

Vaccine Distribution Analysis for PFSA's Mekelle Hub, Tigray Region, Ethiopia

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Background

- Integrated Pharmaceutical Logistics System (IPLS):
 - Integrated system for essential medicines, program items & revolving drug fund - managed by PFSA
- Vaccines – Historically vertical system that follows FMOH hierarchy (5 levels); “pick up” system
- 2013: Policy decision to place vaccines and related products under PFSA, transition began in 2014.
- Phased approach:
 - Three PFSA hubs in Phase I
 - Eight more included in Phase II



Key Questions

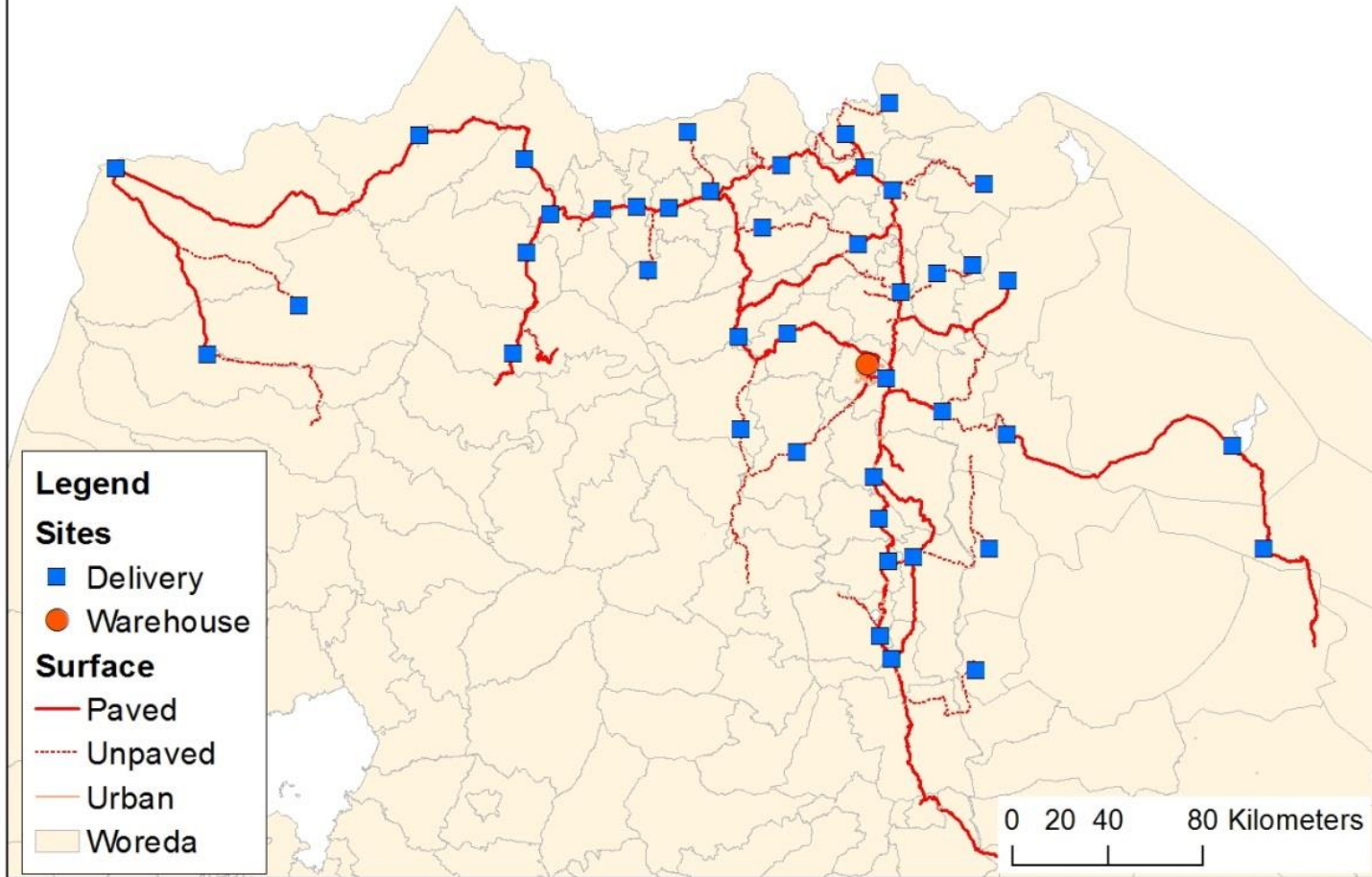
1. Does hub have enough transport resources to provide direct delivery from PFSA's Mekelle Hub to the 40+ woredas (districts)?
2. Are there other constraints that would impact hub's ability to move quickly to direct delivery to woredas?
3. What frequency of delivery is possible (monthly or bimonthly)?

Methodology: Use of LLamasoft's Supply Chain Guru to conduct transportation optimization analysis to determine/assess:

- Number and sizes of vehicles needed
- Possible distribution routes
- Storage capacity needed at Woredas



Mekelle Hub Sites Map



Data used

- Volume of vaccines and related commodities
- Locations (GPS) of hub and woreda sites
- Cold storage capacity at PFSA hub and woredas
- Digital road network
- No. of vehicles and carrying capacity of each vehicle
- Loading and travel times (mins)
- Maximum length of routes (days)
- Travel speed of vehicles
- Policy regarding bundling vaccines & related products
- Business hours of woreda stores

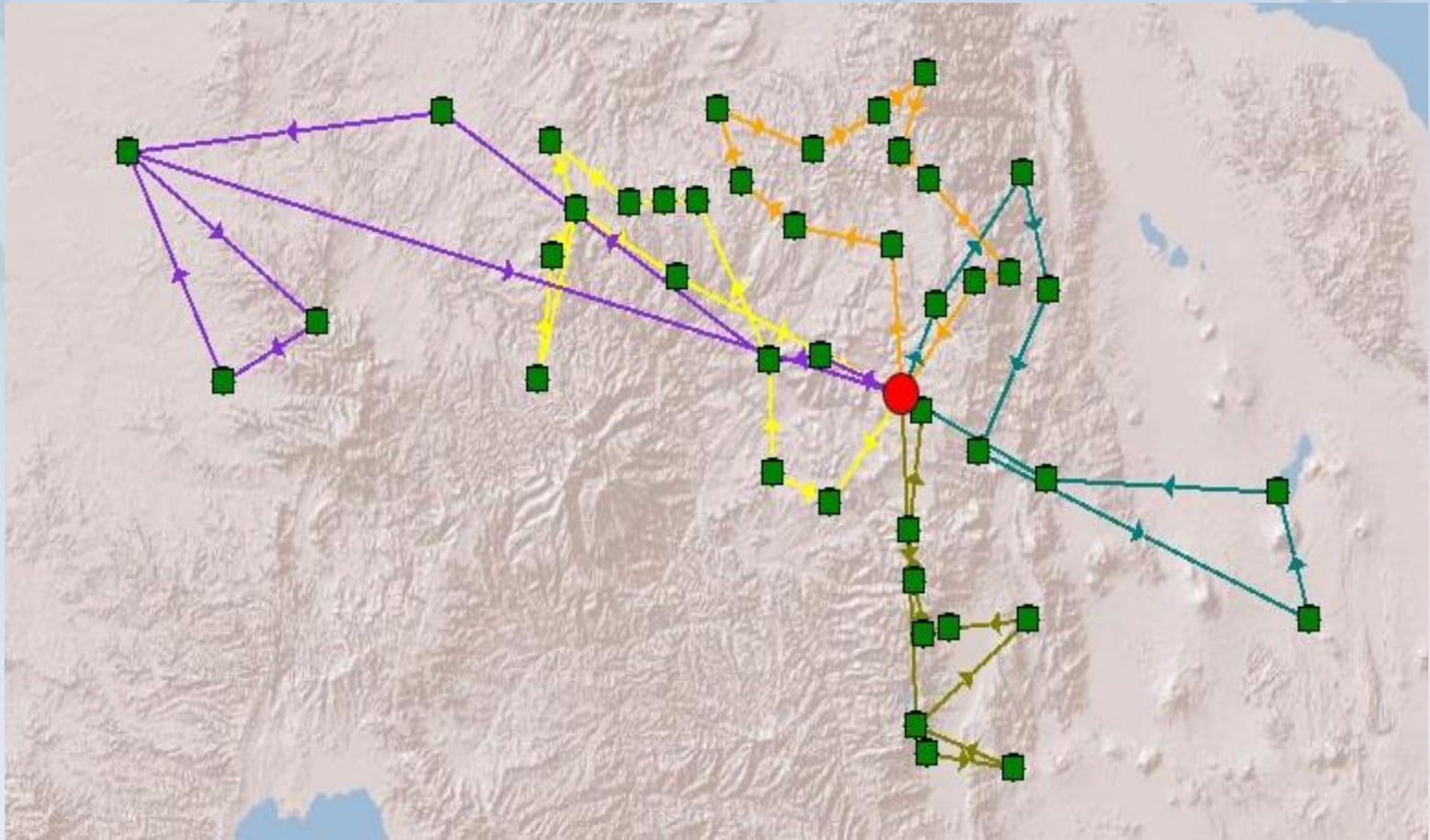


Findings, Monthly Delivery

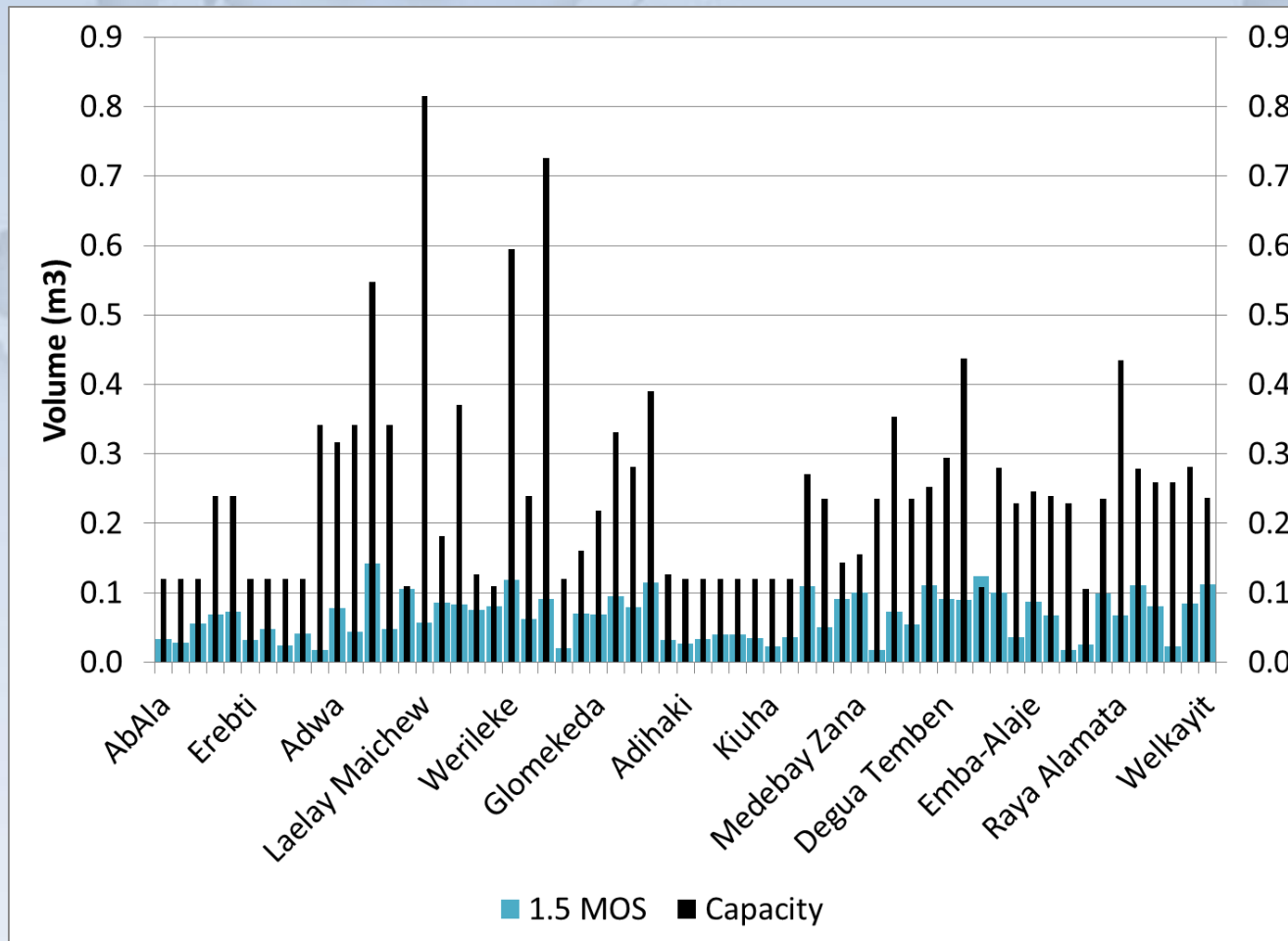
- Number vehicles
 - 2 refrigerated vehicles
- Number of routes
 - 5 are needed
- Total distance
 - 4,553 kms.
- Total time in days
 - 19.8 (max. 40 days)
- Average volume per route
 - 1.5m³ (max. 9.0 m³)
- Avg. % of woreda cold storage utilized
 - 32%



Route Map



Storage Volumes at Woredas



Results

- With current resources, monthly direct delivery to all woredas is possible.
- Bimonthly delivery would, in some cases, place a strain on woreda storage capacity.
 - 20% of the woredas would be beyond 80% of capacity
- **Hub moving forward on monthly delivery in coming quarter to all woredas** (vs. previous plan to deliver to six zones only).



Sensitivity Analysis

- Adjusting the stoppage time
 - 45, 60 and 90 minutes
 - **Impact:** All deliveries completed, followed similar routes, increase of time at sites to 90 minutes, adds 1 route
- Vary travel speeds
 - Tested 10% and 20% reductions in average travel speed
 - **Impact:** 10% had minor impact, 20% adds 1 route
- Increase in volume estimates (for future)
 - Tested 20% and 100%
 - **Impact:** 20% had no impact, 100% caused less than 2% change

Overall: No significant impact



Additional Analysis

- Include distribution for campaigns
 - Polio campaign
 - **Impact:** Campaign vaccines to be distributed together with routine - not separately (if done separately it would require additional resources)
- Including the soon-to-be operational Shire Hub
 - Cold Room storage space and vehicle resources
 - **Impact:** Use analysis to determine optimal distribution network for best utilization of resources
- Further analysis
 - Add specific constraints; for example, Woredas that are not easily accessible by refrigerated vehicle
 - Costing
 - Other Hubs



Thank you

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