IV MSU Food Assistance Packaging Solutions Workshop
Michigan State University School of Packaging

October 27-28 2021

The FASPA Report

2021 Food Assistance Sustainable Packaging Agenda

Sustainable fit-for-purpose food packaging is a critical element of food assistance programming, to ensuring the safe and timely delivery of life-saving nutritious foods. An unsuitable packaging can deem an entire food assistance program unsustainable.

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I. Introduction

Every year the U.S. Agency for International Development, with the support of Michigan State University's School of Packaging, and in collaboration with the U.S. Department of Agriculture (USDA) and the United Nations' World Food Program (WFP), holds a food assistance packaging workshop. The main goal of the event is to gather key food assistance stakeholders to discuss the status of food aid commodity packaging, challenges, new technological advances, potential solutions, and identify next steps in optimizing food aid packaging. The workshop leads to the identification and outlining specific steps to address challenges, using readily available technologies, as well as research and innovation opportunities. Normally a wide spectrum of stakeholders including but not limited to commodity suppliers, technology vendors, academia, food assistance implementing partners and research organizations engage in discussions around specific packaging themes and topics.

II. Food Assistance Sustainable Packaging Agenda (FASPA)

Packaging sustainability has been an important theme of discussion ever since the food assistance workshop series began, in 2017. Different from the traditional definition of sustainability with specific focus on environmental impact, the conversation around food assistance packaging sustainability has a broader scope, emphasizing as well other areas of concern. This broader sustainability concept ensures that efforts on packaging design and functionality are more responsive to climate change and the environment. It also aims at ensuring the sustainability of the food assistance programs that are meant to save lives and improve human conditions in the many deprived regions of the world where humanitarian food assistance programs occur. In this regard, the broader packaging sustainability concept looks at multi-purpose packaging, reusability, cost, biodegradable, and smart films.

The FASPA Report. An important goal of each packaging workshop every year, and in between, is to identify collaborating opportunities among groups of stakeholders, and build a common agenda, leading to the solution of the various packaging and supply chain challenges, sustainably. That's what *FASPA,* or simply **The FASPA Report** is: a *Food Assistance Sustainable Packaging Agenda*, outlining steps forwards to solve major packaging challenges. This effort should ultimately lead to achieving more sustainable humanitarian food assistance programs.

For access to full presentations at the workshop, please go to the following link: https://mediaspace.msu.edu/playlist/dedicated/1_e7kxq8zw/

III. Relevant workstreams discussed and included in 2021 FASPA

3.1 Packaging Sustainability Global Initiative

Humanitarian assistance demands continue to rise in parallel with an increasingly urgent and underfunded global solid waste management crisis. This waste management crisis disproportionately affects countries that commonly receive humanitarian assistance, many of which often lack sufficient infrastructure or management systems to handle the countries regularly produced solid waste, let alone the waste generated by assistance efforts. Packaging is an essential aspect of humanitarian assistance for commodity delivery and protection, but often becomes an unintended waste stream in fragile contexts. Improper waste management of plastic packaging can inadvertently damage human and environmental health. Many countries receiving assistance are increasingly turning away disposable plastics, forcing relief organizations to rethink their packaging practices. Humanitarian actors around the world are evaluating their procurement and supply chain delivery processes to respond to the issue of packaging waste management. From the discussions held at IV MSU Food Assistance Packaging Workshop, the following ideas were discussed as part of the sustainable packaging agenda:

a) Digital printing
b) Larger packaging sizes
c) Green stretch wrap for pallets
d) Active agents on laminates
e) Burning packaging to recover energy
f) Providing better communication about repurposing on the packaging itself
g) Reusable packaging

The ideas were then assessed in terms of feasibility (how easy will it be to implement) and impact (how significant is the intervention to reduce harm to the environment?). Some were easy to implement and low impact, such as digital printing. Others were more difficult, but high impact, such as incentivizing waste collection. All are valid but require different levels of effort and timelines. The conclusion of the discussion reflected well what was mentioned several times during the 2-day workshop: “there is not only one route that leads us to sustainable packaging, it depends on the product and the context. Additionally, most of the ideas given are already included in the scope of the activities of the Joint Initiative for Sustainable Humanitarian Assistance Packaging Waste Management (more info here) and other on-going projects led by the humanitarian community. An immediate next step is to connect through a platform for sharing ideas from the field showcasing creative and valuable reuse of humanitarian assistance packaging. The intention is to get the best ideas more intentionally integrated into programming.

3.2 Packaging Standardization

Lack of standardization of humanitarian food packaging sizes and shapes has led to significant challenges throughout the supply chain. It includes issues with stackability in warehouses, traceability, containerization, handling, and final distribution. Examples include the packaging of both RUTF and RUSF of pouches of same content (100 grs) in primary packaging of different dimensions and secondary packaging of different sizes. Other instances are oil tin cans of different diameters and heights as well as super cereal plus with different headspace, leading to different volumes for the same metric tonnage. A focus group will be assembled, led by USAID, to look at improvement opportunities.

3.3 Commodity Fumigation Process/Improvement

Food assistance commodity fumigation process is a corrective treatment of a food products, most commonly unprocessed grains, using specialized gases or other harmless chemicals to eliminate the risk of a pest infestation. For USAID and USDA, commodity can be described as anything from grain or flours to personal effects used in humanitarian programs. At the 2021 MSU Packaging meeting, it was agreed to take on the task of reassessing current fumigation practices with the intend of optimizing the use of fumigants.

3.4 Reusable Oil Tin Can Functionality Improvement

One of the flagship commodities for USAID Tittle II food assistance programs has historically been vegetable oil. As a premier energy provider, as well as a valuable cooking aid and a component of a range of specialized food formulas, vegetable oil is of great relevance for USAID mission of fighting hunger and poverty around the world. Over the years though, the FFP office and its implementing partners have been wrestling with field challenges, due mainly to the unique nature of humanitarian food operations and the harsh conditions typically encountered throughout the food supply chain. Major challenges include: a) meeting the right functionality of the packaging to enable appropriate and safe use of the oil by end-users; b) achieving shipping and warehouse efficiency levels that allow maximizing resources and cost-effectiveness; c) leaking containers leading to inefficiency and waste; d) packaging size harmonization to enable effective stacking and handling; and e) achieving food safety and quality at source, to allow for preventive quality assurance and improve performance of product and packaging. To address these challenges, BHA has been holding expanded meetings with all stakeholders and gathering feedback from field missions and through onsite country visit reports. The consultation process has included the annual food assistance packaging meeting. A major goal for 2022 agreed upon at the MSU meeting was to trial several tin can lid modifications, including but not exclusively: a) adding a side pouring septum (potentially recloseable) besides the filling centered opening to allow pourability and

possibly increase reusability of the container; b) a two-septum lid (besides the centered filling opening) to further increase pourability; and c) adding a removable plastic lid as an aid to help keep oil as safe as possible but also as a way to increase reusability of the tin can, once it has been used by end-user for the storage of ingredients at household levels.

3.5 Hybrid Bag Reusability Assessment

Hybrid bags or high performing paper-nylon bags have been trialed by USG with flour suppliers and is currently being assessed as a potential solution for fortified rice packaging. Main attributes of this high-performing bags include: a) resilient material to minimize package breakage and food waste; b) heat-sealable bags to ensure hermeticity of packaged food and so minimize infestation; c) appropriate gas exchange profile allowing for its use in different commodities with different water or moisture contents, allowing for adequate protection of food integrity while minimizing spoilage (i.e. molding, rancidity and micronutrient oxidation). An update of current trials was provided during MSU Packaging meeting. It was also agreed that further tailoring of this bag will be explored to make it more sustainable, in terms of improving its reusability. Reusable packaging not only will contribute to reducing waste and environmental detrimental impact, but also can lend itself as z means for end-user to harvest their own crops.

3.6 Packaging Shelf-Life SOP Development

Just as ingredient shelf-life is critical to finished product quality, packaging shelf-life should also be considered critical to ensuring safe and complete arrival of food commodities to the end user. Packaging that is stored longer than its shelf-life can affect its functional properties and thus contribute to reduced food quality or failure of the packaging, leading to food loss and waste. As an action out of the packaging workshop, the USAID and USDA teams, with stakeholder engagement, will consider acting on the following: 1) Ask that suppliers identify packaging shelf-life in future specification revisions, whether by communication with their packaging supplier, or through shelf-life testing; 2) Ask the USDA audit team to review packaging shelf-life protocols during their facility audits; 3) Create an SOP on shelf-life testing of packaging materials.

3.7 Non-Foil Packaging Exploration for HEB Packaging

Non-foil materials, based on thin film coating technologies, which are currently being tested for military ration packaging and for food packaging that supports deep space missions for NASA, could potentially have other uses in the humanitarian world. The d Food Protection and Innovative Packaging Team at the U.S. Army Combat Capabilities Development Command (DEVCOM) Soldier Center (in Natick,

MA is evaluating high barrier packaging materials and technologies, which are an ideal packaging choice for shelf-stable processed foods. High barrier coatings can improve the barrier, mechanical and thermal properties of non-foil food packaging films. The possibility of using non-foil films will be assessed, particularly in products such as high energy biscuits. USAID and DEVCOM Soldier Center are currently working an Inter-Agency Agreement to assess the potential use of non-foil films in extending the shelf life of HEBs.

3.8 Bulk Oil Shipping Trial

BHA and WFP are currently working on a different delivery mode for vegetable oil. The objectives are multiple: a) gain logistical flexibility, b) reduce food and packaging waste that can occur during long transport oversea and in-land, and on a long run: reduce packaging quantity and improve quality of packaging. The following value chain has been agreed for the pilot project: oil will be procured in the USA, transported to Kenya, packed in Uganda, and distributed in South Sudan. The project aims at gathering learnings related to food and packaging waste, cost, shelf-life study, complexity and challenges met during the implementation.

3.9 End2End Traceability

The MIT Lincoln Lab (MIT LL) has worked with humanitarian food assistance supply chain stakeholders and implementing partners to understand the humanitarian supply chain. Specifically, MIT LL stood up a bi-weekly data and process focus group to flush out all the data/documentation available in our supply chain. Thanks to the cooperation from everyone involved in in these focus groups, MIT LL gathered all the necessary documentation to construct a dashboard prototype. Since then, MIT LL has met with USAID staff to better understand what information should be displayed in the dashboard. Furthermore, MIT LL has done extensive research on GS1 and the benefits data standardization could provide to the humanitarian community. As it stands, GS1 is the global traceability standard that appeals to most supply chain stakeholders. Once enough information is gathered, MIT LL will work closely with our supply chain stakeholders to launch a test pilot that will test the traceability application, as well as the dashboard prototype. We hope to have this prototype ready to use this year once BHA and it's supply chain stakeholders are ready to launch a test pilot. After recently coming back from a trip to Djibouti, MIT LL now has a better understanding of our supply chain business processes, as well as the infrastructure limitations.

3.10 Process Capability Systems to Prevent Leaking in LNS Packaging

Ready to eat therapeutic foods and ready to eat supplementary foods (RUFs) are a critical addition to the humanitarian food basket, particularly in the management and treatment of acute malnutrition. However, RUFs are very specialized viscoelastic pastes made of peanut and legumes, dairy protein, and plant oil. Oil represents over 30% w/w of the formula, which makes it particularly challenging to achieve stability throughout the supply chain. Therefore, both hermetic packaging and stable product (not oil segregation) is critical. Although huge effort has been invested into perfecting the formula and improving packaging, still a great deal of challenges resulting in leaking and packaging staining exist. At the MSU 2021 Packaging meeting, it was agreed that further work on in-process control and process capability is needed to prevent excessive product leaking.

3.11 Fortified Rice Shelf Life and Packaging Improvement

USG, in partnership with Kansas State University, is engaged in evaluation of packaging efficacy for fortified rice through an accelerated shelf life (ASL) study. This ASL study includes three different packaging types including current used woven polypropylene (WPP), WPP with polymer lining and a more robust hybrid multi-layer packaging that is used for corn soy blend and other commodities. The 6-month ASL study started in September 2021 and will continue until March 2022 with data analyses and recommendations by May 2022. Prior to the start of the ASL study, a detailed literature review was conducted for ASL methods. Also an exhaustive comparison of micronutrient analyses methods across 5 different testing labs in the US was carried out in order to identify a suitable partner. A detailed protocol was developed for the fortified rice ASL study based on experimental work conducted on sample preparation/ grinding, micronutrient analyses methods, sampling and color sorting of grain, and temperature and humidity calibration of storage chambers. This protocol is now being implemented for the ongoing ASL study. The results from this ASL study along with a field study in real time/ storage conditions conducted by WFP will lead to recommendations for packaging of fortified rice with a robust shelf life of 2 years or more.

WFP is undertaking a real-time field study of FR and FRK to understand micronutrient retention and related shelf-life estimation in different packaging options in foods stored in the field under conditions frequently experienced within the humanitarian supply chain.
The packaging options are:

- **Fortified Rice** (WFP PP woven bag, PP woven bag w/ PE inner liner (optional), USAID hybrid bag (laminated (nylon/PE) paper bag)
- **Fortified Rice Kernel** (Paper bag + PE inner liner and Metallized laminate: PET12 /ink/metallised PET12/PE140 or equivalent)

The field study will continue from January 2022 – January 2024 with the results published by end of Q1 2024. Samples packed in 10 kg bags will be stored in India at a designated warehouse where temperature and humidity will be monitored. The samples will be tested at regular intervals for all micronutrients as per WFP specification, uncooked as well as cooked.

The results from this ASL study along with a field study in real time/ storage conditions conducted by WFP will lead to recommendations for packaging of fortified rice with a robust shelf-life meeting minimum nutrient retention targets.

IV. 2021 FASPA Workplan

Themes	Projects/Next Steps		Focus Group Lead/Members
1. Packaging Sustainability Global Initiative	• Global Packaging Sustainability Coordination • Identify Research opportunities • Implement Knowledge, evidence-Sharing Activities		**Leads**: Greg Rulifson (USAID), Carole Manceau (WFP) **Other Group Members:** Odile Caron (MSF), Rafael Auras (MSU)
2. Packaging Standardization	• Packaging Size Standardization (i.e. oil cans, LNS Cartons, rice bags, etc.) • Pallet Standardization		**Leads:** Ruffo Perez, Jamie Fisher **Other Group Members:** (USAID), Mr. Brett Mears (Palmer Logistics), Odile Caron (MSF), Carole Manceau
3. Commodity Fumigation and Shipping Processes and Practices /Improvement	• Assessment of status of fumigation practices • Identification of main reason leading to current fumigation practices • Hold a workshop on fumigation practices and processes		**Leads**: Dan Webber (USDA), Ruffo Perez (USAID), Carole Manceau **Other Group Members:** Jamie Fisher (USAID), WFP Supply Chain
4. Reusable Oil Tin Can Functionality Improvement	• Improvement of pourability • Limiting leakage • Improvement of resealability and reusability • Carryout testing protocols • Execute field trials • Improve reusability		**Leads:** Steve Mihm (Reynold Services) and Ruffo Perez (USAID) **Other Group Members: Danielle** Rafael Aureas (MSU), Dan Webber (USDA), Carole Danielle Froio-Brumsack
5. Hybrid Bag Reusability Assessment	• Improve reusability of current hybrid bags (i.e. labeling, sealing mechanism, handling instructions).		**Leads:** Dan Fetherson (SEMO Milling) and Ruffo Perez (USAID) **Other Group Members: Danielle** Rafael Aureas (MSU), Dan Webber (USDA), Carole Danielle Froio-Brumsack
6. Packaging Shelf-Life SOP Development	• Development of SOP for packaging quality monitoring		**Leads:** Kelsey Ryan (USAID), Andrew Greenfield (USDA), Odile Caron (MSF),

	• Incorporate language in specification to allow enforceability		
7. Non-Foil Packaging Exploration for HEB Packaging	• Is there a possibility to use non-foil packaging to achieve 24 mo+ shelf life for HEB?		**Leads:** Ruffo Perez (USAID) and Danielle Froio-Blumsack, (DoD), Carole Manceau
8. Bulk Oil Shipping Trial	• Bulk Oil Shipping Baseline Data Development: food safety and quality, logistics efficiency, strategic relevance		**Leads:** Paul Vicinanzo, Mary Ngima and Jamie Fisher (USAID) and Carole Manceau/ Deblina SARKAR (WFP)
9. End2End Traceability	• Intelligent dashboard development • QR & IFRD Piloting		**Leads:** Kevin Tusatig (USAID), Megan Richardson (MIT), Troy Hickerson (MANA Nutrition) and Jennifer Esterle (Edesia)
10. Process Capability Systems to Prevent Leaking in LNS Packaging	• Development of auditable process capability SOP for LSN focused on packaging performance and product stability		**Leads:** Ruffo Perez (USAID), Peter JAKOBSEN (UNICEF), Davor JANJATOVIC (WFP and Odile Caron (MSF), David Todd (MANA Nutrition) and Jennifer Esterle (Edesia), Odile Caron (MSF)
11. Fortified Rice Shelf Life and Packaging Improvement	• Accelerated Shelf-Life Assessment • Field Shelf-Life Trial (Fortified Rice and Rice Kernels)		**Leads:** Sajid Alavi (Kansas State University), Deblina SARKAR (WFP),, Paul Alberhine (USDA) and Ruffo Perez (USAID)

V. IV MSU Food Aid Packaging Solutions Agenda

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Michigan State University School of Packaging,
The Henry Conference Center
3535 Forest Rd, Lansing, MI 48910

Agenda

October 27-28 2021
Registration Portal: https://www.canr.msu.edu/packaging/events/FoodAidPKG/

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Day 1			
Time (US EDT)	**Topic**		**Speakers/ Organizations**
8:00-8:05am	**Welcome, Introduction, expectations, review of the agenda**		**Matthew Daum,** **Director MSU School of Packaging** **Jamie Fisher,** **Director, Supply Chain Management** **Bureau for Humanitarian Assistance** **U.S. Agency for International Development**
8:05-9:15	**The broader sustainability concept of packaging as it relates to humanitarian food assistance programs**: 1. Programmatic and cost-effective sustainability (i.e. food protection, food safety and quality, transportability, cost, feasibility) 2. Environmental sustainability (i.e. waste, losses, pollution) 3. Multifunctional packaging (i.e. recyclability, reusability, biodegradability)		A PANEL- Moderated by USAID/MSU **Marita Schmid,** Mondi Group Social Sustainability Manager **Prof. Rafael Auras, MSU** Packaging waste, and sustainable packaging systems
9:15-9:50	**The Joint Initiative for Sustainable Humanitarian Assistance Packaging Waste Management**		**Greg Rulifson, USAID** **Elise Bell, USAID** **Carole Manceau (WFP)**
9:50-10:20	**Assessing non-foil packaging solutions for shelf-stable foods**		**Danielle Froio-Blumsack,** Materials Engineer Food Protection and Innovative Packaging Team Combat Feeding Division, The Natick Lab
10:20-10:30	**Coffee/Tea Quick Break**		

10:30-12:00	**Update on ongoing Food Aid Packaging Work** 1. Fortified Rice Packaging -Accelerated Shelf-Life Study 2. Vegetable Oil (Bulk Shipping Pilot Project) 3. Emergency foods-HEB -Shelf-Life research update 4. Prepackaged Oil Functionality Improvement update 5. LNS Packaging -Addressing Leakage and Packaging Defects		Moderated by Ruffo Perez (USAID) and Carole Manceau (WFP) 10 min + 5 min Q&A each 1. Mehreen Iftikhar/Sajid Alav Kanasas State University 2. Paul Vicinanzo/Jamie Fisher, USAID 3. Carole Manceau (WFP) 4. Steve Mihm (Reynolds Services, Inc.) 5. David Todd Harmon/ Mark Moore, MANA Nutrition
12:00-12:20	**Remote Break and Early Lunch**		
12:20-1:30	1. USAID Intelligent Dashboard Project and End2End Traceability, applied to humanitarian Programs -30 min 2. Update on The TraceAID Project -20 min		**Led by USAID (Kevin T.)** **MIT Lincoln Lab, Megan** Richardson **Mana Nutrition/Edesia Nutrition** **Troy Hickerson & Jennifer Esterle**
1:30-1:50	Packaging Specification Update, spec compliance and Raw Packaging Quality monitoring at manufacturing levels		**Kelsey Ryan (USAID/BHA** **Andrew Greenfield** (USDA/AMS) **Carole Manceau (WFP)**
1:50-2:00	Wrap-Up first day, takeaways		**Ruffo/Carole/Cimberly**

Day 2			
Time (US EDT)	**Topic**		**Speakers/ Organizations**
8:00-8:10am	**Second day overview and Expectations**		**Ruffo/Carole**
8:10-9:40	**Mitigating Risk in the Supply Chain** • **Warehousing and standardization of processes** • **Containerization/Ensuring Compliance** • **Palletization Improvement** • **Fumigation Processes** • **Pest Control** • **Reviewing Transportation Modes**		Led by **Paul Vicinanzo**, Chief of USAID Transportation Division **Panelists:** 1. **Amin Joodaky,** MSU School of Packaging 2. **Brett Mears** - Palmer Logistics/USAID Prepositioning Warehouse operator. 3. **Mr. Yussury Kallouche,** Country Manager - Bahrain Maritime and Mercantile International (BMMI) /USAID Prepositioning warehouse operator Djibouti. 4. **Mr. David (Dez) Pagemorris** - The World Food Programme (WFP) Regional Logistics Office - Nairobi, Kenya, 5. **Mr. Kebede Seifu,** WFP Logistics/South Sudan and 6. **Mr. Aimad Ollah,** WFP/Logistics South Sudan.

9:40-10:30	**Public-Private-Partnership on Packaging Innovation**
	• **Why it is important**
	• **Success Stories**
	  ○ **USAID PSE Initiative**
	  ○ **WFP-Mondi Group**
	  ○ **High Performing Bags**
			Led by USAID/WFP/Suppliers
			
			1. Ruffo Perez/Nacasi Green (USAID)
			2. Marita Schmid Mondi Group/ Carole Manceau (WFP)
			3. Dan Fetherston (SEMO Milling)

10:30-10:45	**Coffee/Tea Break/ Break group formation**		MSU Will Instruct how to form the various discussion groups
10:45-12:40	**Operationalizing an End2End Traceability System, suitable for Humanitarian Food Assistance Programs**		**Group 1: End2End Traceability** Led by USAID/MIT -Lead: **Kevin Tutasig and Megan Richarson**
	Reducing packaging carbon footprint through innovative packaging solutions		**Group 2: Sustainability** Led by USAID/WFP -Lead **Greg Rulifson** (USAID) and **Carole MANCEAU** (WFP)
	Ongoing Discussion around Oil Packaging Continuous Improvement		**Group 3: Oil Packaging** Led by USAID/Oil Suppliers - **Steve Mihm (Reynolds Services, Inc.) and Ruffo Perez, USAID**

12:40-1:00	**Individual groups to report back on discussion highlights and way forward**		Team Leads
1:00pm	**Wrap-up and end of workshop. Adjourn**		**Ruffo/Cimberly**