



# Feasibility Report

**Improved Utilization Of Existing  
Warehouse Space in Balochistan**

## **October 2017**

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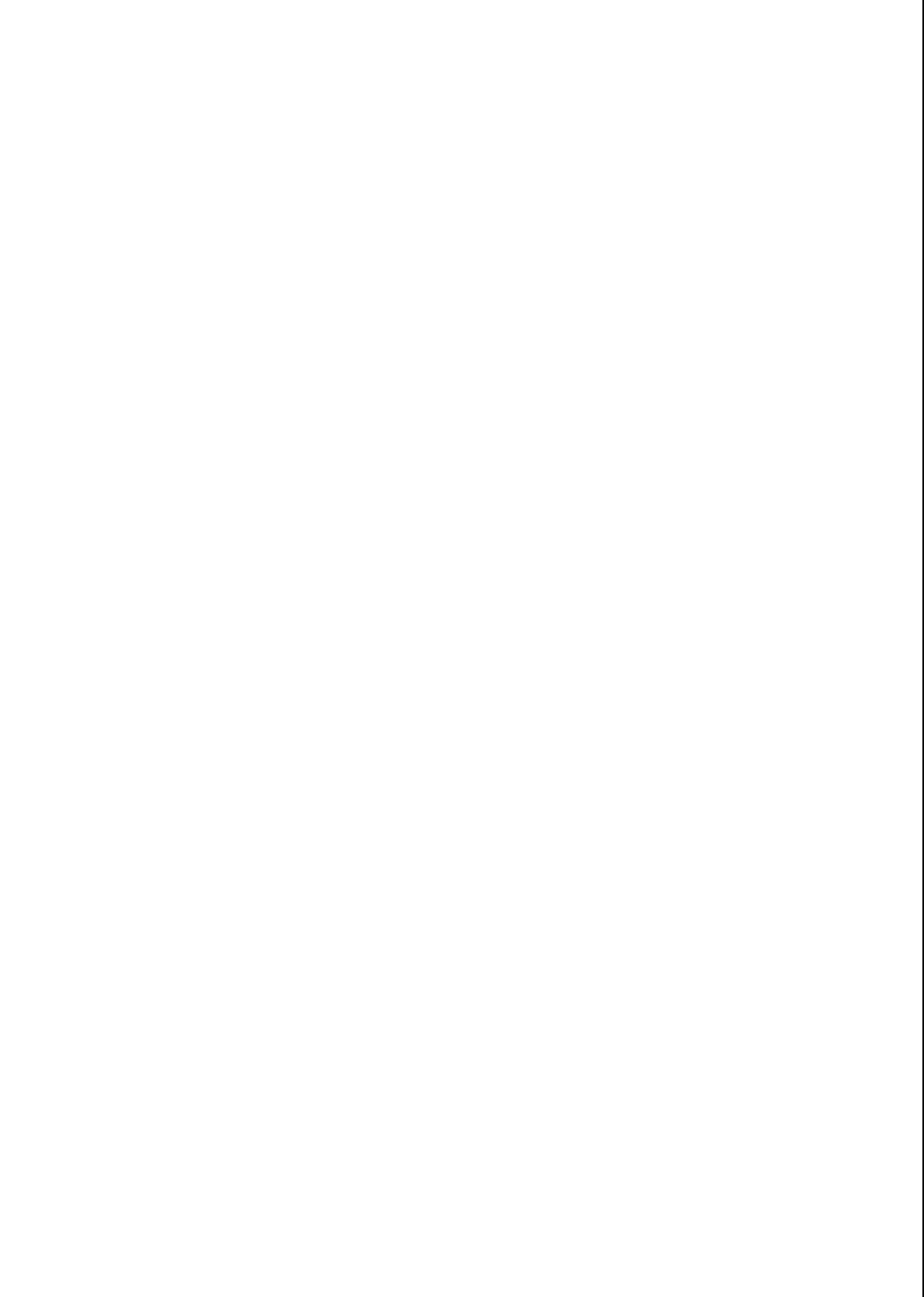
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# Acronyms

FMJC	Fatima Jinnah Medical College
GoP	Government of Pakistan
DoH	Department of Health
MNCH	Maternal Neonatal & Child Health Program
MCP	Malaria Control Program
HCP	Hepatitis Control Program
TBCP	Tuberculosis Control Program
LWH	Lady Health Worker Program Nutrition
MSD	Medical Store Depot
SCM	Supply Chain Management
TA	Technical Assistance
USAID	United States Agency for International Development
GHSC-PSM	Global Health Supply Chain Program– Procurement and Supply Management



# Study Objectives

- Initial assessment of currently available space in existing warehouses/stores and storage practices of various programs including MSD Balochistan
- Determining storage requirements of each program looking forward to the next ten years
- Identifying existing infrastructure and opportunities for optimization of space utilization in those structures
- Development of a proposed plan for the integration of all vertical programs to optimize warehouse space utilization and to ensure better management and achieve economies of scale in warehousing.

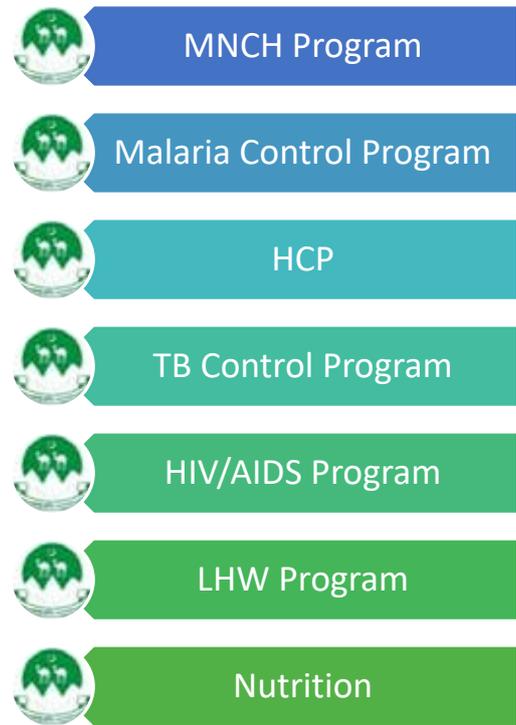


Figure 1: Vertical Programs of Balochistan



# Background

The United States Agency for International Development (USAID) has been providing technical assistance (TA) to the Government of Pakistan (GoP) aimed at strengthening public health sector supply chain management at Federal and Provincial levels since 2009. The scope of this support and TA encompassed all functions around supply chain management including forecasting & quantification, procurements, warehousing and distribution planning, development and deployment of logistics management information systems ([www.lmis.gov.pk](http://www.lmis.gov.pk)), monitoring and evaluation, and human resource capacity building. As part of this support, USAID, in collaboration with the GoP, provided TA for modernization and rehabilitation of the Central Warehouse & Supplies (CW&S) Karachi and the Federal EPI warehouse in Islamabad, both national repositories for contraceptives and vaccines, turning both the warehouses into state of the art public sector storage facilities with ISO 2001-9008 certifications.

In July 2016, this support from United States Government (USG) transitioned to the USAID Global Health Supply Chain Program, Procurement and Supply Management (GHSC-PSM) project whereby a new approach of supply chain technical assistance was put in place for strengthening public health supply chain systems holistically. The objective of this renewed supply chain TA mechanism is to introduce significant and sustainable changes in provincial supply chain landscapes. This involves transformation of health and population welfare systems and other vertical programs with a particular focus on gradual shift to integrated supply chain functions for enhanced efficiency, economy and reliability.

Based on detailed deliberations with federal and provincial governments, GHSC-PSM finalized its first-year work plan for FY17, which was disseminated in Islamabad on December 7, 2016. One of the major areas identified for the program's TA to Department of Health (DOH) Balochistan was to develop a proposal for optimization of available warehousing space in Balochistan.

In this regard, a larger consultative meeting of the Project's technical experts was held with relevant stakeholders of DOH, Balochistan on April 05, 2017, in Quetta (***Annex- 1- List of Participants***). During the meeting, a consensus was built on the adoption of an integrated approach to warehousing and a basic data collection was undertaken.



Figure 2: Consultative Meeting April 05, 2017, Quetta

Based on the initial assessment of the current space requirements and supplies volume in all of the vertical programs, including the Maternal Neonatal & Child Health (MNCH) Program, Malaria Control Program (MCP), Hepatitis Control Program (HCP), TB Control Program, HIV/AIDS Program, Lady Health Worker (LHW) Program, Nutrition, and Medical Store Depot (MSD) Balochistan, a hybrid approach was adopted to propose storage space optimization by identifying space utilization requirements of products stored under one roof in an integrated warehouse.

# Methodology

1. Desk reviews of current warehousing infrastructure and systems (Tools, Policy, Literature, PC- 1 Budgets of DoH Supplies, Products characteristics, and National & International Procurements) were performed through interaction with individual programs and engagement with key persons from the Department of Health, Government of Balochistan (including vertical programs and other relevant stakeholders).
2. Tools were developed for data acquisition from different tiers of DOH warehousing and distribution at provincial, district, and sub-district levels (*Annex- 2- Data Collection Tool*).
3. The questionnaire was shared with logistics officers and store incharges and stakeholders during field visits to MNCH, MCP, HCP, TB, HIV/AIDS, LWH, Nutrition and MSD warehouses/stores to gather information about the annual supply flow transactions and current space utilization.
4. Information received via data collection tools and physical visits to all warehouses/stores was analyzed for proposing viable solutions. Responses mainly emphasized on the development of an integrated warehouse having a strong governance structure, appropriate space and infrastructure, smooth operations management system, sufficient and qualified human resource, and an ability to monitor warehouse functions.

# Findings

Generally, it was observed that distribution, storage, and quality of supplies in DOH Balochistan and vertical programs could be at risk due to inadequate storage space and poor infrastructure of warehouses/stores.

Some of the key findings of assessment are summarized below:

1. During the assessment of in-flow and out-flow supply against volume of products for each program, it was found that the existing space could not meet space requirements of 42,000 sq feet. for procured supplies volume for all vertical programs. Each program's supplies were stored in the office premises building in different, smaller rooms. Due to the shortage of space, supplies stored at different rooms outside of program office building and inventory were being managed at different location. The in-and out-flow of supplies were calculated for last year in warehouses visits and findings regarding the space requirements for each vertical program have been put together in **Table 1**. The infrequent distribution of products

resulted in larger stock storage with limited space availability. The installation of racks in warehouses/stores of vertical programs would not be feasible due to inappropriate layout of rooms and thereby, there are risks of compromise on the quality of these products.

**Table 1: Space Requirements for Each Vertical Program**

Sr. #	Provincial Program	Total Area sq. ft.	Walk Way 30%	Storage Area sq. ft. Avg. Piling, 6.5 ft.	Storage Area Cb. Ft.
1	MNCH	1150	345	805 x 6.5	5333
2	MCP	500	150	350 x 6.5	2275
3	HCP	500	150	350 x 6.5	2275
4	TB Control Program	850	255	595 x 6.5	3868
5	HIV/AIDS Control Program	500	150	350 x 6.5	2275
6	LHW Program	1800	540	1260 x 6.5	8190
7	Nutrition Program	4000	NA	4000 x 4.5	18000

2. There was a decentralized storage of supplies within small rooms in MCP, TB and HIV/AIDS Control programs due to a shortage of space. Since the warehouse building of MSD was not purpose-built, it could not allow maximum utilization of space in the wake of limited height and lack of storage racks.

3. The nutrition program has no warehouse at the provincial level. Instead, they rented a WFP tarpaulin in the Rub Hals warehouse for storage of nutrition supplies on an annual contract basis. In this outsourced warehouse, WFP oversees the warehousing functions, storage, and inventory management. This is a classic example of warehouse outsourcing to third party specializing warehousing firm in Balochistan.



**Figure 3: Nutrition Program Rented Warehouse in WFP compound**

4. DOH Balochistan has already sanctioned a budget of PKR 300 million for restructuring a MSD building and constructing a new purpose-built warehouse followed by redesigned layout which was completed by a professional architect. The standardized layout of health supplies warehouse PC-1 was approved.



**Figure 4: FJMC Warehouse**

5. Fatima Jinnah Medical College (FJMC) located in a prime geographical area of Quetta was found with sufficient space and purpose-built infrastructure where the space could be enhanced from 14,000 sq. ft. to 62,000 sq. ft. upon adjustments in the current space. This facility has also the potential of installing a racking system which would allow vertical space utilization up to the top of the roof.

The following table highlights the promising practices that have been put in place to address the common barriers of last mile health supplies delivery:

**Table 2: Common Barriers of Last Mile Health Supplies Delivery and Promising Practices to Address Those Barriers**

Common Barriers	Description	Promising Practices that Address the Barriers
<p>Poor warehouse infrastructure due to:</p> <ul style="list-style-type: none"> <li>• Inadequate available space</li> <li>• Poor/No installation of racks shelves</li> <li>• Non-purpose built warehouse buildings for health supplies</li> </ul>	<ul style="list-style-type: none"> <li>• The storage space available for the volume of products to move through warehouse is inadequate. In case of no installation of racks/shelves in a warehouse, the maximum utilization of vertical space in a warehouse is not possible which may lead to compromised quality of products. Poor layout of warehouse is another challenge to optimize space utilization in a warehouse.</li> </ul>	<ul style="list-style-type: none"> <li>• Improving health warehouse infrastructure for optimal storage capacity.</li> <li>• Installation of racking system which may increase the existing space availability up to 50% with the utilization of vertical space in an existing warehouse/store.</li> </ul>
<ul style="list-style-type: none"> <li>• Poor product traceability</li> <li>• Manual inventory management</li> <li>• Stock leakage and security</li> </ul>	<ul style="list-style-type: none"> <li>• The records about in- and out-flow of products in a warehouse is usually paper-based. This is time-consuming process with greater chances of error. With no definite process in place, a paper-based system may limit the visibility of data at different levels of the supply chain. Stock leakage, security issues, and product traceability throughout the supply chain frequently lead to stock-outs.</li> </ul>	<ul style="list-style-type: none"> <li>• Improving inventory management and security using barcoding</li> <li>• Installation of web-based Warehouse Management System (WMS) at all levels of supply flow transaction points to track products</li> </ul>
<ul style="list-style-type: none"> <li>• Government poor capacity of warehouse management coupled with aging or inadequate warehouse infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• The upgradation of aging infrastructure and information systems (WMS/HMIS) to modern standards may require an investment which the provincial government is not willing/able to make. Outsourcing of warehousing functions may be a cost-effective approach for the management of medicines and supplies in a national health system.</li> </ul>	<ul style="list-style-type: none"> <li>• Outsourcing warehouse functions to specialized third party logistics service providers</li> <li>• Development of parastatal, semi-autonomous and central medical store managed by a professional health warehousing firm as per international warehousing standards</li> </ul>
<p>Poor performance by existing warehousing staff due to:</p> <ul style="list-style-type: none"> <li>• Lack of proper resources</li> <li>• Lack of training</li> </ul>	<ul style="list-style-type: none"> <li>• If the staff responsible for monitoring warehouse operations are not properly trained, they will not be able to appreciate their defined goals and responsibilities resulting in lack of accountability for their actions and thus, the warehouse operations will be inefficient and ineffective.</li> </ul>	<ul style="list-style-type: none"> <li>• Dedicated logistics personnel</li> <li>• Increased SCM capacity for health personnel at service delivery points</li> <li>• Performance management and supportive supervision for supply chain activities</li> </ul>

# Key Challenges

In a series of field visits and follow-up engagements with focal persons and relevant stakeholders of DOH Balochistan, the key challenges identified for their vertical programs storage facilities were:

- Insufficiency of currently available space in the warehouses of vertical programs to meet the space requirements for bulk supplies procured annually;
- Incompatibility of geographical expansions of health services with future requirements for maximum coverage of clients at both primary and secondary levels in urban and rural Balochistan;
- Poor infrastructure and non-purpose built warehouse buildings causing problems with optimum utilization of available storage space.

# Proposed Solutions

## OPTION 1: UPGRADE EXISTING WAREHOUSE - FJMC QUETTA

Given the current scenario, FJMC Quetta would be an ideal option for setting up an integrated warehouse. This will serve as a cost-effective and efficient approach for implementing integrated warehousing. The installation of racking system would boost the existing land-space utilization from 16,000 sq. ft. to 62,000 cb. ft. by using vertical space up to the roof. This would even be greater than the total space requirement (42,000 cb. ft.) of all the vertical programs of this province, allowing for future growth.

**This option will serve following advantages:**

- The last mile delivery of vertical programs can be improved if the supplies are properly stored and distributed under one roof where many other interdependent and interlinked supply chain management issues can be streamlined.
- Each vertical program's supplies can be segmented in the integrated warehouse with a proper warehouse management system (WMS) for better inventory management and real time stock traceability for all vertical programs.
- The existing FMC Quetta can be converted into a state-of-art integrated warehouse by investing in installation of racking system in the warehouse. To facilitate an all-inclusive decision making for the Government of Balochistan, a comprehensive plan for the proposed integrated warehouse has been put down in 3D layout along with budget required for installation of racking system.

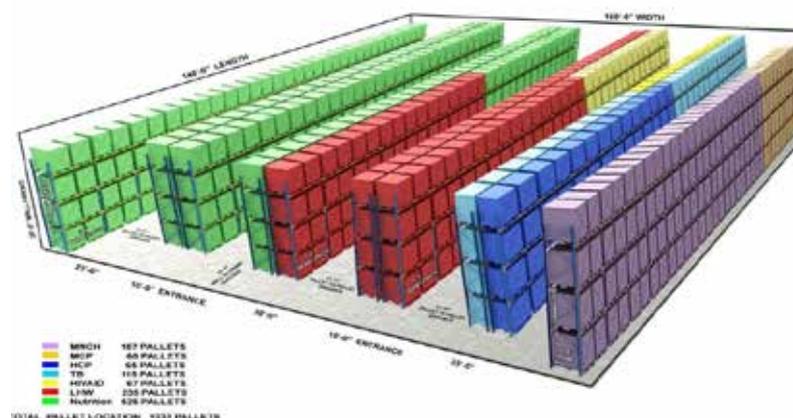


Figure 5: Proposed 3D Layout Plan (FJMC)

**Table 3: Estimated Costs of Racks**

Sr. #	Item	Required Number of Bays	Per Bay Cost	Total Cost of Bays
1	Starter Bay	10	Rs. 49,700	Rs. 497,000
2	Add-on Bay	144	Rs. 36,100	Rs. 5,198,400
			Total Cost	Rs. 5,695,400

**Table 4: Estimated Costs of Pallets Handling and Placing Equipment**

Sr. #	Item	Required Unit(s)	Per Unit Cost	Total Cost
1	High Reach Truck (Stacker)	1	Rs. 5,000,000	Rs. 5,000,000
2	Hydraulic Pallet Lifter	10	Rs. 18,000	Rs. 180,000
3	Plastic Pallets	1232	Rs. 5,000	Rs. 6,160,000
			Total Cost	Rs. 11,340,000

**Table 5: Summary of total Budget**

Sr. #	Item	Total Cost
1	Racking System Cost	Rs. 5,695,400
2	Equipment Cost	Rs. 11,340,000
	Total Cost	Rs. 17,035,400

## OPTION 2: PRE – ENGINEERED BUILDING (PEB) WAREHOUSE STRUCTURE ON DOH ACQUIRED LAND AT BOLAN MEDICAL COLLEGE QUETTA

The DOH Balochistan has sufficient land in the premises of Bolan Medical College Quetta. The Department of Health confirmed that land is under the acquisition of health department and that the required land could be allocated for the integrated warehouse for the vertical programs for the health department of Balochistan.

The total area requirement of land

for construction of Pre –Engineered Building (PEB) structure is 30,000 Sq. ft to fulfill the health department’s 30-40 year futuristic warehousing requirement for all vertical programs.

- Total proposed land area = 30,000 Sq.ft, 5,000 Sq.ft for throughput
- Proposed area for racks= 25,000 Sq. ft.
- Proposed wall Width = 100 ft
- Proposed height = 25 ft
- Proposed wall Length = 250 ft
- Per pallet storage in Cubic feet = 51.67
- Approximate numbers of Pallets = 3000
- Total available space for storage in cubic feet 3000 \* 51.67 = 155,010

**Figure 6: Space calculations PEB structure warehouse**

By adopting this option, the DOH Balochistan could gain the following advantages:

- The roof height of Pre – Engineered Building (PEB) structures can be placed up to 40 feet high with zero middle support beams. A maximum vertical space up to 40 feet high can be utilized with 100 percent clear space inside warehouse building without middle support beams.
- In the proposed allocated 30,000 Sq ft with a clear height of 40 feet, approximately 3000 pallets could be stored. The current space requirement is 1232 pallets for all vertical programs. Through installation of pallet and rack system in the proposed land of 30, 000 Sq. ft., the storage capacity could be enhanced up to 155,010 cb. ft.

**Table 6: Estimated Cost of Racks**

Sr. #	Item	Required Number of Bays	Per Bay Cost	Total Cost of Bays
1	Starter Bay	10	Rs. 138,200	Rs. 1,382,000
2	Add-on Bay	290	Rs. 95,700	Rs. 27,753,000
			Total Cost	Rs. 29,135,000

**Table 7: Estimated costs of pallets, high reach truck and hydraulic pallet lifter**

Sr. #	Item	Required Unit(s)	Per Unit Cost	Total Cost
1	High Reach Truck (Stacker)	1	Rs. 6,000,000	Rs. 6,000,000
2	Hydraulic Pallet Lifter	10	Rs. 18,000	Rs. 180,000
3	Plastic Pallets	3000	Rs. 4,000	Rs. 12,000,000
			Total Cost	Rs. 18,180,000

**Table 8: Summary of Total Cost**

Sr. #	Item	Total Cost
1	Pre- Engineering Building Cost (PEB) Fabricated warehouse structure @ Rs. 2500 * 25000 Sq . ft	Rs. 62,500,000
2	Racking System Cost	Rs. 29,135,000
3	pallets, high reach truck and hydraulic pallet lifter	Rs. 18,180,000
	Total Cost	Rs. 109,815,000

### **OPTION 3: OUTSOURCE WAREHOUSE FUNCTION TO A THIRD – PARTY LOGISTICS (3 - PL)**

Outsourcing warehouse function to a third-party logistics (3PL) firm could be another viable option in the current scenario where there are multiple challenges ahead for the DOH Balochistan to establish their own proper purpose-built warehouse, keeping in view the limited resources, financial constraints and fragmented health supply chain system in the province. The warehouse functions could provide the best option to outsource to third party logistics of all vertical programs to eliminate quickly current challenges in terms of shortage of space, poor warehouse infrastructure, disintegration, lack of coordination, quality of supplies, and inventory management. In Balochistan, the World Food Program (WFP) is already providing warehousing services to their different clients on a cost-recovery basis. The WFP warehouse compound is a well-established and purpose-built warehouse, which is operational under trained human resources. The Balochistan Nutrition program, Population Welfare Department, National Program, primary health care, all UN agencies, world bank clients, Global education fund, secondary education, INGOs and local NGOs, have already signed contract with WFP for leasing the warehouse on an annual and monthly basis.

The following are potential advantages of outsourcing to 3PL providers:

- DOH Balochistan could quickly overcome existing warehousing challenges i.e insufficient storage space, incompatibility of geographical expansions of health services with future requirements and poor infrastructure.
- Secondly, warehouse functions of the government health department vertical programs will have an integrated warehousing facility at one compound under trained and expert logistics professionals.

However, engaging 3PL providers could potentially pose challenges such as management of these firms, communication and coordination issues, and fragmentation, especially in terms of funds allocation and system integration through 3PL providers.

The below table describes the estimated budget required if warehousing functions were outsourced to the WFP Balochistan.

**Table 9: Estimated Budget**

Sr. #	Provincial Program	Total Area sq. ft.	Walk Way 30%	Storage Area sq. ft.	Storage Area (cb. ft)	Per cb. ft cost @ of 8.442 Rs. Per month	Total per month cost
1	MNCH	1150	345	805 x 6.5	5333	8.442	45,021
2	MCP	500	150	350 x 6.5	2275	8.442	19,206
3	HCP	500	150	350 x 6.5	2275	8.442	19,206
4	TB Control Program	850	255	595 x 6.5	3868	8.442	32,654
5	HIV/AIDS Control Program	500	150	350 x 6.5	2275	8.442	19,206
6	LHW Program	1800	540	1260 x 6.5	8190	8.442	69,140
7	Nutrition Program	4000	NA	4000 x 4.5	18000	8.442	151,956
<b>Total per month cost PKR</b>							<b>356,387</b>

# Annexure- 1 List Of Participants April 5, 2017 Consultative Meeting

#	Name	Designation	Department
1	Dr. Masood Qadir Nousherwani	Director General Health Services	Department of Health
2	Mr. Salahuddin Kasi	Logistics Officer	LHW Program
3	Dr. Irfan Ahmed Rasani	Deputy PTP Manager	TB Control Program
4	Mr. Abdul Wali Khan	Stock Officer	TB Control Program
5	Dr. Ismail	Program Manager	Hepatitis Control Program
6	Dr. Samiullah Kakar	Program Coordinator	LHW Program
7	Dr. Sultan Lehri	Provincial Manager	PTP Population
8	Mr. Muhammad Dawood	Logistics Incharge	Malaria Control Program
9	Mr. Zafar Ahmed	Logistics /Store Incharge	MNCH Program
10	Dr. Khalid Mehmood	Additional Director Logistics	BHD Quetta
11	Mr. Naseer Ahmed	Procurement Specialist	Department of Health
12	Mr. Abdul Qadir	Program Specialist	Department of Health
13	Dr. Zahida	L.M.O	Provincial EPI Program
14	Dr. Muhammad Yousaf Bizanjo	Additional Director MSD	Department of Health
15	Mr. Naseebullah Khan	Pharmacist	Department of Health
16	Ms. Jamiia Niaz	Provincial Coordinator	MCH Program
17	Dr. Ali Nasir	Program Coordinator	Nutrition Program
18	Dr. Noor Qazi	Program Manager	HIV/AIDS Program
19	Dr. Imdad ullah	National Program	Department of Health
20	Dr. Rafiq ullah	Program Coordinator	Malaria Control Program
21	Mr. Muhammad Shafiq Lodhi	LMIS/ Computer Operator	Department of Health
22	Mr. Muhammad Saleem	LMIS/ Computer Operator	Department of Health
23	Mr. Zafar Jamil	Director Systems Strengthening & FO	GHSC-PSM Project
24	Mr. Muhammad Qasim	Manager Distribution and Transportation	GHSC-PSM Project
25	Ms. Saleha Manzoor	Supply Chain Officer	GHSC-PSM Project



# Annexure- 2 Data Collection Tool

S.No.	Product	Take unit as carton	Category (Equipment/ Syrup/ Medicine)	Manufacturer	Per outer Carton volume			Per carton Qty	Temperature Requirement	Total Quantities Received		
					Length (cm)	Width (cm)	Height (cm)			2014	2015	2016
1												
2												
3												
4												
5												
6												
7												
8												
9												







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**Procurement and Supply Management**



**Department of Health**  
**Government of Balochistan**