increased soil C and N

Insect Frass

Frass Value Proposition



ASPIRE
FOOD GROUP



Insect Nutrition, Decent work and Income for Women in Rakhine Region (INDIWIRR):

Small Grants programme for Edible Insect farms and microbusinesses in Rakhine. Features:

- 300 farmers targeted in 3 phases of small grants call. (IDPs particularly eligible). 3000 beneficiaries total.
- aimed for an 80% women farmer target for establishing insect farm, & a category for PwD
- 1st round on cricket farming
- 2nd on crickets or BSF
- 3rd as a larger funding pool for integrated farming for livestock feed (fish, poultry, pigs)
- various Rakhine CSOs and businesses included.

Insect Nutrition: Well documented!

Nutritional table

Source	Protein g	Fat g	Calcium	Iron	Zinc	Potassium	Niacin	Magnesium	B ₁₂ (mcg)
Cricket	20.5	6.8	40.7	1.9	6.7	347	3.8	33.7	5.4
Mealworm	23.7	5.4	23.1	2.2	4.6	340	5.6	60.6	0.5
Waxworm	14.1	24.9	243	5	2.5	221	3.7	31.6	0.1
Soldier Fly Larvae	17.5	14	934.2	6.6	13	453	7.1	40	5.5
Silkworm	9.3	1.4	17.7	1.6	3.1	316	2.6	49.8	0.1
Cockroach Nymph	19	10	38	1.4	3.2	224	4.4	50	23.7
Earthworm	10.5	1.6	44	5.4	1.7	182	N/A	13.6	N/A
House Fly	19.7	1.9	76	12.5	8.5	303	9	80.6	0.6
Chicken, skinless	21	3	12	0.9	1.5	229	8.2	25	0.4
Beef, 90% lean, ground	26.1	11.7	13	2.7	6.3	333	5.6	22	2.1
Fish, Atlantic Wild Salmon	19.8	6.3	12	0.8	0.6	490	7.8	29	3.2

ကျန်းမာရေးနှင့် ညီညွတ်အောင် စားသောက်ရမည့်ပုံစံ

အဟာရမျှတစေရန် နေ့စဉ် အစာအုပ်စု
(၃) စုမေးများ လုပ်နည်းပညာများကို စုလုပ်စွာစားပါ။

ကောက်နှင့်အပါးဖို့မျိုး
နှင့်အားလုံးများနှင့်
သစ်သွေ့များ



ရေများများ
သောက်ပါ။



ဟင်သီယံပင်း
ဆိုက်များနှင့် ပဲ
အချို့မျိုး



သစ်သီး
ဝလ်များ

အသိနှင့်သော
အသားကြော်သား၊
ငါးသူပြေား၊ အငွေအသန
များနှင့် ပဲအပါးဖို့မျိုး

အခါးလျှော့ မို့ ဒီဇိုင်း၊ ဒီဇိုင်း
အဗြားနှင့်ကြုံနှင့်များ



ပမာဏနှင့်နည်းသာဓားပါ။



ပမာဏနှင့်နည်းကို တစ်ခါတစ်ခါသာဓားပါ။

သုတေသနအိုင်း
ယာများ၊
အသုတေသန
အခေါ်အချို့မျိုး

Myanmar Insect Food Sector Status



**MYANMAR'S WILD CATCH CRICKETS:
LEARNING FROM A SUSTAINABILITY HOT SPOT ANALYSIS**

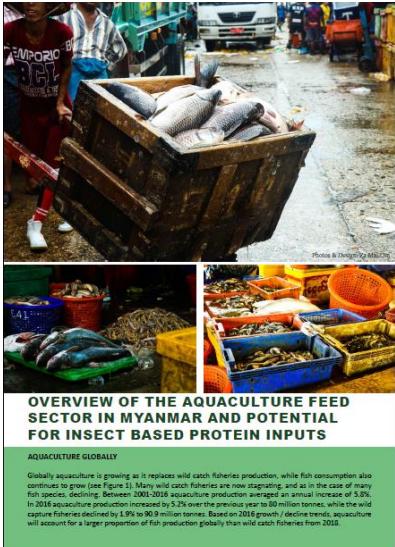
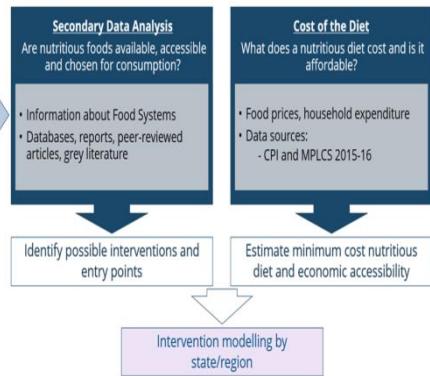
Myanmar has a well established, large scale wild-catch cricket industry of significant value (US\$33.9M), with a highly organized value chain for product collection, distribution and sales.

A Sustainability Hot Spot Analysis (SHSA) can help assess sector life cycle impacts and sharpen focus on opportunities for improvement. This analysis can help to improve decision making and business enhancements across the whole value chain, from collection to end sales and final consumer use.

- Very high consumer insect acceptance
- Wild harvest of crickets dominates
- Organised value chains now worth \$5M, most farmed insects currently small scale
- Sustainability Hotspot Analysis highlights environmental impacts, food safety, and points to a need for increased farming
- Vendor practices need improvement
- Nutrition contribution very clear now
- Online markets give major change potential
- Food sector outlook – good, modest growth.

Insects as Feed Feed Focus – Aquaculture, Poultry and Pigs

Multiple useful nutrition approaches underway:



- MM aquaculture sector 9th largest globally, with fish protein very accepted and growing
- Insect fish feeding trials successful, with MM University collaborators
- Black Soldier Fly (BSF) most obvious species
- Circular economy potential significant
- Substrates and species need more research
- Much larger scale trials, research and enabling investment focus needed
- Feed sector outlook – can be enormous – and cover both small and large scale.

Insects in Feed Sector Value

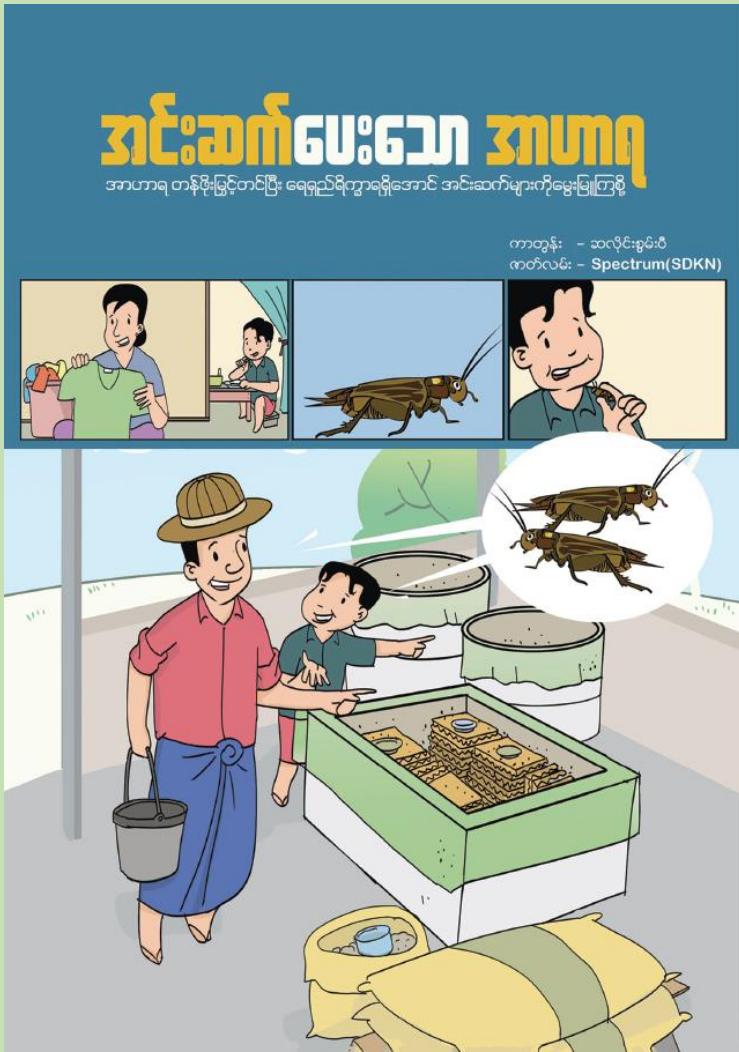
(based on 2020 stock production estimates)

Table 2M - 1. Indicative Analysis of the total market for insects for feed market in Myanmar

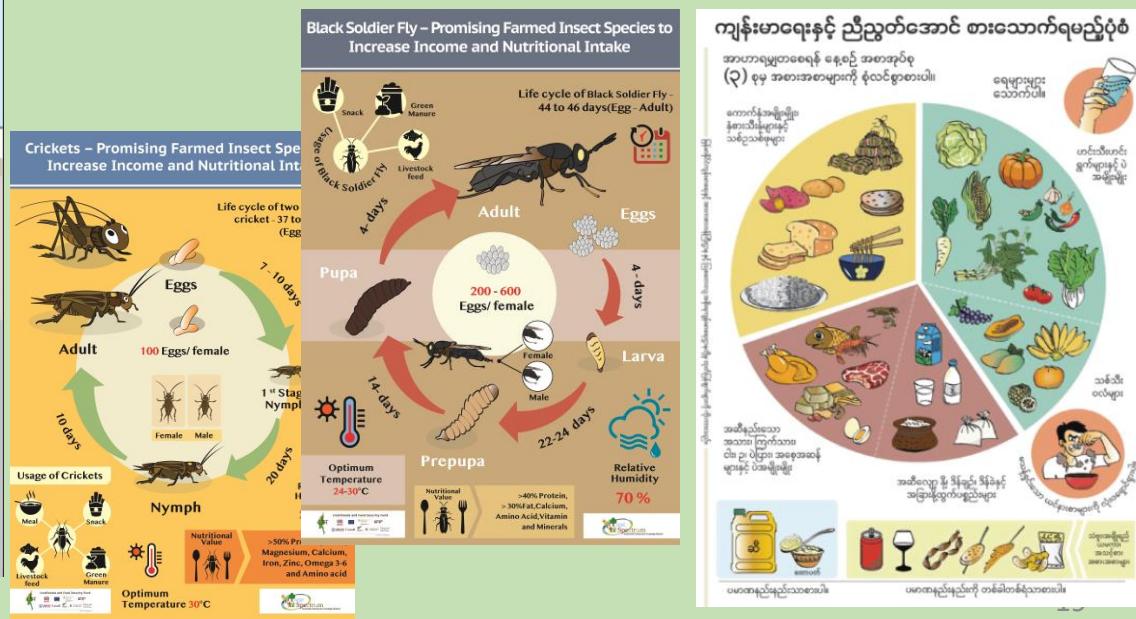
Sector	Tonnes of Product/a	Feed Conv. Rate	Tonnes of Feed /a	Insect Protein Inclusion Rate	Total Insect Tonnes	Annual Value USD	Value per tonne of feed
Poultry	711,669	1.6	1,138,670	10.0%	113,867	59,929,987	526
Layers	725,906	2.0	1,451,812	7.5%	108,886	57,308,383	526
Aquaculture	449,106	2.4	1,055,400	10.0%	105,540	55,547,347	526
Pork	365,881	2.9	1,061,055	5.0%	53,053	27,922,495	526
Beef	168,719	6.8	1,147,292	?		NA	
Sheep/Goats	31,020	2.5	77,551	?		NA	
Dairy	1,037,464	6.8	7,054,755	?		NA	
Total						200,708,212 USD/a	
						266,941,921,551 MMK/a	

Using Insect Protein Inclusion Rates ex Agrifutures 2020 Report, which can be considered conservative.

Children's book as an Integrated Education Material



- Children's story prepared to help edible insect farming knowledge and life cycle promotion and **nutrition** information dissemination



“Everyday Insects” Recipe Book & Facebook page



The screenshot shows the Facebook profile of the page "Everyday Insects". The cover photo features a woman in a blue sweater holding two red copies of the "Everyday Insects" book. The book covers feature the title and some small images of insect-based dishes. To the right of the photo is a green promotional graphic with Burmese text: "အရသာရှိပြီး အဘယာရပြည့်" (After cooking) and "ဒေဝါးဆင်းတင်းပျော်" (Insect-based dishes). Below the text are three small bowls of food numbered 1, 2, and 3. The top navigation bar of the Facebook page includes icons for Home, People (with 9 notifications), Videos, Groups (with 3 notifications), David (the page owner), and other standard social media controls.

Everyday Insects

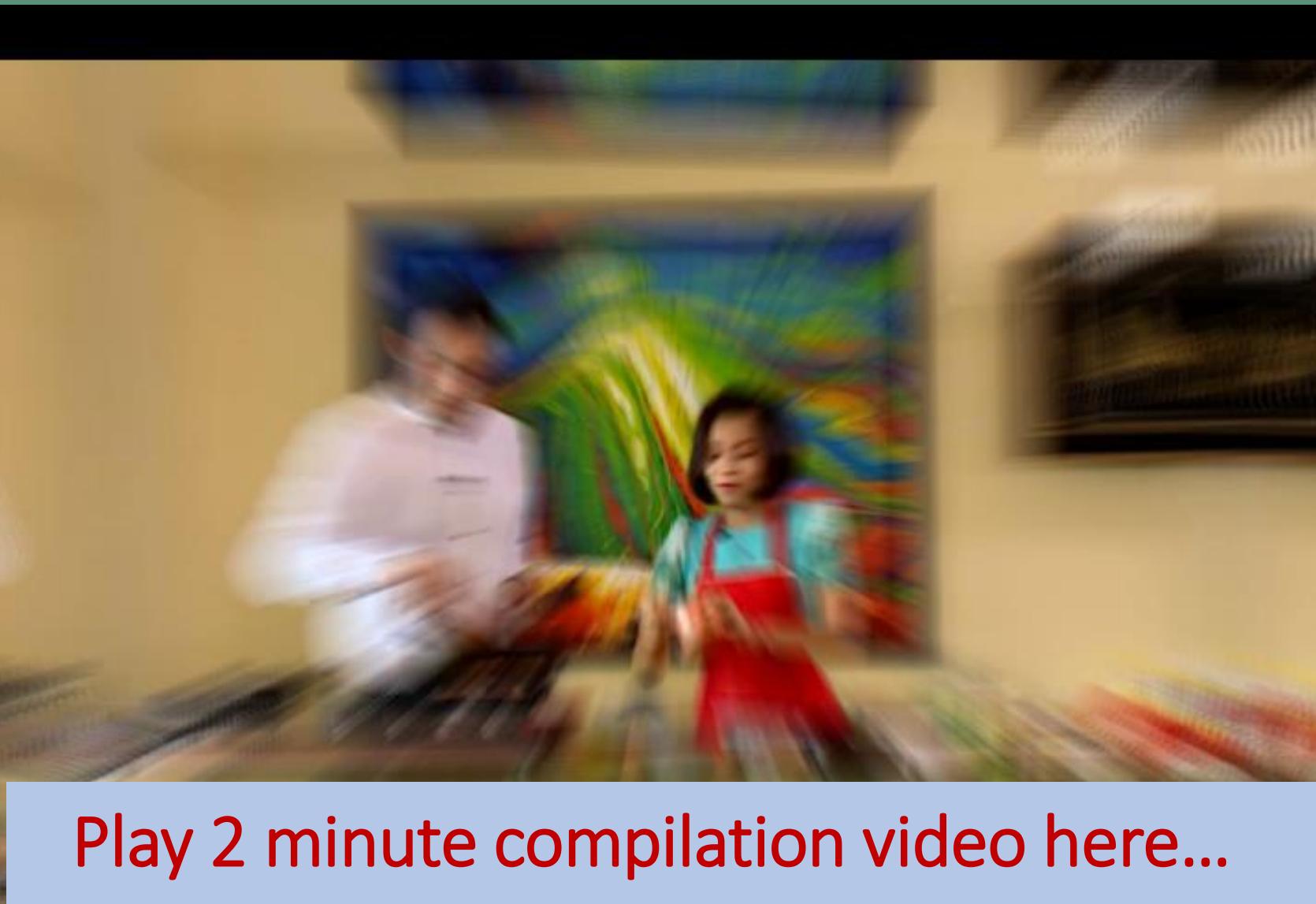
@everydayinsects · Kitchen/Cooking

Edit Send Message

Home Shop About Photos More Promote Search ...

20

MITV “Lets Taste Delicious Insects” Series



Play 2 minute compilation video here...

2 recipes in each of 9 x 15-20 minute TV episodes.
Multiple re-runs done & 3rd series in discussion.



“Everyday Insects” Recipe Book & Facebook page

<https://www.facebook.com/everydayinsects/videos/811756929740021>

Videos

See All

Shorter format videos than TV series...



ຕູດບຶນມຸນ
ມຸນຟັນ

ຕູດບຶນເອກະພົບກິ ອິ່ນໝາຮືຕໍ ປິອົນປອຫຍະລົວເຕູກິ ອາວຸບີ...



1.1K

169.5K Views · a week ago



TOP PERFORMING POSTS - COOK-ALONG RECIPES

Cook-Along Recipe: Cricket Papaya Salad



Everyday Insects

Published by May Thu Khine · 15 July at 18:00 · 6 d

ပုဂ္ဂစ်၊ အရာသာဟာ စီမံခိုင်လေးနဲ့ တစ်ဦးကိုကိုယ်ဝါယံမှုမှာ ကုတ်ထားခဲ့ရနိုင်တဲ့ ဖို့နဲ့ အနဲ့လေးကြာ့နဲ့ တစ်မျိုးခြားတဲ့ ခဲ့စားမှ ကိုပေါ်လေ့မြင်ပေါ်တောယ်၊ လတ်ဆတ်တဲ့ ထဲတော်သို့ပေါ်လေးနဲ့တွေ့ဖော် လျှို့ဝှက်တဲ့ အခါမာတော့ အချို့ အချို့ အစပ် နဲ့ အခို့အရာသာကိုယ် လျှို့ဝှက်လေးနဲ့ရောစာတော်တဲ့ ပြီးပြုလိုတဲ့ အရာသာကိုပေါ်လေ့မြင် မာပါ၊ ကိုယ်အနီးအနွဲပဲ အလွယ်တကူပေါ်ကြိုး ချက်ပြတ်နေပါ၏။ အားလုံးပဲ အတွက် ချက်ပြတ်ကြည့် အဆင့်ပုံပေါ်လေး၊ စားသုံးလှိုရမှုတဲ့ အင်းဆင်...

See more



Reach: 482,556

Reactions: 2,400

Comments: 28

Shares: 113

Video Views: 238,352

**Total Engagement:
240,893**

Engagement Rate:
50%

Cook-Along Recipe: Cricket Masala and PoeSar Masala



Everyday Insects

Published by May Thu Khine · 15 July at 18:00 · 6 d

မဆလာ ဆိတ္တက် မြန်မာစိုင်မှာ လူသိများ အထူးမြှုံးတဲ့ ဟင်ပဲ ပါဝင်ပွဲလို့တစ်ခဲ ဖြစ်ပါတယ်၊ အသား ကြော် နဲ့ အင်းဆင်ပါး ကောင်းလေးတွေ စားသာကော်ပါဝင်တဲ့ တွဲချက်နှင့်တဲ့ ဗျယ်စွဲရှိ ဟင်ခေတ်အမှုးအကြိုင် ပစ္စည်လေး ဖြစ်ပါတယ်။ ဒေါ်မြတ်သား မြတ်မြတ်ပါး အတောက်များနှင့် နေစွဲ အာဟာရ တအုပ်စုရာသားလူ မ အပြန် အတွက် ပုဂ္ဂိုလ်နဲ့စားသာကော်ပါဝင်ရှုခေါ်အောင်။ အရာသာရှိလွန်နဲ့ စွေမျှမော့သွားမှာ အာမျှတယ်နော်။

See more



Reach: 301,964

Reactions: 830

Comments: 4

Shares: 41

Video views: 149,075

**Total Engagement:
149,075**

Engagement Rate:
49%

Learnings:

The cook-along recipes were well-received. People expressed their desire to try making the dishes at home, and thanked the page for sharing the recipes.

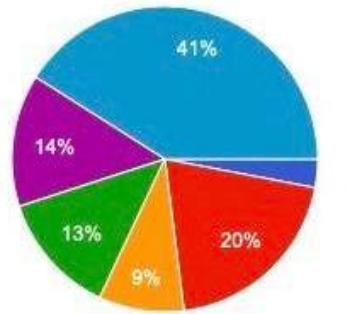
This recipe video format was very effective and resonated the most with our audience.

Latest Training in June 2022 – 100 people, good reviews.

3. What type of stakeholder are you? သင်၏ပါဝင်မှု အခန်းကဏ္ဍ

 Copy

100 responses

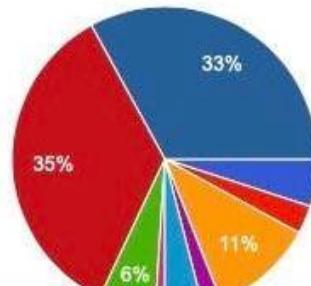


- A) Government အစိုးရွှေ့ကြာန
- B) Farmer ဧည့်ပြုရေးသမား
- C) Local business/ retailer/ vendor ဒေသခံစီးပွားရေးသမားလက်လိပ်စီးခ...
- D) University/ Institution တက္ကသိုလ်အဖွဲ့အစည်း
- E) NGO အစိုးရုပ်ဟုတ်သောအဖွဲ့အစည်း
- other

4. In which area(s) do you predominantly work? (select all that apply) အဓိကလုပ်ကိုင်ခဲ့သည့်နယ်ပယ် (လုပ်ကိုင်ခဲ့သမျှအားလုံးကို ရွှေးချယ်ပါ)

 Copy

100 responses

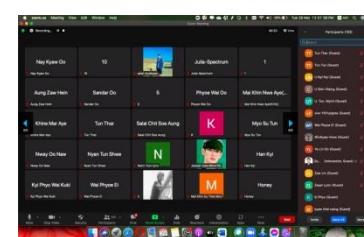
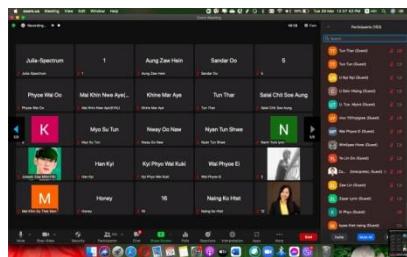


- A) Food security အစားအစာ ဖူလို့မှု
- B) Nutrition အာဟာရ
- C) Agriculture/ Land Use/ Farming/ Liv...
- D) Scientific Research သီပုံသူတေသန
- E) Insects/ Entomology အင်းဆက်ကိစိုလ...
- F) Value Chains/ Trade တန်ဖိုးကွင်းဆက်၊ ...
- G) Policy/ Governance မူဝါဒအစိုးရပိုင်း...
- H) Environment/ Conservation သဘာဝပ...
- I) Other

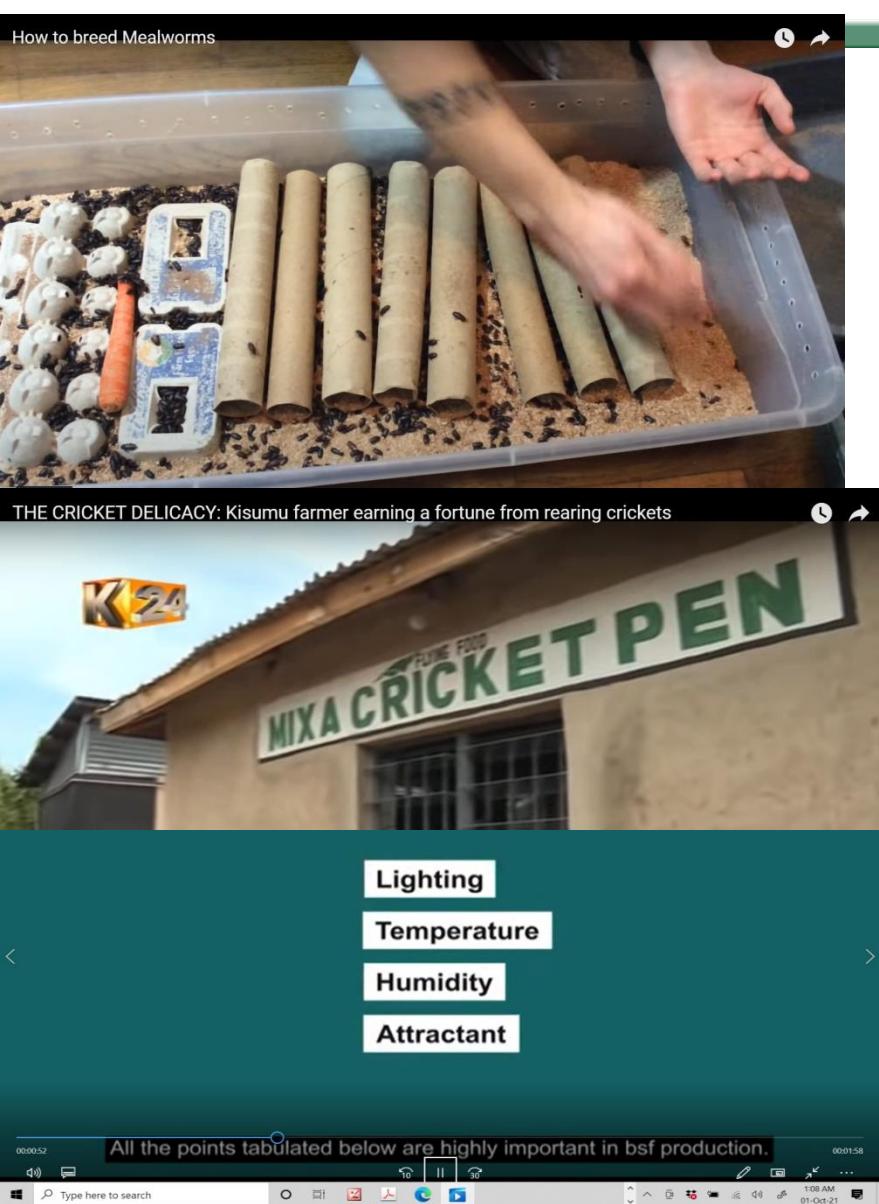
Safari

▲ 1/2 ▼

Latest Training in June 2022 – 100 people, good reviews.



Insect Farming Video Collection - MM Subtitled Youtube Videos:



- Made and screened a collection of around 130 videos on various aspects of insect farming.
- Selection criteria:
 - Relevant and of likely interest for Myanmar farmers
 - Not complicated
 - Not too high a technology level – eg NOT automated systems
- 1 Cricket, 1 Mealworm, 6 BSF videos separately for copyright reasons.
- Extremely popular on the 4 social media groups used.

Translations: – FAO – Cricket Manual



Food and Agriculture
Organization of the
United Nations



Food and Agriculture
Organization of the
United Nations



- Translation completed with FAO co-publishing agreement.
- 991 Downloads.

ရောင်အကျိုးဖြာ
ပုဂ္ဂစ်မွေးမြှုနည်း လက်ခွဲ

မွေးဖြူသူများနှင့်စစ်ဆေးသူများအတွက်
လက်တွေ့လမ်းညွှန်

Guidance
on sustainable
cricket farming

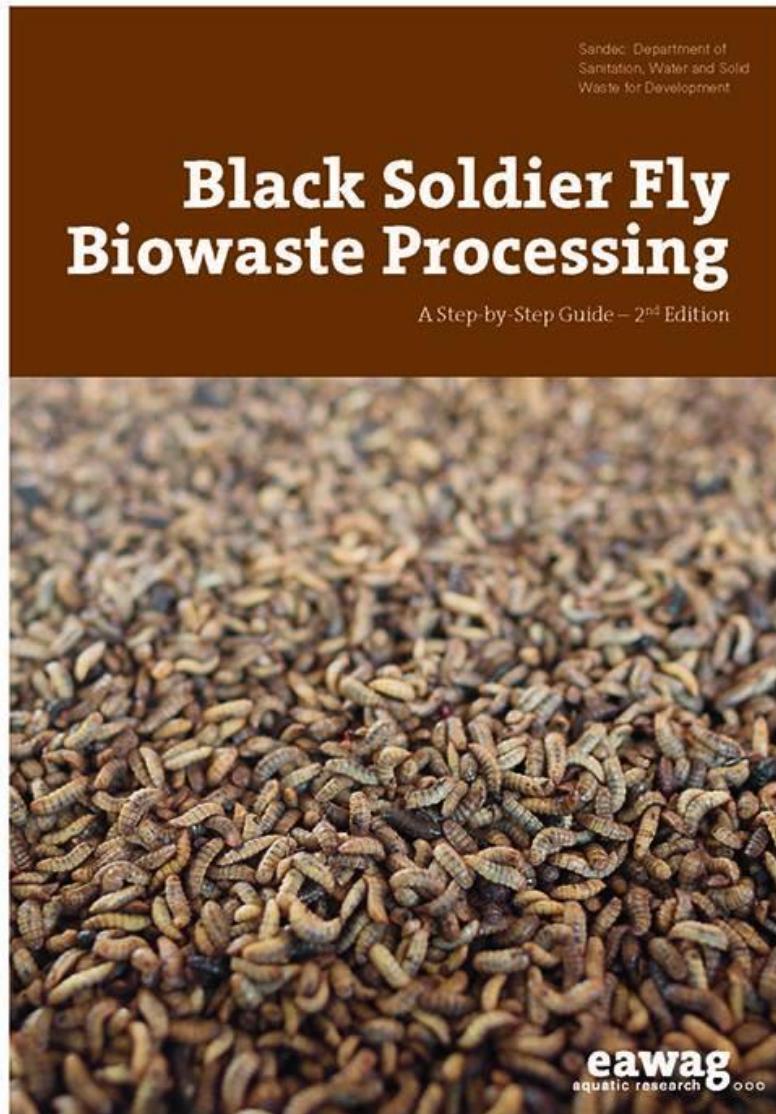
A practical manual
for farmers and inspectors

Translations: – ICIPE BSF Guide



- Translation launched, with downloads:
2342 for MM,
2157 for English.
- Extremely popular, and followed up by much interest in EAWAG BSF guide translation.

Translations: EAWAG BSF Guide



- Based on Indonesian experience.
- English DL:
1008 Ed 1,
581 Ed 2.
- Myanmar version coming very soon...

Materials Developed



OVERVIEW OF THE AQUACULTURE FEED SECTOR IN MYANMAR AND POTENTIAL FOR INSECT BASED PROTEIN INPUTS

AQUACULTURE GLOBALLY

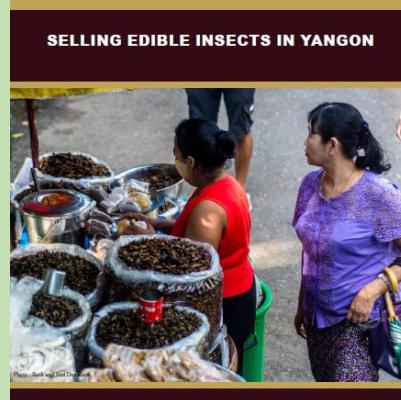
Globally aquaculture is growing as it replaces wild catch fisheries production, while fish consumption also continues to grow (see Figure 1). Many wild catch fisheries are now stagnating, and as is the case of many fish types, demand has increased. Between 2005 and 2015, aquaculture production increased by 5.8% to 80 million tonnes, while wild capture fisheries declined by 1.9% to 90 million tonnes. Based on 2016 growth / decline trends, aquaculture will account for a larger proportion of fish production globally than wild catch fisheries from 2018.



MYANMAR'S WILD CATCH CRICKETS: LEARNING FROM A SUSTAINABILITY HOT SPOT ANALYSIS

Myanmar has a well established, large scale wild catch cricket industry of significant value (US\$0.33M) with a highly organized value chain for product collection, distribution and sales.

A Sustainability Hot Spot Analysis (SHSA) can help assess sector life cycle impacts and sharpen focus on critical environmental or social issues, to improve decision making and business enhancements across the whole value-chain, from collection to end sales and final consumer use.



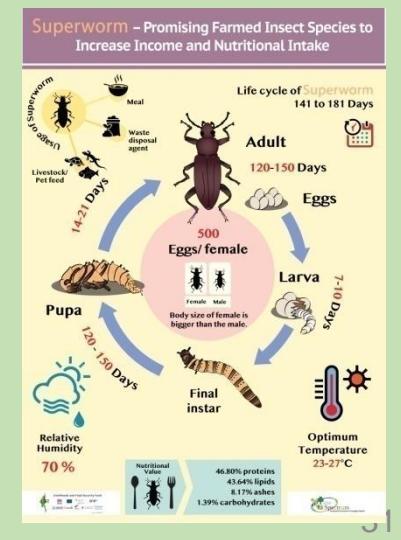
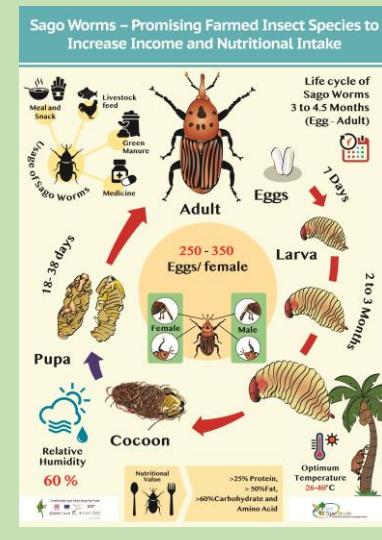
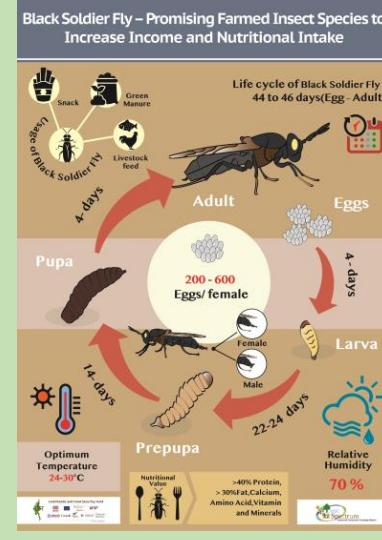
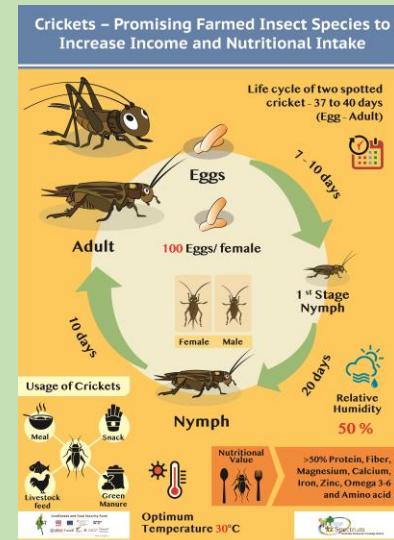
SELLING EDIBLE INSECTS IN YANGON

Street-scenes in many townships of Yangon include vendors selling insects for people to eat. Insects are considered delicious and nutritious. Crickets are the most popular species sold and consumed, along with other species such as bamboo worms, sage worms and water bugs. A majority of sales is through small-scale roadside, mobile and market stall vendors. Added to these sales is a growing on-line market. An estimated 10 million crickets are sold each year in Yangon. This paper shows locations of sales and some of the characteristics in more detail.



CRUNCHING ON CRICKETS: WILD-CATCH CRICKET VALUE CHAINS FOR HUMAN CONSUMPTION IN MYANMAR

Wild crickets, in their season, are part of the street-scene in Yangon and Mandalay. Delicious and nutritious, and sold by many vendors, there is a hidden story to share. There is a high degree of organization in getting these insects to the market. From collection to sale, there is a complex chain of actors involved in the process, from catching to eating the cricket. Value chains show linkages between different sectors involved, current markets, as well as changes in value as the product moves through the various stages. Understanding this chain can help in growing the industry and in making the insect diet more acceptable ways. Also, they provide livelihoods for many individuals, families and small businesses. Low set up costs mean that a range of people can be included in the chain.



Materials Developed (2)



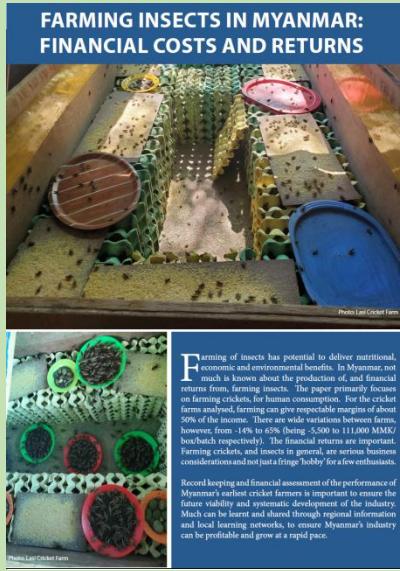
MYANMAR EDIBLE INSECT SECTOR OVERVIEW - FOOD & FEED

Insights and Policy Proposals - Dec 2020

Edible Insect Sector Areas of Work and Studies:

- National Species and Cultural Practices Survey
- Existing Value Chains (Crickets + 2 minor) Study
- Entomophagy and Entomophagy Potential
- Food Safety Issues Overview
- Local Market Practices Study
- Market Assessment (Recipes / TV)
- Regulatory Overview
- Entomophagy Sector Engagement
- Entomophagy Sector Promotion
- Entomophagy Sector Overview
- Insect Aquatic Trial Results
- Insect Aquaculture Sector Overview
- Insect Aquaculture Sector Overview
- Feed Sector Market Overviews
- Small Farmer Support
- Industry Association Engagement / Support
- Nutritional Overview
- Food Safety Issues Overview
- Local Market Practices Study
- Market Assessment (Recipes / TV)
- Regulatory Overview
- Entomophagy Sector Engagement
- Entomophagy Sector Promotion
- Policy Needs Assessment

FARMING INSECTS IN MYANMAR: FINANCIAL COSTS AND RETURNS



Farming of insects has potential to deliver nutritional, economic and environmental benefits. In Myanmar, not much is known about the production of, and financial returns from, farming insects. The paper primarily focuses on farming crickets, for human consumption. For the cricket industry, the average gross margin is 30% and net margin is 50% of the income. There are wide variations between farms, however, from -14% to 65% (being -5,000 to 111,000 MMK/batch/batch respectively). The financial returns are important. Farming crickets, and insects in general, can be a new career opportunity and a fringe hobby for a few enthusiasts.

Record keeping and financial assessment of the performance of Myanmar's earliest cricket farmers is important to ensure the future viability and systematic development of the industry. Much can be learnt and shared through regional information and local learning networks, to ensure Myanmar's industry can be profitable and grow at a rapid pace.

CAN EDIBLE INSECTS FILL NUTRITION GAPS? A NUTRITION OVERVIEW OF MYANMAR'S MOST LOVED AND CONSUMED INSECTS



SUSTAINABLE ORGANIC NOVEL PROTEIN

Summary

Many edible insects are eaten in Myanmar. Public awareness on eight commonly eaten insects is discussed, and they are shown to be high in protein, omega acids, vitamins, minerals, and high in fiber. Their potential role in combating malnutrition problems in Myanmar. Myanmar has a high burden of both under-nutrition and over-nutrition. Consumption of a variety of insects will assist in easier design of meals that can assist with malnutrition.

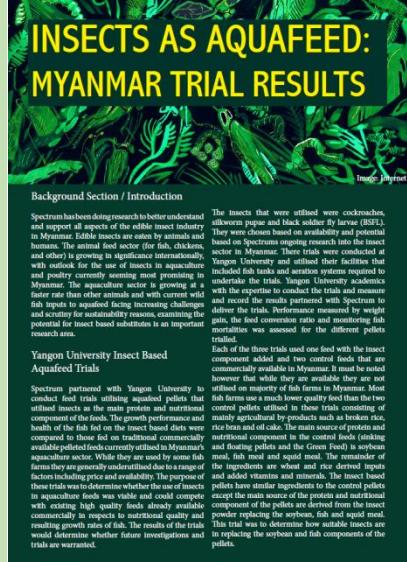
Low current public awareness on nutritional value of edible insects can be boosted through training programs, nutritional education, television programs and social media. A need of demand creation for farmed products can be achieved by working along with healthy meal designs, nutritional information is clear on the role that edible insects can play in improving nutrition.

FOOD AND PRODUCT SAFETY FOR INSECTS IN MYANMAR



A successful insect industry will need to ensure food and product safety. If insects are treated as livestock, then an existing framework can be used. Myanmars 2020 National Policy Roadmap cover with the existing framework, in line with the insect food and feed sectors. Myanmars is currently at a low starting point for both wild-caught and farmed insects. Vendor practices were surveyed and reveal gaps in food hygiene and safety, and consumer awareness. Critical value chain factors are explored, with suggestions and links to useful GAP materials.

INSECTS AS AQUAFEED: MYANMAR TRIAL RESULTS



Background Section / Introduction

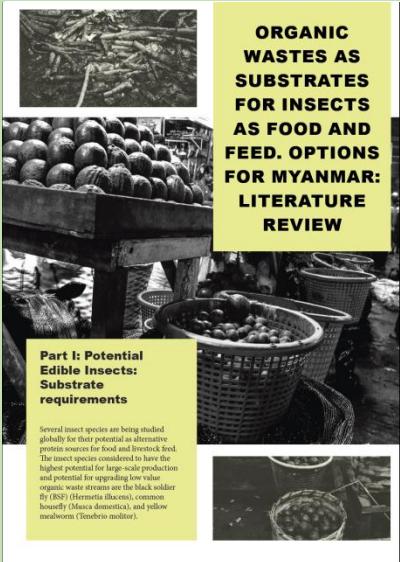
Spectrum has been doing research to better understand and support the aspects of the edible insect industry to help it flourish. This trial was conducted to examine the potential of insects as aquafeed for humans. The animal feed sector (for fish, chicken, and other) is growing in significance internationally, with aquafeed being the largest source of protein and poultry currently seeming most promising in Myanmar. The aquaculture sector is growing at a fast rate, and there is a high demand for fish inputs to aquafeed facing increasing challenges and scrutiny for sustainability reasons, examining the potential for insect based substitutes is an important research area.

The insects that were utilized were cockroaches, silkworm pupae and black soldier fly larvae (BSFL). They were chosen based on availability and potential to be used in aquafeed. It should be noted however, while silkworms are not yet utilized, BSFL have been utilized on many farms in Myanmar. Most fish farms use a much lower quality feed than the two insects mentioned above. The main component of most mainly agricultural by-products such as broken rice, rice bran and oil cake. The main source of protein and energy in these feeds are from the soybean meal, floating pellets and the yeast meal. The yeast meal is generally underutilized and the yeast meal is often added to the diet and mixed in. The insects tested have similar ingredient to the control pellets except the main source of the protein and nutritional components are from the insects themselves. The insect powder replacing the soybeans, fish and yeast meal. This trial was to determine whether the use of insects in aquafeed was viable and could compete with traditional aquafeed. The results of this trial were commercially in nutritional quality and resulting growth rates of fish. The results of the trials would determine whether future investigations and trials are warranted.

Part I: Potential Edible Insects: Substrate requirements

Soybean meal is being studied globally for their potential as alternative protein sources for food and livestock feed. The insect species considered to have the highest potential for large-scale production are black soldier fly (Hermetia illucens), organic waste streams are the black soldier fly (Hermetia illucens), common locust (Locusta migratoria), and yellow mealworm (Tenebrio molitor).

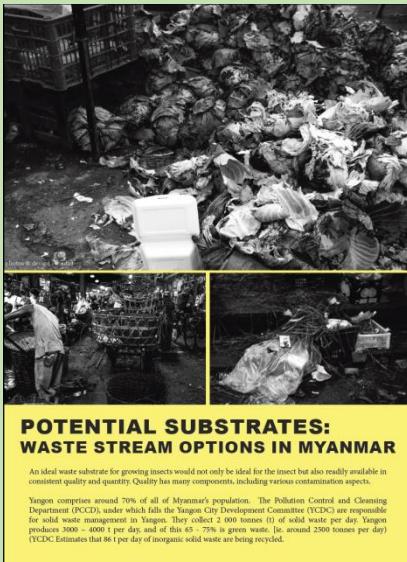
ORGANIC WASTES AS SUBSTRATES FOR INSECTS AS FOOD AND FEED. OPTIONS FOR MYANMAR: LITERATURE REVIEW



Potential Substrates: Waste Stream Options in Myanmar

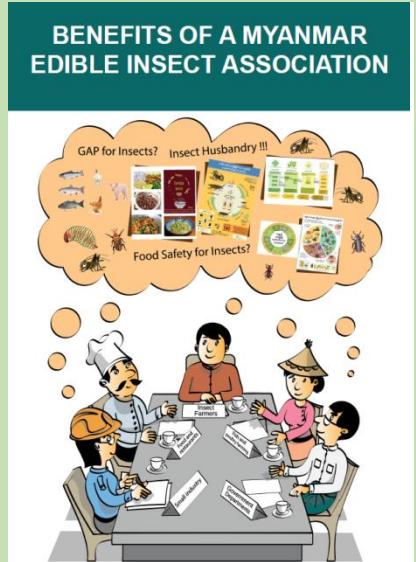
An ideal waste substrate for growing insects would not only be ideal for the insect but also readily available in consistent quality and quantity. Quality has many components, including various contamination aspects.

Yangon comprises around 70% of all of Myanmars population. The Pollution Control and Cleaning Department (PCCD), under which falls the Yangon City Development Committee (YCDC) are responsible for solid waste management. In 2018, the YCDC produced 3000 – 4000 t per day, and of this 65 - 75% is green waste [ie. around 2000 tonnes per day] (YCDC Estimates that 86 t per day of inorganic solid waste are being recycled].



POTENTIAL SUBSTRATES: WASTE STREAM OPTIONS IN MYANMAR

BENEFITS OF A MYANMAR EDIBLE INSECT ASSOCIATION



GAP for Insects? Insect Husbandry!!!
Food Safety for Insects?

Benefits of a Myanmar Edible Insect Association include:

- GAP for Insects?
- Insect Husbandry!!!
- Food Safety for Insects?
- Business Opportunities
- Market Expansion
- Policy Advocacy
- Research Collaboration
- Educational Programs
- Networking
- Resource Sharing
- Standardization
- Quality Assurance
- Brand Building
- Market Research
- Policy Influence
- Regulatory Support
- Consumer Education
- Market Access
- Logistics
- Supply Chain Management
- Marketing
- Public Relations
- Community Outreach
- Policy Influence
- Regulatory Support
- Consumer Education
- Market Access
- Logistics
- Supply Chain Management
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- Public Relations
- Community Outreach

Food Safety Work



Food and Agriculture Organization of the United Nations

LOOKING AT EDIBLE INSECTS FROM A FOOD SAFETY PERSPECTIVE



Challenges and opportunities for the sector

FOOD AND PRODUCT SAFETY FOR INSECTS IN MYANMAR




SUMMARY

A successful insect industry will need to ensure food and product safety. If insects are treated as livestock, then an existing framework can be used. MoA's new 2020-2027 Policy Roadmap can cover well the majority of issues identified, in both the insects as food and feed sectors. Myanmar is currently at a low starting point for both wild-catch and farmed insects. Vendor practices were surveyed and reveal gaps in food hygiene and safety, and consumer awareness. Critical value chain factors are explored, with suggestions and links to useful GAP materials.

- In collaboration with German agencies.
- Regulatory review.
- Critique of Myanmar Food Safety Roadmap from the perspective of Edible Insect farming / commercialisation.
- Collection of learning from FAO Insect & Food Safety practice audits.

- Farming easy for control implementation.
- Vendor practices need work.
- Videos for vendor training in process.

Policy Influence Work

ProciNut

Production and Processing of Edible Insects
for Improved Nutrition



The Edible Insect Sector in Myanmar

Policy and Governance Analysis

Ruth Devadoss

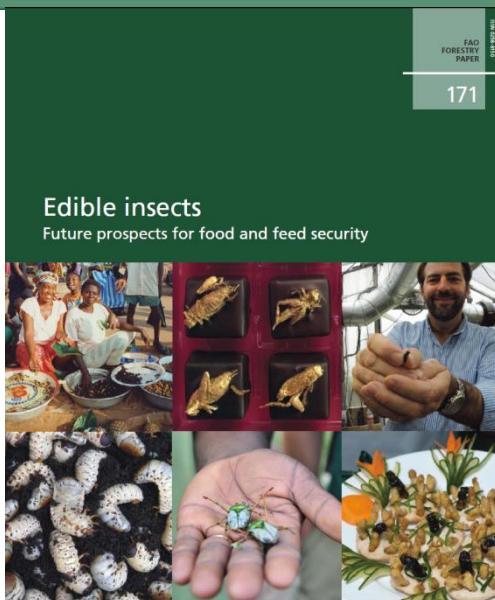


ProciNut is financially supported by the German Federal Ministry of Food and Agriculture (BMEL) based on the decision of the Parliament of the Federal Republic of Germany through the Federal Office for Agriculture and Food (BLE)



- Study done, leans heavily on outcomes from the roundtable event run in 2020.
- Briefer drafted.
- Currently have extreme difficulties knowing who we should deal with , and what strategies to best consider for influence. Will take low risk steps incrementally.
- Association is of rising interest at this time due to issues of price competition.

Regional FAO Studies underway: – Both Feed & Food in 2022.



Insects as Food

- Led by Dr Yupa @ Khon Kaen University.

Insects as Feed for Aquaculture

- Led by AFFIA & Kasetsart University.

1. 5 Country Mapping
2. Regulatory Study
3. Production Study
4. Market Studies
5. Economic Modeling & Scenario Planning

SUMMARISING & NEXT STEPS



- **Demonstrated at micro, pilot, med. scales.**
- Myanmar has a **ready, accepting market** for insects for food, and huge opportunity for feed.
- **TV and social media** used successfully for entertainment and insect food promotion.
- **Food sector** promotion and awareness has potential to stimulate the **feed sector** market.
- Social media holds high interest for both **operational and technical information**.
- Ongoing **market response will be the key**.
- **Capital and operating cost inputs** will be **critical enablers for scaling**.



Thank - you for your attention.

Questions welcome!

djallan7@gmail.com

With thanks for support to:



With support from



by decision of the
German Bundestag



Livelihoods and Food Security Fund



managed by UNOPS

