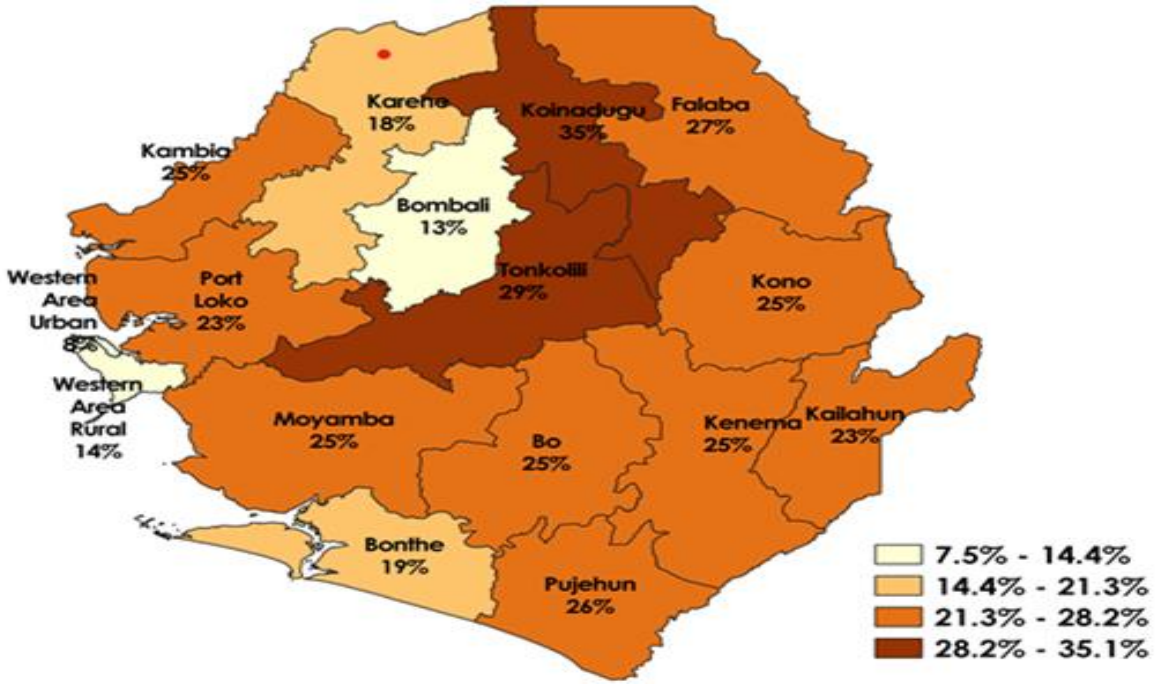
SIERRA LEONE WASTE MANAGEMENT PROCESS



Prevalence map of malaria in children under five by district

ITN distribution table by district by type

Districts	IG2	PBO	Total
Kailahun	396,725		396,725
Tonkolili	387,382		387,382
Pujehun	261,123		261,123
Kambia	260,379		260,379
Moyamba	240,117		240,117
Falaba	154,771		154,771
Koinadugu	153,767		153,767
Bonthe	151,325		151,325
Port Loko	400,106		400,106
Kono		381,440	381,440
Bombali		318,779	318,779
Western Area Urban		795,867	795,867
Western Area Rural		334,841	334,841
Karene		215,212	215,212
Bo		433,731	433,731
Kenema		459,667	459,667
Total	2,405,694	2,939,537	5,345,232

Planning for waste management

All PBO nets were bulk packaged, all IG2 nets had individual packages

Initial planning to map incineration capacity in-country before/during microplanning

NMCP conducted a fact-finding mission to assess the availability of functional incinerators at facilities.

Findings revealed that most facilities lacked functional incinerators and could not therefore handle the volume of waste.

Incineration was not feasible due to the limited number of functional incinerators.

Waste recycling was considered as a more environmentally friendly and sustainable option.

Planning for waste management

- Engagement with private sector for waste recycling option.
- Vectorlink has been engaging with Premier Enviro Solutions (PES), which has been recycling plastic waste from the IRS waste plastic for about three years.
- Vectorlink introduced PES to the NMCP for partnership in the ITN waste management process.
- Premier Enviro Solution was selected for their willingness to take on the waste without additional costs.
- Detailed engagement with Premier Enviro Solutions was done through an MOU signed with the MOH to ensure effective waste management.

Planning for waste management

- Waste management option adopted for the 2023/24 ITN mass campaign was recycling
  - Plastic waste recycling company Premier Enviro Solutions limited (PES) was identified and volunteered to co-implement the process (supporting the crushing and recycling process)
- Coordination with the recycling company
  - The NMCP and PES collaborated in the planning and budgeting for the waste management process and an MOU was signed between the two parties

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Planning for waste management – Consideration & assumptions

The following considerations and assumptions were made in the planning process (operational and financial)

Considerations	Assumptions
Estimated quantity of waste to be generated (macro quantification)	Empty bale sacks for all nets procured + individual net packaging for IG2 nets
Weight of empty bale sack	From the label of a previously used bale of nets for routine distribution (with individual packaging): Gross weight – Net weight = Weight of waste 28.46kg – 27.86kg = 0.35kg (for IG2 nets) 0.35kg/2 = 0.175kg (for PBO nets)
Transport means	Trucks (from DMS to consolidation point, consolidation point to recycling plant)
Waste packaging	Jumbo bags
Waste collection mode	Vehicles of national monitors and supervisors during supportive supervision
Waste tracking and verification	Waste tracker tool and waste crusher report
Waste sorting and separation	Manual labour at the crushing point
Waste crushing point	Regional level (consolidation point)
Waste recycling point	PES recycling plant, Freetown

Planning for waste management – Budget development

- Initial macro budget covered the transport of waste from the DMS to the consolidation points, the crushing, bagging into the jumbo bags and transport to the recycling plant in Freetown. Total = 8,231.69 USD.
- Pilot campaign to test digitalization took place in Oct/Nov 2023 and gaps in the waste management process were identified including:
  - Strategy included using vehicles of national monitors and supervisor to move waste from the fixed DPs (PHUs) they visit daily to the DMS
  - Strategy was not adapted to the reality, transport means were insufficient and over 70% of waste was estimated to still be left at the 1,281 fixed DPs at the end of the campaign
- A supplementary budget to address the gap was developed (using the estimate of 70% of total bales of nets distributed during the campaign). Total = 40,733.11 USD.

PES findings from pilot waste management

Pilot Test scheduled for October'23 was postponed to February'24.
Crusher was transported to Bo by PES using a crane truck

Findings:

1. Team on the ground could not give record into number of bales brought to the Centre, so we had to backward calculate to estimate no. of returned bales that we were to crush.
2. Empty PBO nets Bales were mixed with PET straps that needed to be separated as they were wrapping round the blades and ceasing the machine They will be transported to Freetown to be crushed by a bigger machine.
3. Crusher was not achieving the 200kg/hr capacity as we need to change screen. This can be corrected.
4. Budgeted Diesel consumption was 65 Kg/ltr but we recorded 21Kg/ltr, with screen change it should significantly improve.
5. Assumed weight of empty PBO bale was 0.35Kg but it was actually 0.16Kg and the straps 0.04Kg= 0.20Kg.
6. Volume reduction of 50% was achieved.  9.2 Kg of uncrushed is in bag at back and same weight for bag in front half full.

7. R&D confirmed end of life Nets can be used in our process to produce Blocks

Waste management implementation - Summary of the pilot waste crushing process (extract from PES report)

Pilot Crushing Operation in Bo

Note:
This operation crushed only (PBO) outer bale bags NO individual package bags.
We did not have record of number of Bale bags returned to BO from pilot distribution

Determining average weight of Bale Bag:		weight Kg
Sample 1	20 Bale Bags	3.0
Sample 2	20 Bale Bags	3.5
Sample 3	20 Bale Bags	2.9
	60 Bale Bags	9.4
	Avg weight of Bale Bag	**0.16** Kg

Code:

CPMB	Crushed Plastic Malaria Bo
PSMB	Plastic Strap Malaria Bo

Crushed Plastic in Jumbo Bag No:

Date	CPMB1	CPMB2	CPMB3	CPMB4	CPMB5	CPMB6	CPMB7	CPMB8	Daily Total	
24/02/2024	113.00	47.00							**160.00**	**Kg**
25/02/2024		68.00	113.00	106.00					**287.00**	**Kg**
26/02/2024					100.00	118.00	118.00	87.00	**423.00**	**Kg**
Total	**113.00**	**115.00**	**113.00**	**106.00**	**100.00**	**118.00**	**118.00**	**87.00**	**870.00**	**Kg**

Estimated No. Of Bale Bags Shredded

5,553 units

PET Straps in Jumbo Bags No

PSMB51	PSMB52	PSMB53	PSMB54	PSMB55	Daily Total	
43.50					**43.5**	**Kg**
	52.00	44.30			**96.3**	**Kg**
			42.00	54.30	**96.3**	**Kg**
43.50	**52.00**	**44.30**	**42.00**	**54.30**	**236.1**	**Kg**

We could not crush with this machine but can with machine in Freetown

Diesel Consumption

Date	*B/F*	*Bought*	*Used*	*Balance*	
24/02/2024		15	11	4	provided by PES
25/02/2024	4	20	13	11	provided by Malaria Control unit Bo
26/02/2024	11	20	16	15	provided by Malaria Control unit Bo
			40		

Planning for waste management - Training, SOPs, monitoring

- Training sessions for implementation at all levels included waste management as a key theme for the distribution period
- Standard operating procedures (SOPs) were developed to guide the waste management process and were used as the training guide during training sessions at different levels
- Waste management was supervised as part of ITN distribution and post-distribution activities within the normal supervision structure
- National monitors focused on waste management in the districts they were working in

Waste management process at DPs

- The DP team collected and bagged all the empty individual net packs and empty bale sack into one empty bale sack and tie up when filled. The process is repeated for all the waste and all the bagged waste are neatly packed into the DP store.
- When supervisors or national monitors visits, they are expected to carry as much waste as can be loaded into their vehicle and transport the waste to the DMS.
- All the waste, including the straps, was packed together.
- Most PHUs had only one type of net, either PBO or IG2 nets. So, there was no need to pack waste separately.

IG2 waste

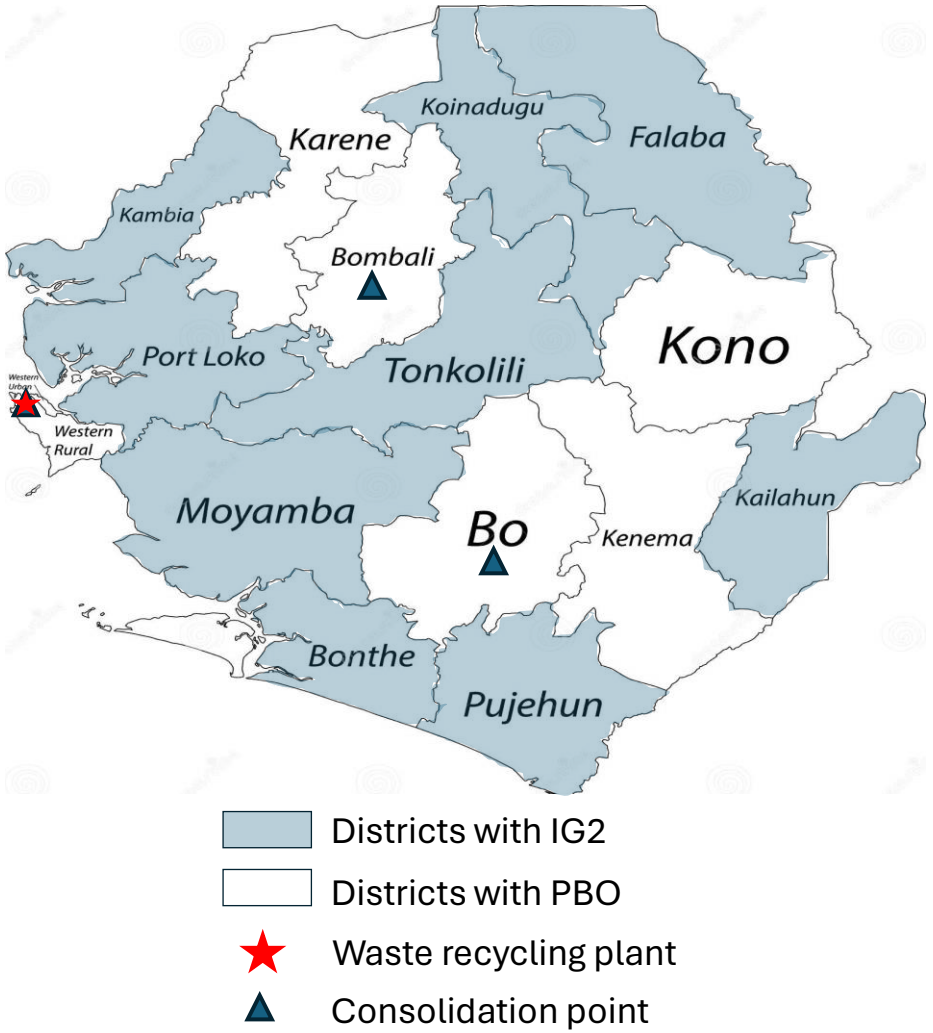
PBO waste

Waste management implementation

- There were two main levels of waste storage in the waste management chain:
  - Fixed DP (PHUs) – packed/bagged 20 empty bale sacks and straps into one empty bale and stored
  - DMS – stored all waste brought from the DPs in readiness for transport to the consolidation point for crushing
- A waste tracker (paper-based form) was developed to track waste movement from the DP to the DMS and captured the following info:
  - Date
  - Origin
  - Destination
  - Vehicle plate number
  - Quantity
  - Remarks/Signature of transporter

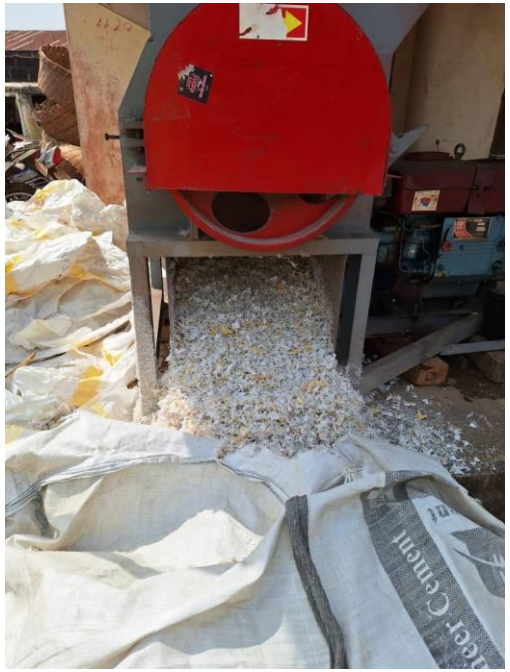
Waste management implementation - Transport of waste

- From the DMS, waste was to be transported to one of the three consolidation points planned out based on proximity
- Crusher was to be moved to each of the three (3) consolidation points:
  - Bo - Moyamba, Bonthe, Pujehun, Kenema, Kailahun and Bo districts
  - Bombali - Tonkolili, Kono, Port Loko, Kambia, Koinadugu, Falaba, Karene and Bombali districts
  - Western Area Urban (WAU) - Western Area Urban and Western Area Rural
- Waste was to be crushed at the consolidation point to reduce volume, then bagged in jumbo bags before being transported to the recycling plant in Freetown



Waste management implementation

- Reporting on waste management
  - The NMCP and PES are to co-develop the waste management/recycling report
  - Report will document the type of waste, the origin and packaging of the waste, waste separation technique, the quantity and volume of the waste, the recycling process and the recycled product



Successes

- Training of the DP supervisors and team members on the waste management process was well understood
- All DPs recorded huge stockpile of waste, well organized in their store, despite the limited storage space as the ITN waste is voluminous
- Pilot test run of the crushing process was successful recording up to 50% reduction in volume

Challenges

- Use of vehicles of monitors and supervisors was insufficient to drive the waste retrieval process
- An estimated 70% of ITN packaging waste is still at the PHUs with a funding gap which has caused a delay in the completion of the waste management process.
- No dedicated campaign personnel at the DMS to keep record of incoming waste, so the waste was only tracked from one end of the chain between the PHUs and the DMS
- Transport of the waste crusher using a crane truck was not envisaged at the planning stage
- Limited storage space in some DMS for storing of waste before the designated date of crushing

Recommendations

- Proper budgeting for waste collection and transport from the DP through the waste management chain as defined by the NMCP and the recycling partners
- Provision of adequate storage space for storage of waste at DMS or extension of warehousing contract to accommodate waste storage for districts with limited storage space
- More emphasis on waste management and filling of waste tracker during trainings at all levels

COMMENTS
CONTRIBUTIONS
QUESTIONS

THANK YOU!

TENKI!