

**The transition from a vertical
program to a health systems
strengthening approach in the
GAVI support to Sudan: literature
review
2021**

By

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Sudan

57th Master of Public Health/International Course in
Health Development
KIT (Royal Tropical Institute)
Vrije Universiteit Amsterdam (VU)

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Abbreviations and Acronyms:

CHE	Current Health Expenditure
CHW	Community Health Workers
DHIS	District Health Information System
EPI	Expanded Program on Immunization
FMOH	Federal Ministry of Health
GAVI	Global Alliance for Vaccines & Immunization
GDGH	General Directorate of Global Health
GDP	Gross Domestic Product
GoS	Government of Sudan
HIV	Human Immunodeficiency Virus
HR	Human Resources
HRH	Human Resources for Health
HSS	Health System Strengthening Grant
HSS1	Health System Strengthening Grant (first cycle)
HSS2	Health System Strengthening Grant (second cycle)
HSS3	Health System Strengthening Grant (third cycle)
MCH	Maternal and Child Health
NGOs	Non Governmental Organizations
NHA	National Health Accounts
OECD-DAC	Organisation for Economic Co-operation and Development - Development Assistance Committee
OOPE	Out Of Pocket Expenditure
PHC	Primary Healthcare
UHC	Universal Health Coverage
UNICEF	United Nation Children's Emergency Fund
USD	United States Dollar
VP	Vertical Program
VPDs	Vaccine Preventable Diseases.
WHO	World Health Organization

Key terms

- **Vertical Programs:**
The vertical approach is called so because it is managed, supervised, and implemented, either fully or mostly, by a specialized service using a dedicated workforce(1)
- **Health System Strengthening Grant:**
It is an investment in activities to help health systems overcome constraints to achieving improved outcomes in immunization, TB, HIV, and other programs(2).
- **Absorption capacity:**
It is the ability to use additional aid without pronounced inefficiency of public spending and without induced adverse effects(3). However, for the purpose of this research, it refers to the proportion of money approved and disbursed for Sudan for activities from the total money approved in the grand proposal of these activities.

The transition from a vertical program to a health systems strengthening approach in the GAVI support to Sudan: literature review

Dedication:

To my family, to Amin -my nephew-,

To the souls of December Revolution martyrs in Sudan

Abstract

Background: Since 2005, GAVI has provided health system strengthening (HSS) grants to address the bottlenecks affecting immunization services. This study evaluates the GAVI HSS grants in Sudan, a country with significant political and socio-economic challenges.

Methodology: This was a desk review and a literature review study. First, we described the health system in Sudan using the health system building blocks, and then we analyzed the transition of GAVI from immunization focus to HSS globally. Lastly, we used OECD-DAC criteria to evaluate GAVI HSS grants in Sudan.

Results: Sudan faces several health systems challenges, especially in governance, finance, and health workforce. These general challenges are reflected in the Expanded Program on Immunization. GAVI HSS grants were established to support national health systems in several countries. These grants were found to be relevant and impactful in different countries globally. Despite some bottlenecks, the introduction of the GAVI HSS grant has positively impacted the immunization program and the health system in Sudan. The grant was relevant to the country's needs, coherent with the national plans. Activities implementation was partially effective and efficient. However, it impacted immunization coverage and HSS, yet this impact might not be sustainable.

Conclusions: Sudan's health system has faced several challenges over time to achieve universal health coverage. The verticalization of EPI must be continued while the health system is being improved. Integration must be a strategic priority. GAVI HSS project bottlenecks must be improved, and GoS and stakeholders must sustain the impact of GAVI funds.

Keywords: Health System Strengthening, GAVI, Sudan, Grants.

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Introduction:

Between April 2019 and March 2020, I have volunteered as a technical officer at the GAVI program management unit in Sudan. I learned a lot about the grant management and engaged with representatives of different implementing units and partners in that period. I have seen the difficulties in planning, implementing, and evaluating the GAVI HSS grant. Before coming to KIT, I always wanted to analyze these issues scientifically, and this thesis exercise was an excellent chance to do so. I have reflected on some of my experiences as a global health professional in this document. Enjoy reading.

Chapter one: Background

1.1. The Republic of Sudan

1.1.1. Geographic and demographic characteristics

The Republic of the Sudan is a middle-income country located in Northeast Africa. Its strategic geographical location links Sub-Saharan Africa with the Arab world. Before July 2011, Sudan was the largest country in Africa, after which the South of Sudan seceded, resulting in the country's split into two countries: Sudan and South Sudan(4). Sudan currently has 18 states; however, the population is unevenly distributed in these states(5), refer to annex (1) for population distribution.

Current Sudan occupies 1,886,068 KM² and has eight boarding countries. According to the last census in 2008, the total resident population is 30.9 million. The World Bank's 2020 estimation of the population is around 42.8 million, with a male to female ratio of 1:1 (6). Approximately 64.7% of the population lives in rural areas(7), and children 0-14 years old represent 40% of the population(7).

1.1.2. The socio-economic and political situation

Sudan's secession of South Sudan brought several economic shocks, with the oil revenue loss being the most substantial, which previously accounted for more than half of Sudan's government revenue and 95% of its exports(8). This consequent reduction in economic growth resulted in double-digit consumer price inflation and a fuel shortage, which, together with increased fuel prices, triggered violent protests in 2013, 2016, and 2018(8). The latter resulted in a revolution which ultimately led Sudan's ex-president Omar AL Bashir to be overthrown. Sudan is currently governed by a transitional cabinet and a transitional sovereignty council(9). The political landscape of Sudan is characterized by political instability and frequent military coup d'états of presidents. The United States designated Sudan as a state sponsor of terrorism in 1993, diplomatic ties between Sudan and several countries remained tense for almost three decades under the rule of Sudan's Omar al-Bashir. The country was put on a trade embargo which further weakened the economic state of the country. The sanctions of the U.S. government were partly lifted in 2020(10).

Economically, according to the ministry of finance, Sudan used to be categorized as a middle-income country (with a Gross Domestic Product (GDP) of \$2,899 per capita) in 2017(11). However, in 2018 the country's economy experienced several financial crises resulting in high inflation rates (more than 60% in 2018), devaluation of the national currency with scarcity in hard cash, and a decline of the GDP per capita to \$1229, which re-categorized Sudan as a low-income country(11).

1.1.3. Health profile and environment

Climatic factors can contribute to humanitarian emergencies related to drought and floods, and ecological factors expose much of the population to major infectious diseases. Difficult access to some areas, rural-urban migration, natural disasters, the longstanding civil war in the South, and limited resources significantly impacted health care services(12). Therefore, there are variations within the country in the delivery of services, vaccination coverage, and disease incidence. The total fertility rate in Sudan is 4.5, and the under-five mortality rate is 58.4 per 1000 newborns(12). Sudan reports high accessibility to Primary HealthCare (PHC) facilities (within 5 km reach); however, most PHC facilities

cannot provide all essential components of a PHC package. Access to basic health services is difficult constrained, especially in rural areas(13).

Sudan is experiencing an epidemiological transition now that it has a double burden of disease. Non-communicable diseases (NCDs) are increasing remarkably, contributing to multimorbidity. Meanwhile, the progress against communicable diseases is slow, and the burden of chronic and endemic infections remains high and causing substantial morbidity and mortality. Antimicrobial resistance has become a significant threat throughout the healthcare system, with an emerging impact on vulnerable populations. Meantime, malnutrition, micronutrient deficiency, and poor perinatal outcomes remain common and contribute to a lifelong burden of disease(14).

1.2. Overview of GAVI's Grants (health system strengthening and immunization)

The discussion of the health system-oriented approach versus the vertical programs (VPs) started as early as the 60s and 70s of the last century. Historically, the focus of the World Health Organization (WHO) was on tackling several communicable diseases such as malaria, smallpox, and polio. Consequently, WHO member states expressed the need for support with their health services from the WHO in the 1960s. Ultimately, WHO's Secretariat began to search for a balance between the vertical (single disease) programs and the horizontal (health systems) approach in the 1970s (15).

Created in the year 2000, The Global Alliance for Vaccines and Immunization (GAVI), now known as GAVI, the Vaccine Alliance, is an international organization bringing together public and private sectors with the shared goal of "saving lives and protecting people's health by increasing the equitable and sustainable use of vaccines"(16). However, in 2004, a report and stakeholder meeting suggested that weak health systems undermined GAVI's immunization program investments (17,18). As a result, The GAVI Alliance Board voted to endorse the health systems goal in 2005, and after a year of consultations, the health systems strengthening (HSS) initiative emerged(19). While each country chooses to spend GAVI HSS funds differently, most interventions target service delivery and supply procurement, human resources (HR) development, and health information system(20). The annual GAVI's disbursements for HSS globally fluctuated across the years; it started with a \$206 million grant in 2006 and then rose steadily until it reached \$1.3 billion in 2015, before declining to \$1.07 billion in 2017(18).

Between 2013 and 2015, several studies have been conducted to evaluate GAVI's HSS grants in various countries; the studies were conducted in Burkina Faso, Cameroon, Chad, Ethiopia, Madagascar, Nepal, Tajikistan, and Somalia were GAVI-managed evaluations. In contrast, Afghanistan, Eritrea, Ghana, Myanmar, Sudan, and Yemen conducted country-managed evaluations(21). All studies highlighted several bottlenecks of the effective implementation of the GAVI HSS grant, including poor country program management, lack of guidance and support from the secretariat, delays in implementation, ineffective reporting and monitoring systems functioning, weak country's planning capacity, and the lack of clarity of GAVI's scope and objectives(22). Another study was conducted in Chad and Cameroon in 2017 found that HSS programs are characterized by delayed disbursement, frequent deviation from approved budgets, and reprogramming of funds (23). Although this could be considered a sign of flexibility and adaptation with the system needs, it was highlighted in the context of those countries as a sign of weak planning and implementation - a root cause for other issues. They also found poor communication with GAVI, poor

governance, and inadequate capacity for planning and implementation as other major root causes(23). Another study in Bangladesh highlighted that government ownership of HSS programs and the absence of sustainability of the impact of the grants are key challenges(24). A thorough discussion of the evaluations of HSS grants will follow in the subsequent chapters.

Chapter two: Problem statement, justification, and research objectives

1. Problem statement:

Sudan's health sector, not different from that of most low-income countries, is suffering from a shortage of financial resources accompanied by increased community demand for health services. Current Health Expenditure (CHE) was \$2.4 billion (\$58.84/capita) in 2018, where the public resources cover 24% of it, private revenues cover 69.3%, and donors cover the remaining 6.6%. The level of public health spending for 2018 was about 7.2% of the government budget and 1.5% of the GDP. These figures indicate that Sudan is not mainly a donor-dependent country. However, the donor's role is catalytic in certain areas, especially those related to strengthening the health system (25). For example, both GAVI and the Global Fund for AIDs, TB, and Malaria (GFATM) have invested heavily in HRs for health (HRH) development, procurement, and supply chain management system, and Health Information Systems in Sudan(26).

Since 2001, GAVI has committed a total of \$54 million for HSS divided into two grant cycles, each is five years long (further divided into \$16.1 and \$37,9 million as HSS1 (2008-2013) and HSS2 (2013 -2018¹) grants, respectively). However, only 67% HSS2 grant was disbursed as of September 2019 (27). That was due to various implementation challenges, including an unstable political environment, economic downturn, and high turnover in critical positions involved in implementing the GAVI grant. A reprogramming of activities was undertaken (late 2019/early 2020) to accelerate implementation, and the grant has been extended to June 30th, 2021. The COVID-19 pandemic that started in early 2020 led to further delays in implementation(28). The third grant cycle (HSS3) proposal for \$24 million for organized activities in the next five years(11). The proposal is approved but yet to be implemented.

According to the Joint appraisal report 2018, several implementation bottlenecks were identified to the GAVI HSS grants in Sudan. These included insufficient administration and managerial capacities of the ministry of health staff, particularly at the sub-national level, high staff turnover at different levels of the health system, new requirements and procedures, and the recent GAVI assessments (29). During these assessment activities (audit, grant review, etc.), some HSS activities were temporarily paused or postponed for later, which led to these HSS activities being delayed or canceled. Likewise, the audit report 2018 of the GFATM grants in Sudan also highlighted several issues, including the lack of a formal, time-bound plan to build capacity at the Federal Ministry of Health (FMOH) and other national stakeholders, as well as programmatic and procurement risks, leading to compromised efficiency and effectiveness of grants(30). In contrast, previous reports and literature rarely highlight the planning process of GAVI HSS grants in Sudan. This study intends to provide a critical analysis of the effectiveness of the GAVI HSS grants in Sudan, considering all organizational, political, economic, social, and cultural factors and the dynamics of international aid and the general policy of GAVI.

¹ Originally it should be between 2013-2018, but it was extended until 2021.

2. Justification

GAVI has supported HSS in Sudan for nearly 15 years. In 2022, the 3rd cycle of HSS funding will be available to the country. Low absorption rates have been persistently presented as a serious challenge to GAVI HSS2 grants; evaluation or review reports recurrently highlight decreased absorption of HSS grants as a problem(28,29). However, it is essential to understand that increasing absorption is not an end goal; instead, it should be a means to ensure the most effective utilization of resources and funds available. A more thorough analysis should be done to scrutinize further why HSS grants have existed in the first place; what are their goals, were resources used for the core issues, and were they utilized efficiently? Answering such questions would provide context to understand the bottlenecks of GAVI HSS grants and allow planners and stakeholders to make informed decisions about health system financing. In contrast, improper utilization of such funds increases wasted resources in a country where resources are already limited. Strengthening the health system is crucial to the effectiveness and sustainability of the vaccination program and would eventually contribute to reducing disease morbidity and mortality in children in Sudan.

The only evaluation study of the GAVI HSS grant was conducted in 2015(31), when the country had better economic resources and more political stability. Since then, the country has been through many political, socio-economic, and geodemographic changes. The country witnessed several epidemics (including COVID-19), political uprising and change, and a series of economic downturns. As the HSS2 grant is coming to an end, there should be a thorough analysis and evaluation of it. The findings of such a study serve an excellent purpose to improve performance and mitigate future risks for the GAVI program management unit in Sudan and the different implementing units and partners of GAVI in the country and GAVI HSS grant coordinators in other countries with similar contexts. These findings are equally important for HSS grants of other global health initiatives, particularly for GFATM, World Bank (WB), and any other multilateral or bilateral health system grant coordinator. This study will systematically review the architecture of the donor funds targeted for strengthening the healthcare system in Sudan, taking the case of GAVI HSS grants as a case study. The results will synthesize relevant policy recommendations for the health system grants planners' and stakeholders. The evaluation of the HSS grant must be preceded by a description of the health system in Sudan in terms of structure, performance, and needs and an understanding of the GAVI's general goals and policies globally.

3. Objectives

2.3.1 General objective:

This literature review aims to critically review the transition from a disease-specific approach to a HSS approach of the GAVI support to Sudan. The results of this thesis can inform future policies to ensure the effective utilization of health system strengthening initiatives in Sudan and globally.

2.3.2 Specific objectives:

- 1- To describe the Sudanese Health System and summarize the experience of Sudan in Health System Strengthening.
- 2- To analyze the transition of GAVI from a vertical program approach to a Health system strengthening approach.
- 3- To evaluate GAVI Health System Strengthening grants in Sudan.
- 4- To use results to propose policy recommendations for donors and ministries to ensure effective utilization of similar grants in Sudan countries with similar interests.

4. Limitations:

The study was conducted as a literature review only. The quality of the findings could have been improved if they were triangulated with other information sources (such as key informant interviews). The robustness of evidence from most documents issued by the Sudanese government is sometimes weak (for example, mentioning statements without supporting evidence, showing contradicting statistics). Some documents had huge linguistic errors and a lack of clarity about some terms used.

Methodologically, most impact evaluation studies did not sufficiently examine the counterfactual scenario (what would have happened if the intervention had not been implemented) and the attributable impact to the intervention.

Chapter three: Methods

3. 1 Methodology and literature search:

This study is conducted using desk review and literature review as the main strands. Firstly, the reports, academic literature and grey literature were reviewed by mainly using Google search engine and other important search engines (e.g., google scholar and PubMed) for open access documents. Other full-text documents were accessed through the VU library. Additionally, several reports and documents were collected from the website of GAVI (GAVI.org) and the WHO website (who.int). Furthermore, Sudan Health Observatory (sho.gov.sd) was also accessed for country reports and documents.

The search string used is explained in detail in Annex (2). However, the word combinations used covered three main areas: geographical location of the study (Sudan, Africa, Asia, specific countries chosen based on GAVI reports of evaluation studies conducted there), the implementor of the grant (GAVI, GFATM, WB...etc), and some relevant technical terms (HSS grants, health donor funds...etc).

3. 2 Study context and area:

This thesis is conducted in the context of Sudan, looking historically at the development of the GAVI HSS grant over time and the associations with the health system and Expanded Program on Immunization (EPI). The study also examines the events and the thinking behind the development of health system interest and approach at GAVI and the changes in policies and decisions of the board over time. Despite the main focus on Sudan, relevant studies from other countries were used to make contrasts and comparisons.

3. 3 Finding's framework:

In principle, two frameworks were used to answer the study objectives.

The conventional WHO health system building blocks framework (figure 1) was used to guide the results of the first research objective, describing the health system in Sudan(32). These building blocks relate to HSS in numerous ways. Some components (leadership/governance and health information systems (HIS)) set the basis for the overall policy and all the other building blocks. Input components to the health system include financing, the health workforce, and medical products & technologies. A third group, namely service delivery, reflects the immediate outputs of the health system, i.e., the availability and distribution of care.

The second objective was answered by (i) highlighting the summary of the ongoing discussion between vertical (disease or intervention specific) and horizontal (health system support) approaches to health services delivery, (ii) describing how GAVI reacted to these discussions and how GAVI decided to support HSS in their sponsoring countries, and (iii) to analyze the GAVI transition toward in several countries including Sudan.

For the third research objective, the Organisation for Economic Co-operation and Development's Development Assistance Committee (OECD-DAC) evaluation criteria were used to evaluate the GAVI HSS grant in Sudan. Figure (2) illustrates the criteria being presented in the order in which they are most

logically considered: starting with relevance and coherence, then effectiveness and efficiency, and finally impact and sustainability(33).

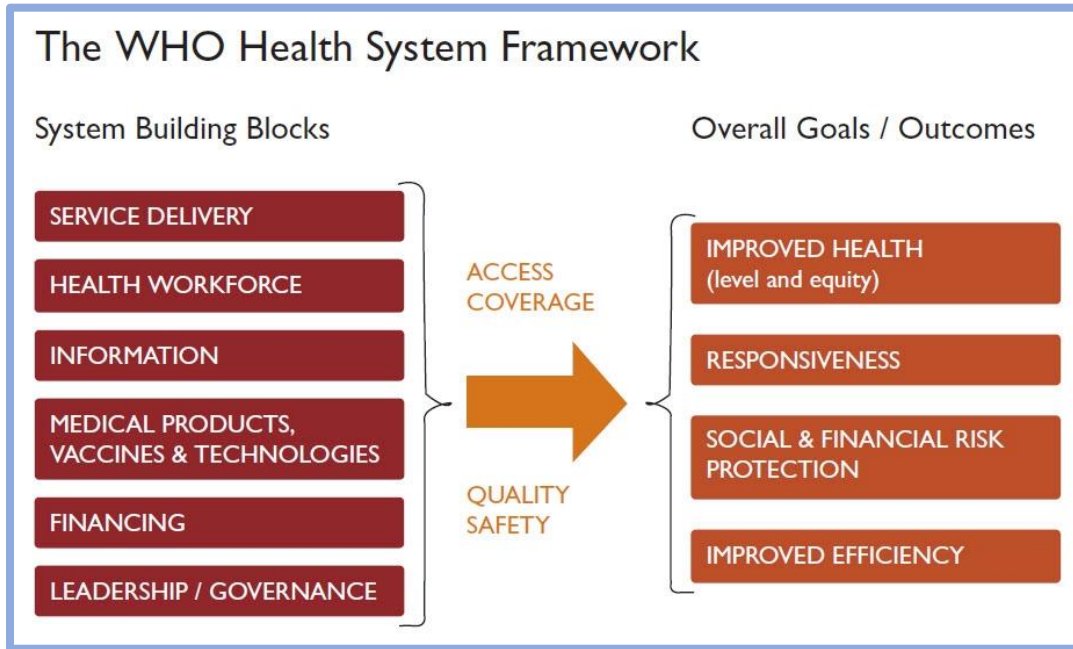


Figure 1: Health System Building Blocks



Figure 2: Organisation for Economic Co-operation and Development's Development Assistance Committee (OECD-DAC) evaluation criteria

Chapter four: Description of Sudan's Health System.

This section provides an overview of the health system in Sudan in relevance to the study question. The following sections summarize the main features of the Sudanese health system, EPI, and GAVI Program Management Unit (PMU) in Sudan through its different building blocks. A comparison between both is summarized in table (2). It will also briefly describe the experience of Sudan in vertical and horizontal approaches.

4.1. Description of Sudan's health system

The health system in Sudan, as per the Constitution (2006), Local Governance Act (2003), and Public Health Law (2008), is decentralized with three levels of governance (federal, state, and locality). This structure, however, is characterized by an absence of a clear demarcation of the role and responsibility of each health system level(34). The following is a description of each building block in Sudan's health system.

4.1.1 Leadership and governance:

The FMOH, with its ten general directorates, became the main layer for healthcare financing, policy-making, strategic planning, coordination, regulation, international relations, and central source of technical support and guidance for the states(35). The state-level is concerned with the daily running and implementation of policies and service delivery at the hospitals and health facilities. In each of the 18 states, a governor – with a cabinet of 5-7 ministries and 5-12 localities -work as a state administrator. For every locality², there is a commissioner responsible for its administration(36). For HSS, the National Health Sector Partners' Forum is an effective inclusive coordination mechanism for all the health sector partners.

4.1.2 Health workforce

A 2006 health system profile report highlighted that the health workforce is divided into more than 20 jobs titles or functions (such as doctors, nurses, and midwives) whose production has not been adequately planned, resulting in an over-supply in some health professions and a shortage in others. The drain of some categories, such as doctors and pharmacists, towards working in the private sector and abroad is a special dilemma. In some other categories, such as public health officers, unemployment is high. (35). According to the latest estimate, there are 0.26 doctors per 1000 population, and 0.69 nurses & midwives per 1000 populations(37,38). Compared to the WHO recommendations (4.45 doctors, nurses, and midwives/1000 population), these numbers are enormously shy for achieving Universal Health Coverage (UHC)(39). It could be explained partly by the imbalanced production of the health workforce and partly by the high brain drain. Furthermore, the geographical distribution of health workers is uneven across states, demonstrating an evident bias towards urban settings (70% of health workforce), especially in Khartoum state(38% of health workforce), despite 70% of the population are in rural areas(11,40). Figure (3) shows the distribution of the health workforce/1000 in each state(41). The denominator in the Northern, BlueNile and Western Darfur states is very low.

² Locality is equivalent to districts in other countries in size and leveling.

Production of HRH has increased significantly over the past few years due to establishing training institutions (Universities and Academies of Health Sciences). Key challenges include lack of systematic linkages between production and health system needs, skill mix imbalance, and absence of academic quality assurance measures and adequate capacities of faculties (11,40).

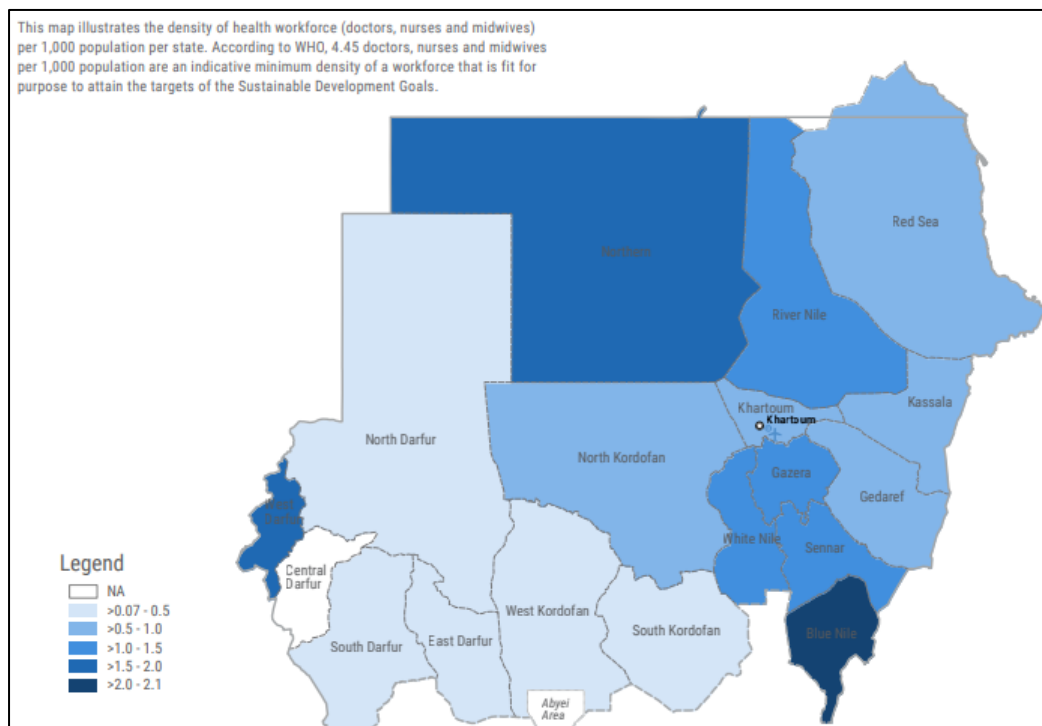


Figure 3: The health workers' density and distribution across states in Sudan(41).

4.1.3 Medical products, technologies

The Health Technology Management system (a system that undertakes needs assessment, planning, selection & procurement of medical technologies and ensures the maintenance and safe use) is weak in Sudan (34,42). Medical devices assessment and management functions are fragmented between FMOH, National Medicines and Poisons Board, and Central Medical Supply Fund. Furthermore, there is no clear division of the roles, and there is a lack of coordination. Needs assessment is not regularly done, and information about medical devices is not regularly updated due to the lack of regular and systematic reporting. So, the planning, procurement, and supply of medical devices are not according to the medical devices' life cycle. A complete package of guidelines, training modules, and audit system is absent and needed for efficiency and service availability at public facilities(34).

4.1.4 Health Information and Research

The national health information strategy 2012–2016 has focused on integration, improving reporting and data quality, computerizing the system, and building human and infrastructure capacity(43). Fourteen of the eighteen states (except Darfur Central, Darfur South, and Sennar) have developed a HIS plan. Eleven states established a functioning inter-agency body to guide the implementation of these plans. In terms of improving completeness and timeliness of information, evidence from states indicates that health information is yet to show progress.

Most cadre managing data at locality levels are at least qualified to undertake basic data collection and analysis; the programs often take the better qualified, while the system continues to be paper-based(31). To strengthen the health management information system and to improve the quality of health indicators data and accessibility to it by the staff of the FMOH and other actors, an integrated health information system and district health information system (DHIS2) have been developed, with a community health information system that is still in a piloting phase(43). The deployment of DHIS2 has not been completed to all localities; this is challenged by (computer, electricity, staff, accountability not only capacities to take the handbooks of outreach activities to be entered to the DHIS2). Their completeness, timeliness, and relevance vary amongst different localities.

4.1.5 Health Financing

The Sudanese system for financing health is mixed with a complex flow of funds. The health sector suffers from scarce financial resources, coupled with an increased demand for health services. The primary financing schemes include Ministries of Health, National Health Insurance Fund, Armed Forces Health Insurance Schemes, Out of Pocket expenditures (OOPE), and International Donors scheme. The CHE in 2018 was \$2.4 billion (\$58.8 per capita). In 2018, the total donor contribution of the CHE was 6.63% (\$159 million), while the government contribution is 24%, and the remaining 69.3% are covered by OOPE (25). In contrast, the CHE was \$ 4.8 billion (\$132.3 per capita) and \$3.39 billion (\$86.7 per capita) in 2015 and 2008, respectively; this shows an ongoing trend of ongoing reduced governmental allocation for the health sector. However, the CHE's OOPE share remained high over time (83.3% and 63% in 2015 and 2008, respectively). In the same vein, the donor funds remained below the 7% limit (44,45). Table (4) summarizes the most crucial health financing figures from 2018, 2013, and 2008 National Health Accounts (NHAs).

Table 1: Main health finance data from National Health Accounts in different years in Sudan

Figure	NHA 2008	NHA 2015	NHA 2018
Population (millions)	39.1	38.4	41.9
Current Health Expenditure (\$)	\$3.39 billion	\$4.8 billion	\$2.4 billion
CHE/capita (\$)	\$86.7	\$132.3	\$58.8
OOP as % of CHE	66.9%	83.3%	69.3%
Public revenue as % of CHE	28.8%	15%	24%
Donor funds as % of CHE	4.1%	1.7%	6.6%

4.1.6 Service Delivery

A three-tiered network organizes service delivery. PHC facilities include PHC units, dressing stations (DS), dispensaries, health centers, and rural hospitals. In principle, PHC units are staffed by community health workers (CHWs), a nurse staff dressing stations, and dispensaries are headed by a medical assistant, whereas the health center serves as a referral point for the lower-level facilities. It is headed by a physician (medical officer). The localities manage health centers. The rural hospitals, on average, have bed capacities of 40 to 100 and are managed by

State Ministries of Health (SMOHs). Tertiary hospitals, including teaching, specialized, and general hospitals, are in State capitals and are operated by the SMOHs(35). The UHC service coverage index was 44 (compared to 65.6 globally) in 2017, reflecting low coverage(46). Additionally, the number of beds per 1000 population was 0.74 (compared to the 2.8 global average) in 2017 (47).

In conclusion, the health system in Sudan is developing slowly over time. Nevertheless, it has structural, inherited challenges within the system (such as reduced fiscal space, poor coordination and governance, limited human and logistical resources), and some operational challenges (maldistribution of resources). However, some of the system inputs are improving (such as information systems).

4.2. EPI structure

4.2.1 Governance and leadership: The planning, implementation, and evaluation of Immunization services are mainly the responsibility of the EPI, which comes under the Maternal and Child Health (MCH) Department (one of the four departments under the PHC Directorate under the supervision of the Undersecretary FMOH). The positioning of the EPI program within the organogram of the FMOH is explained in figure 4. The immunization services structure is composed of four levels. (i) National (central) level is responsible for the overall policy and decision-making and management of immunization services in Sudan. (ii) Sub-national Level, where state EPI managers work under the state director general administratively and central EPI supervision technically, they are responsible for planning and implementing immunization services at state levels and supervise locality immunization activities. (iii) Districts (Locality) level: district level is the third tier in the federal structure. (iv) Health facility level, the last tier in the immunization services structure, is the service delivery point.

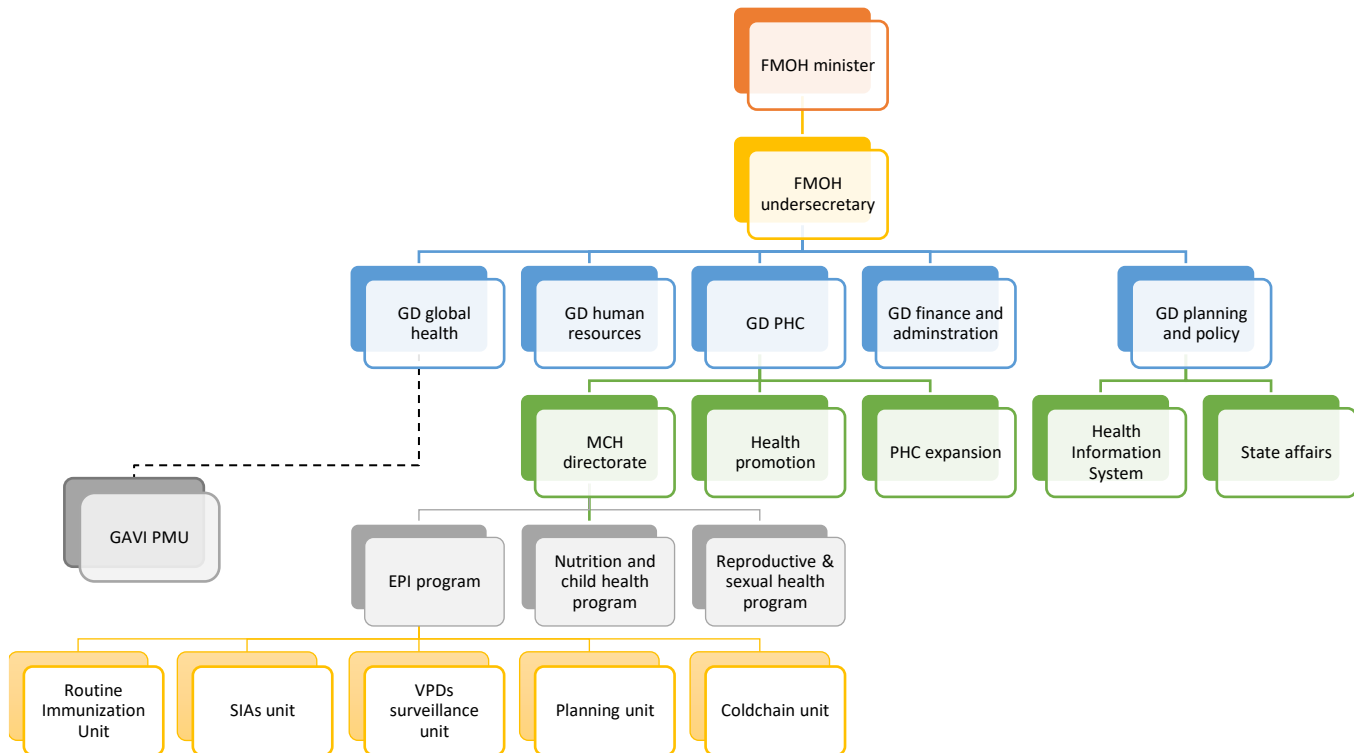


Figure 4: Organogram of the FMOH in relevance to immunization program

-- Dotted line indicates other layers in between - GD= General Directorate - Different colors indicate different administrative function

4.2.2 Health workforce: The immunization program structure in Sudan has an adequate human resource distribution at all program management and service delivery levels. Following 2016 and onwards, the program faced high staff turnover at the different management levels, either due to new competing opportunities abroad with better financial rewards and salaries or frequent political and administrative changes, in addition to the concerns regarding equitable distribution of the service providers. 50% of immunization service providers are volunteers or temporary staff (i.e., not permanent staff at the ministry). 81% of the vaccinators in the fixed immunization sites are females, while the mobile services are delivered mainly by males(12). With the scope of integrated PHC service delivery, the immunization service providers have been trained to deliver PHC packages of services, including nutrition(12).

4.2.3 Medical products and supply chain: The Immunization Supply Chain in Sudan operates as a vertical supply chain system (separate from other supplies like essential medicines) featuring four levels; central vaccine store, state vaccine store, locality vaccine store, and health facility. Sudan has conducted a comprehensive national cold chain equipment inventory in October 2016, updated in August 2018, with the primary objective of quantifying and characterizing the condition of the cold chain equipment throughout the country. The inventory findings showed that all types' total functional Cold Chain Equipment is 81%(12).

4.2.4 Health information system: The immunization program has its information system. It includes service coverage and disease surveillance data, supply chain and vaccine management data, and communication data. The flow of information follows the country's administrative structure from the health facility, locality, and state levels to the national level(12). The integration of this HIS and DHIS2 was established in some localities, but not in all.

4.2.5 Finance: In 2018, the total Vaccine-Preventable Diseases (VPD) Expenditure in Sudan was \$64.8 million, representing 2.63% of CHE. Donors covered 83.6% of it (further subdivided into 70% by GAVI, 19% by United Nations Childrens' Emergency Fund (UNICEF), and 11% by WHO). The government co-finance a share of 15.9%. Most government shares were paid as administration fees, while WHO and UNICEF mainly paid supportive immunization activities, and GAVI supports the routine vaccination(25). Figure (4) shows the expenditure of VPD functions.

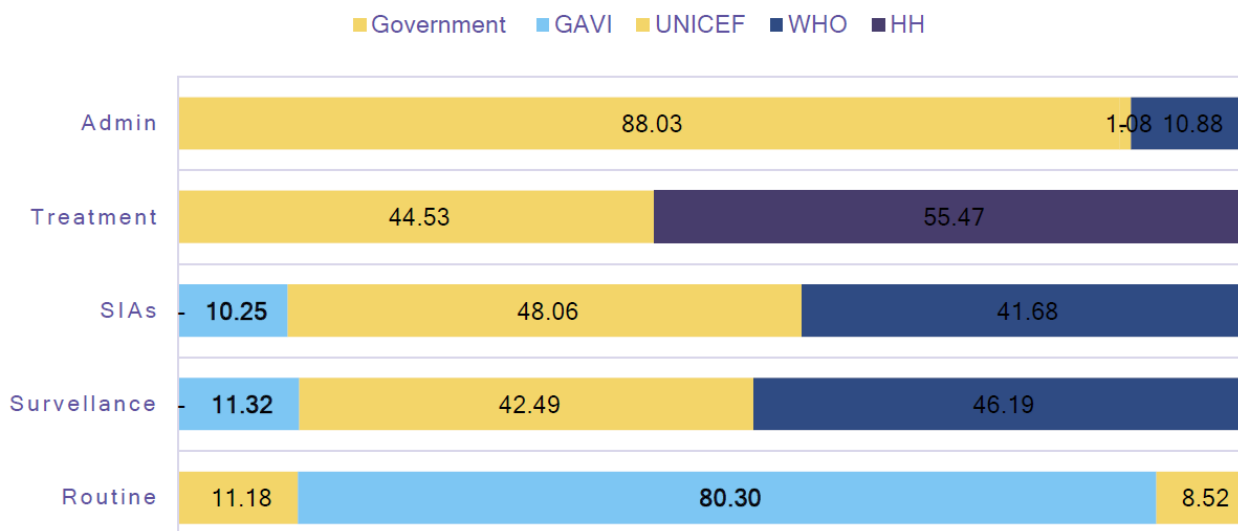


Figure 5: VPD functions finance, SIAs= Supplementary Immunization Activities, HH= household.

4.2.6 *Service delivery*: EPI provides services through 2,031 fixed sites, 4,668 outreach sites, and 333 mobile teams. The national routine immunization coverage varies with different antigens in the national immunization schedule; vaccines like BCG, Pentavalent, polio vaccines, PCV, and Rota had achieved and maintained a high coverage of more than 90% over the last year five years. DTP3 national immunization coverage is 93% by the end of 2019, with 51% of the target population received their vaccinations in fixed immunization sites. The remaining were covered via outreach services. The first dose of measles is in progress but did not reach the target (89.5%), while the second dose and tetanus coverage are lagging (74% & 52 respectively) for the last five years.

Table 2: Characteristics of Sudan's health system and EPI

Building Block	Sudan's Health system characteristics.	EPI characteristics
Governance and leadership	<ul style="list-style-type: none"> - It is structured into three levels (federal, state, locality). - Coordination of HSS is by national health sector partners forum 	<ul style="list-style-type: none"> - Immunization activities are governed by EPI, working on four admin and operational levels (federal, state, locality, health facility)
HRH	<ul style="list-style-type: none"> - There is a general shortage of health workforce. - There are high rates of drain to the private sector and abroad. - Skill mix imbalance and maldistribution in the HRH. - Production of HRH has increased recently 	<ul style="list-style-type: none"> - High rates of volunteerism among vaccinators - There is External brain drain and turnover of managerial positions across all levels of EPI.
Medical Products & technologies	<ul style="list-style-type: none"> - There is a fragmentation of functions of medical devices assessment and management across different bodies, without clear role division. - No regular follow up or update to current devices 	<ul style="list-style-type: none"> - Vertical supply chain system for the vaccination resources. - 81% of Cold Chain Equipment are functioning.
Health information system	<ul style="list-style-type: none"> - Most states started have information system plans. - DHIS2 has been established but not well functioning in all localities. 	<ul style="list-style-type: none"> - Immunization programs have an information system on coverage and supply chain. The information flow follows the administrative structure and surveillance for VPD.
Service delivery	<ul style="list-style-type: none"> - It is organized via a three-tiered network: Primary, secondary and tertiary levels. - UHC index is 44 reflecting low coverage 	<ul style="list-style-type: none"> - EPI program covers 80% of the population - There are ongoing efforts to integrate it in DHIS2.
Finance	<ul style="list-style-type: none"> - There are limited financial resources for health in the country. - Low government allocation, high OOPE 	<ul style="list-style-type: none"> - The majority (83%) of immunization is supported by donors. - Government support administrative and transport fees

4.3. GAVI Program Management Unit:

GAVI has appointed a program management unit (PMU) to liaise between the GAVI secretariat and the national implementing units and partners. This PMU also coordinates with WHO, UNICEF, and EPI for the vaccine program and other directorates in the ministry to arrange various HSS activities. Lastly, GAVI PMU also arranges and coordinates the overall grant planning, implementation, and evaluations. The PMU has a leadership structure including activities management, Monitoring and Evaluation (M&E), procurement, and finance teams. The GAVI program management unit and the PMUs of GFATM and multilateral donors fall under the multilateral donors' department at the General Directorate of Global Health (GDGH) (figure 4). Although GAVI PMU is supervised and supported by the GAVI secretariat, the multilateral department plays a pivotal role in coordinating and aligning these grants with each other and with the country's goals and issues.

4.4. Vertical Programs vs. Integrated Health services:

As a leap for the next chapter, this section summarizes Sudan's experience in vertical and horizontal approaches.

There are many VPs served in units, centers, and hospitals. The most important programs are Reproductive, Maternal and Child Health, control programs of communicable diseases, and non-communicable disease control programs(35,48). These programs have several challenges, including the inability to reach some areas due to armed conflicts (e.g., Southern Kordofan and Darfur), frequent outbreaks that drain resources and disrupt plans, political issues, and conflicts(48). Furthermore, VPs have independent HISs, and they poorly share their data with the central HIS directorate, and the story is the same for other sectors(34,43).

Thus, integrating health services on each level comes at the heart of the country's current priorities. Sudan's national health sector policy puts "health services are provided in comprehensive and integrated manner among all health services levels and within levels" as one of its fundamental guiding principles for the policy. Integration also comes on the health system functions; for example, integration of training modalities for HRH services was also sought as an option to enable them to deliver vaccination, nutritional assessment, advice and follow-up, and health promotion/education(49).

Chapter five: From vertical approach to health systems strengthening in GAVI.

Historically, donors and multilateral organizations have channeled funding in health through vertical disease programs, typically focused on one disease area or one specific target group and a set of short- and medium-term objectives. Although VPs present several advantages, they have been controversial, especially over the last two decades. This chapter summarizes the global debate between the two approaches, highlights the experience of GAVI globally in the transition from vertical immunization program to health system support, and analyzes the experiences so far of such approach in several countries.

5.1. Vertical programs vs. health system support

Typical examples for VPs include disease-specific programs (e.g. TB, HIV/AIDS, cancer control) or for clustered groups of diseases (NCDs program), or specific health services (e.g. vaccination, nutrition, child health services). On the other hand, the horizontal approach seeks to tackle the overall health problems in a comprehensive and integrated manner and long-term by creating a system of permanent institutions commonly known as “general health services” (1).

There is an intense debate about which one best serves the health needs of populations. The VPs are often very appealing for donors as they are specific and measurable (e.g., vaccinating 10 million children in a country for polio). The philosophy of the horizontal approach (or HSS), in contrast, is to support health-sector reforms that respond to the system needs, reduce fragmentation, develop coherent policy, empower local stakeholders, and built a national capacity(50).

Literature from across the globe identified several advantages and disadvantages of vertical approaches to health services. The advantages (positive health system effects) of vertical approaches over general health system support include enhanced capacity for partnership building and supervision within the program context, improved data collection tools and procedures as well as the M&E process, improved financial access to services covered by VPs, effective allocation and mobilization of resources, reinforced technical skills of staff, and improved quality of care for the specific programs(51). This approach is efficient, for example, when the service is not readily accessible (stigmatized conditions/services) or for rapid response (COVID/outbreaks)(52). The disadvantages of verticalization sometimes include inefficient utilization of resources unless they exist yet are underutilized in the system; for example, immunization is expensive unless they use resources, such as trained health workforce, ready yet underused in the existing health system. Other disadvantages include disturbances and imbalances in the health system, internal brain drain, and the creation of parallel systems for the health system functions (HRs, information system, governance).

The advantages of the horizontal approach are numerous, including being cost-effective in the long term compared to VPs. The problems with general health system support include lack of clarity of what it means to strengthen the health system, the value for money of interventions is difficult to be captured into an impact on the health of people; in other words, it is easier to demonstrate a 30% progress in a single disease more than 3% in 10 different programs. Strengthening the health system is a limitless

need because it could be an ever-moving target if there is room for improvement, compared to VPs where the goals (endpoint) are clear and pre-defined.

However, programs vary enormously in the nature and degree of verticality. The governance, funding, and delivery of a program may be run in a standalone fashion or run via standalone fashion in some aspects while not in others. For example, immunization services have a separate management unit within health ministries and separate funding channels in many countries, as they depend mostly on donor funds. However, they are delivered through the same network of service providers like most other health services. In other instances, immunization activities could be funded from one budget, delivered through one health care facility, and have similar governance structures but still have a vertical element and are offered as dedicated services by dedicated teams in specific periods (such as a once-weekly clinic). Integration, therefore, may mean making some services more widely available and linking them to other services (counseling mothers or offer family planning during vaccination sessions), it does not necessarily mean combining funds(52). Therefore, the two approaches should not be seen as mutually exclusive; instead, they should be coordinated and combined in different ways, with the long-term goal being a unified scheme of general health services. The following section would highlight the transition of the GAVI approach towards health system support and how these philosophies and ideologies impacted GAVI funds in LMICs.

5.2. The transition of GAVI to support HSS:

GAVI was launched to increase immunization coverage and reduce global disparities in access to vaccines. In 2005, GAVI decided to invest resources in health systems, given that immunization coverage depends on strong health systems. This section highlights the transition from disease-specific to the HSS approach, focusing on what has changed in the global health arena, why HSS was needed, what projected results are, and the challenges for planning and implementation.

In the year 2000, the GAVI board had already decided to consider strengthening the capacity of the governmental data systems and not creating parallel processes in the Immunization Service Support (ISS) project(53). This consideration could be one of the earliest recorded activities of GAVI towards supporting the health system beyond its mandate of vaccination campaigns back in the time. The notion behind diverting some of GAVI's vaccine funding to health systems was advocated by GAVI's CEO in 2004. He argued that strong health systems are needed to increase and sustain vaccination coverage(54). In 2005, amongst other vital decisions made by GAVI, the board approved the continuation of immunization services support (ISS), including the extension of support to all GAVI-eligible countries and the opening of a new funding stream for Health Systems Support (HSS). In 2007, GAVI approved \$77.6 million for the multi-year programs for HSS, this figure expanded by an extra \$300 million allowing all countries to apply for at least one round in 2008. In 2009, GAVI decided to work with the WB, GFATM, and WHO to develop a joint platform for HSS to support the delivery of vaccines, in consultation with partner countries, civil society, development and development funding agencies. In 2010, GAVI requested its partners to harmonize existing investments to ensure better health outcomes and better value for money while deciding that all GAVI-eligible countries be eligible for HSS funds(55).

It could be argued that, at first, what was meant by HSS support remained unclear; there contested views on the health system in GAVI’s community, reflecting professional pressures and competing public health ideologies. HSS supporters (such as Norwegian and British governments) argue that system issues were hindering the vaccine programs supported by GAVI, particularly the issues related to financing, HRs, infrastructure, and information management. Therefore, there is a need to complement this system to ensure effective vaccination services. The opposing camp (United Nation Agency for International Development, Gate’s foundation, and vaccination experts) were concerned with defining and measuring HSS support and whether this support would alter the primary mission of GAVI(54). However, GAVI’s HSS window has evolved significantly since then; At first, GAVI’s contribution to the health system was minimal monitoring to support the immunization services; however, this support adjusted its purpose and guidance over time. The current investments of HSS target bottlenecks of the health system across three key focus areas measured by five related key indicators. Thus, HSS is becoming a dynamic goal for GAVI; with the changes in time, GAVI HSS funds are becoming more responsive to the adjustments needed for the system’s improvement and creative to develop feasible solutions for the bottlenecks of very different health systems(56).

The guiding principles of the first GAVI grant in 2005 were to be country-driven, country-aligned, harmonized, predictable, additional, inclusive and collaborative, catalytic, innovative, results-oriented, and sustainable(57). To achieve these results, the GAVI HSS guideline 2007 set the three key areas for intervention; (i) HRs mobilization, distribution, and motivation; (ii) organization and management of health services (especially at district level); and (iii) supply chain and maintenance systems for drugs, equipment, and infrastructure for PHC(57). The GAVI grant application guideline 2020 updated the list of principles to be gender-focused, community-owned, differentiated (into national and subnational), integrated, adaptive, collaborative, accountable, and to prioritize missed communities (58). Similarly, two additional priority areas were incorporated into the original areas; the new priority areas were: (i) data system & use and (ii) demand generation and community engagement. Nevertheless, the question remains: Did GAVI HSS grant work?

5.3. GAVI HSS experience in action:

This section reflects to what extent has GAVI’s HSS experience been successful. It examines what GAVI HSS is achieving globally, the issues with GAVI HSS in practice, and the strengths and weaknesses of the current GAVI HSS.

Classically, GAVI HSS support activities could be divided broadly into four types depending on two main factors (see figure 5): 1. the type of activities (i.e., how much change it brings to the system: marginal/fundamental), 2. the target of activities (i.e., specific service/region, or nationwide or system change)(20). Countries in which specific services or minor changes in a ‘functioning’ system report a positive experience of GAVI HSS grants. For example, the training of midwives and CHWs and a refresher course for existing ones per township has

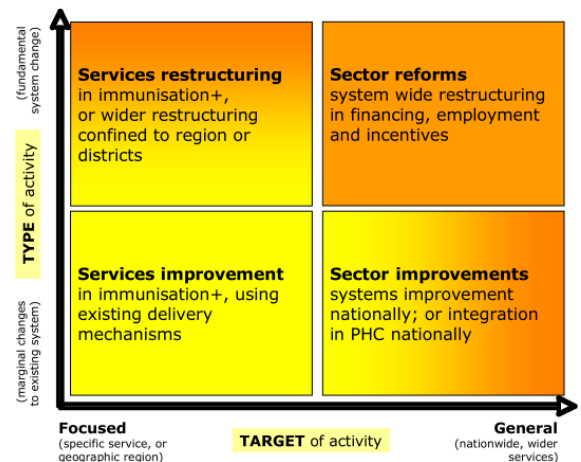


Figure 6: types of GAVI HSS activities

contributed to the supply of the voluntary health workforce in Myanmar. The same report of Myanmar concluded that outreach is seen as a crucial transitional mechanism until static services are gradually established and accessible to hard-to-reach areas(59). In contrast, evaluations of GAVI HSS grants varied in countries where structural changes at specific components or the system were implemented; in some countries (like Burkina Faso), the HSS grant was not very effective, the persistent vaccination bottlenecks were not or not sufficiently targeted by the HSS program. That could also be justified by the different understandings of various stakeholders of what HSS is(60). In other countries (like Ghana), the sector improvement impact of the GAVI HSS grant benefited the immunization service and other programs such as maternal health and HIV programs(61). Achieving results on a small scale is relatively easier to achieve and monitor. It requires fewer resources and timeframe for goals to be achieved and provides a clearer roadmap and specific stakeholders for planning, implementation, and evaluation.

As an exercise for the next chapter, this section uses the DAC criteria to highlight examples of GAVI HSS in other countries:

- Relevance: GAVI HSS support was introduced to support the bottlenecks of achieving effective immunization coverage services. As a process, the design of the grants (and grant proposals) is supposed to be flexible in responding and providing the needs and priorities of countries. However, in some countries (Madagascar), the proposal was based on critical gap analysis and sound evidence base(62). Other countries (like Somalia and Cameroon) lacked relevance in their plans(54,55); the over-planned design of activities was unsuitable given the context of poor implementation capacity and limited resources.
- Coherence: In principle, the design of the GAVI HSS grant is coherent with the other core mandates of GAVI, i.e., without an efficient health system in place, the delivery of vaccination activities could be jeopardized. When it comes to the compatibility with other national plans, the HSS fund in most countries (Nepal) was aligned with funds to increase the pooled fund for HSS together with other partners and to unify the plans to reduce the transaction costs and the burden on the government on limited resources set up(63).
- Effectiveness: The degree to which GAVI HSS is achieving its objectives in countries varies across the countries. Numerous countries reported effective utilization of the funds to strengthen the different components of the health system, such as HRs development in Myanmar and service delivery in Yemen(59,64). However, some countries (Burkina Faso, Eritrea) reported the persistence of vaccination bottlenecks despite the implementation of GAVI HSS activities. That could result from poor planning or implementation of these activities(60,65).
- Efficiency: Countries with solid governance and monitoring -pre-existing- systems had better use of funds. Contrariwise, countries with weaker governance structures or malfunctioning program management units had not. The reasons for reduced efficiency were poor planning process (Chad, Cameroon), insufficient staff capacity (Burkina Faso), high turnover rates, or absence of coordination(60,66,67). All these reasons weakened the system, leading to reduced achievements despite available resources; the lack of understanding of programming and reprogramming processes increased the transaction costs, but it also contributed to increased immunization focus.

- Impact: Generally, most evaluation reports improved immunization services after GAVI HSS support was introduced(59,61,62,68). Proposed activities for most countries have been completed, and there were few delays in some countries. The GAVI HSS grants positively impacted government capacity and planning, HRs, and service delivery. Several countries directly impacted policy development, improved work processes and coordination, or indirect effects such as improved advocacy for HSS and raising revenues from other sources to support HSS (22) further.
- Sustainability: the evidence on the sustainability of GAVI HSS funds varies amongst countries. Some countries (Ethiopia, Afghanistan) are integrated into routine programming or regular health budget(68,69). In other countries, elements of sustainability of HSS funds -or impact- after GAVI remains questionable. That could be due to the lack of exit strategy from GAVI (donor dependence) or GAVI being the only donor for HSS (Myanmar)(59,70).

In conclusion, GAVI's experience is considered successful in some elements (and countries) and not high in others. Nonetheless, some improvements in immunization and health outcomes have been seen in most countries. The existing organizational, political, and financial characteristics of different countries affected the absorption, utilization, and impact of the GAVI HSS grant in that country.

Chapter six: Evaluation of the GAVI HSS grant in Sudan.

This chapter is an evaluation of the HSS grants of GAVI in Sudan. It summarizes the needs underlying the application and the main achievements for GAVI HSS support in Sudan. It will also highlight the major bottlenecks of the grant implementation. Finally, will use the OECD-DAC criteria for evaluation (figure 2, annex 5) to analyze the relevance, coherence, efficiency, effectiveness, impact, and sustainability of the context of Sudan.

6.1. The needs underlying the application for GAVI HSS support?

The initiation of the proposal writing was driven by the need to strengthen the initial gains made through Multi-Donor Trust Fund³ support(31). The FMOH was looking for support to address HSS constraints. In 2007, the progress of Sudan towards achieving Millennium Development Goals was poor and stagnant, especially about maternal mortality ratio, children mortality ratio, malaria, TB, and HIV/AIDS. That was partially due to the barriers in the health system that hindered progress towards MDGs, and these barriers also affected immunization coverage performance. The initial proposal of the Government of Sudan (GoS) to GAVI HSS mentioned five main barriers to achieving improved immunization coverage; these barriers were (i) weak governance and management systems, especially at the state and locality levels, (ii) low spending on healthcare and inefficiency in utilization of available resources, (iii) inadequate availability of HRs, their quality and inequality in distribution, (iv) inadequate coverage and inequitably distributed primary health and first level referral maternal and neonatal services, and (v) poor infrastructure and inadequate supplies and logistics for primary healthcare (PHC). Therefore, the goals of the GAVI HSS grant were initially to a) improve institutional capacity and system development at all levels of governance, b) support organization and management of the decentralized health system, c) contribute to the development of HRH through HRH policy, system development and rationalization of PHC workers training institutions, d) Expand immunization coverage, and e) Improve access to the essential PHC services(49).

The HSS2 proposal in 2013 identified additional bottlenecks, including low immunization coverage, accessibility in conflict areas; fragmentation and inconsistency of the HMIS; maldistribution of HRH; high volunteerism rates; shortage in cold chain technicians; high turnover rates of staff; and limited funding to PHC. Therefore, the key goals of that proposal were to: a) improve equitable and sustainable utilization and access of quality Immunization services as part of an Integrated PHC focusing on underserved and disadvantaged population; b) strengthen an integrated, comprehensive, efficient, and sustainable Health Information System in support of an evidence-based policy and planning; c) support production, equitable distribution and retention of a multi-tasked facility and community health workforce to meet immunization and PHC needs; and d) strengthen management and leadership capacity of the decentralized health system at the state and locality levels for effective and efficient implementation of an integrated PHC package including EPI services. The program support rationale 2020 had an additional fifth objective (together with the four mentioned in HSS2): Strengthening effective vaccine and cold chain management through improved HR, logistics, capacity building, data systems, infrastructure, and systems(71).

³ A fund established in 2005 centred on the consolidation of peace and pro-poor growth in an effort to reach the Millennium Development Goals (MDGs) in Sudan. It worked on 8 areas including health ([source](#))

6.2. What are the achievements of the GAVI HSS grants?

GAVI HSS grants have contributed to leadership and governance in several ways; firstly, by building the leadership and management skills of staff by providing training and supporting coordination structures for the EPI program through the establishment of zonal coordinators support. Furthermore, GAVI funds also contributed to setting important guiding documents (including the FMOH strategic plan 2017-2020 and several national health policies)(29,72,73).

GAVI HSS support also contributed significantly to providing additional resources for health in Sudan. The funding provided by GAVI supported service delivery (particularly vaccine service delivery) and the other components of the health system. Together with other donors, GAVI also contributed to increasing the pooled funds for HSS and purchasing some of the health system needs. In operational terms, GAVI HSS support assisted in strengthening the GAVI-PMU financial management department staff; by introducing electronic financial systems, recruiting financial officers from within the FMOH, training them these financial systems (73). These trained staffs rotate on the different financial management departments at FMOH and remain an asset.

Regarding infrastructure and equipment, GAVI mainly supported the construction of PHC health facilities in priority states (states with the lowest coverage); GAVI support rehabilitated ten rural hospitals, 18 family health units, and six new health centers (31). Together with other activities (such as workforce training, provision of medicines, improvement of information systems), these constructions contributed positively to expanding health services to new areas. This project encouraged the government to allocate more domestic resources for the PHC expansion project(29). Since 2017, GAVI has started the planning phase of a solar electrification project for rural health facilities. In 2018 and 2019, the baseline study was conducted for 100 facilities, and the project is currently ongoing(74).

In addition, GAVI's support was utilized to support the health workforce, particularly the training for midwives, joint cadres, medical assistants, and health workers. Revision and update of the training curriculum in states such as Continuous Professional Development institute and Academy of Health Sciences were supported through HSS grant as well(29). Additionally, GAVI also supported the training of staff on different functions (e.g., finance, M&E, and planning)

Besides, GAVI joint assessment report (JAR) 2018 reported an improved national health information system; this is reflected by the improved reporting rates in states and their use in the national monitoring and evaluation framework. GAVI has also contributed to introducing DHIS2 software, which is now used by 150 localities (out of 189). GAVI also supported the development of a health information observatory in Sudan, an online platform for documents and reports about health in Sudan from different sources; to lead the process of data documentation, availability and to encourage transparency, data sharing, and use by stakeholders (29).

Lastly, communities were a key beneficiary of the GAVI HSS grants. One of the reported achievements of the GAVI HSS grant was the enhanced engagement and strengthened the capacity of the CSOs, via establishing Non-Governmental Organizations (NGOs) working in the health sector and training of these NGOs for certain health services (especially on emergency support). Supporting NGOs and CSOs was a means to create demand for immunization and other PHC services through raising awareness(29).

6.3. Bottlenecks and challenges identified:

This section examines Sudan's GAVI program management unit's main challenges highlighted by annual progress reports and joint assessment reports. It is divided into four main sections: HRs, management and finance, coordination between implementing units, and other issues in Sudan.

6.3.1. Human resources:

High staff turnover rates have always been a critical challenge across several years(73). That could be due to less competitive salaries and benefits provided by the government and the internal brain drain of skilled staff by other organizations (especially UN agencies). That is applied to all levels of managerial leadership relevant to the context of GAVI. This high turnover resulted in insufficient capacities in the remaining staff, especially at the sub-national level(29,72,73). Another important reason for high staff turnover at the top leadership level was Sudan's political changes after 2019(28). Indeed, over that period, the country had three ministers, five undersecretaries, four directors of the GDGH, and three EPI managers. GAVI PMU operational staff were all changed between 2019 and 2020 (except for drivers and secretaries). On a side note, concomitantly, there were four changes on the grant manager counterparts at the GAVI secretariat. Despite the capacity building and recruitment efforts on the health facility level, there was a gap in the production of health cadres; the 2015 report indicated that 30% of health facilities face an HR shortage. That is concomitant with the low absorption rates of trained staff to the system (due to poor remuneration and employment policies)(75).

6.3.2. Management and finance:

Several reports of the PMU highlighted delayed or canceled disbursement of funds as a key challenge. That could be attributed to several reasons; partly, some delays took place in the GAVI secretariat for approval of activities, or due to ongoing audit processes, or incomplete documentation of activities(72,73,75). The second delay is on disbursement and transaction from the secretariat to Sudan. That could be due to fluctuating exchange rates, the presence of different currencies in transactions and proposals (USD, EUR, Sudanese Genh “pound”), and the sanctions placed upon the country by the US government. Furthermore, cash could not be fully utilized for activities even after the transaction; this could be due to the shortage of resources because of the failure of one of the co-financing actors (government or other partners), for example, the government’s failure to provide its co-payments for projects was also present as a challenge to funds sustainability according to the report of 2015. Another reason is sequential activities planning, where the implementation of some activities depends on the completion of other activities within the same plan (73). Despite supporting the public financing system, GAVI HSS has its parallel financing system (i.e., separate bank account and financial management unit).

6.3.3. Coordination

Coordination was also highlighted as a challenge in several assessment reports. The first communication issue mentioned was within the FMOH, where coordination of various HSS activities across the various implementing units was reported in 2015(76). The 2016 report highlighted the coordination issue from the perspective of representation in coordination meetings; according to the report, there were low levels of representation in the coordination meetings of stakeholders(75). This resulted in the lack of inputs to the national health sector coordination committee and its subcommittees.

6.3.4. COVID

As of August 10th, 2021, Sudan has reported a tally of 37 thousand covid cases and 2,776 deaths(77). A figure that is strongly underestimated given the under testing and underreporting capacity of the country. Since the first quarter of 2020 and part of the COVID pandemic, the EPI program was affected as part of the whole country. Routine services were compromised, and all senior policymakers were solely devoted to the COVID pandemic work, which had implications for other competing priorities. Several activities were postponed, and VPDs surveillance was jeopardized. The main constraints imposed by the pandemic include the economic crisis, fuel shortage, curfews and lockdowns, and stoppage of routine immunization due to stopped transferred funds from abroad. The response plan included updated plans, the provision of guidelines for services continuity, provision of PPE, and borrowing money from other sources(28). Lastly, some of the GAVI planned funds were reprogrammed for COVID response.

6.3.5. Other general issues of the country:

JARS often also highlighted conflict as a significant constraint to strengthening the health system in Sudan; service accessibility in hard-to-reach areas remains a challenge(72,73,75). The most affected regions in Sudan are Darfur, Kordofan, and BlueNile, where active clashes still exist between the government and rebel groups. The new transitional government sets peace as one of the three guiding principles of the country and one of the main targets. The country has reached peace agreements with several rebel leaders. However, there are no recent updated reports about service availability. Another constraint reported in the 2015 report is the splitting of localities over time. Furthermore, the absence of precise denominators and the dependency on population estimations remains a challenge to service delivery and evaluation of targets (76).

6.4. Evaluation of GAVI HSS grant:

6.4.1. Relevance

All proposed activities were relevant; however, some had less of an HSS perspective. GAVI HSS support was timely: the activities and system strengthening areas supported were relevant to strengthening Sudan's health system (31). The process of grant proposal development was always preceded by rigorous assessment for the health system elements in the country context, and the process also involved significant participation from partners and stakeholders. There was high congruity between the health system bottlenecks identified and the developed solutions; taking the HRs aspect as an example, the initial proposal in 2008 indicated inadequate availability of HRH in a rural setting as a critical challenge, and therefore the response was to increase the production of HRs by empowering the teaching institutes for paramedical staff in the country(49). The proposal of 2013 had highlighted poor absorption of trained personnel into the system; therefore, the proposed activities included the provision of incentives (financial and training) and other strategies(71).

6.4.2. Coherence

Strengthening organizational capacity, planning, and M&E systems remain the major priorities of the HSS in Sudan today. GAVI funds were catalytic in supporting the government's PHC expansion project in 2016. The HSS funding is also consistent with other national policies targeted at improving service delivery for the Sudanese population, the latest of which was the 2014 free-treatment policy for the under-5 years old. Furthermore, GAVI, GAFTM, and other HSS grants were synergistic, they complemented each other, and the GDGH primarily coordinated them to avoid duplication of activities or resource waste. However, the design of such an approach facilitated planning, yet it complicated the implementation of activities, as the fund had to be approved by two different bodies externally(31).

6.4.3. Effectiveness

GAVI HSS grant can be considered as an effective fund. The major contribution of GAVI support to health systems strengthening in Sudan was its ability to generate the evidence necessary for a significant policy and priority shift in the health sector; this is evident by the logistical and technical support for such important documents to be issued that advocated the decision-makers to shift towards PHC rather than secondary and tertiary care(29). A similar catalytic effect of the GAVI HSS grant was noticed on other parts of the health system, the contribution of the grant to supporting health information system (establishment of DHIS2), or HRs management (capacity building with AHS or PHI), or technology and equipment (solar electrification of health facilities and CCEOP) was tremendous(29,72,73). Therefore, the grant has achieved some of its planned goals.

Nonetheless, there is a difference between the HSS1 grant and the HSS2 grant in terms of effectiveness. In the HSS1 grant evaluation, the achievement of the eight HSS outcome targets GAVI contributed with the GoS and the GFATM towards the achievement of four targets (50%), For those unmet, the performance of two of them was satisfactory, but due to changes in the course of implementation, the gains were eroded(31). Targets and achievements of HSS1 grants are explained in annex (3). According to the JAR2018, the achievement of activities' implementation ranged between 42% (lowest) and 83% (highest)(29). The bottlenecks in section 6.3 could explain these incomplete activities.

In terms of activities timeliness, HSS2 had to be extended and reprogrammed several times for different reasons: delayed disbursement, incomplete approval of activities, country's instability during the revolution time, and lately with COVID19 pandemic(28). HSS3 grant implementation should have started in 2018 will start in 2022.

6.4.4. Efficiency

The established program management unit supported the implementing units in proposal development, implementation, and evaluation of planned activities in terms of operational efficiency. This helped in ensuring efficient utilization of resources(31). Regarding economic efficiency, there was reported high transaction cost because of the currency exchanges between national and international bank accounts; The support is budgeted in US dollars, the money is transferred to Sudan in Euro, and FMOH must pay by Sudanese pounds (SDG). The lost money in these transactions was high (29,73). However, an evaluation report highlighted that the PMU saved around \$0.5 million to support other underfunded activities(31). Resources are also wasted in activities planning; for example, in organizing the national baseline survey for the solar electrification project, renting cars from an external party

was sought as a first option despite the availability of using the same money -or less- to repair existing cars that belong to FMOH or GAVI(74). These cars could then be used as a long-term asset. Similarly, renting halls for stakeholders’ meetings for a high price in a resource limited context could also be considered as an inefficient utilization of resources. Lastly, the harmonization and complementarity of GAVI, GFATM, and other partners’ HSS grants have enhanced synergy, efficient utilization of resources, and avoiding efforts’ duplication through joint management. This synergy could be further improved by merging the PMUs of different donors or aligning with FMOH units with the corresponding mandates to create a unified and comprehensive team effort.

6.4.5. Impact

There are some aspects to be considered when it comes to the impact of the GAVI HSS grant. Firstly, it has contributed positively to improving the immunization coverage over the years (figure 6); in 2014, the national immunization coverage was 95%, while 90% of localities have reached at least 80% coverage(31). The immunization coverage has increased steadily from 2008 onwards; the measles vaccine coverage, for example, was 58% in 2000 (when GAVI was established, but it increased to 79% before HSS support in 2007, and then to 88% in 2018(78). Indeed, these achievements would not have been made without the improved management, supply chain, information systems, HRs, and service delivery for immunization. Secondly, the grant has supported creating evidence to shift the strategic direction of the policymakers to strengthening PHC as an approach. That is known to be a more efficient and equitable policy option, especially with the vast land space, the exploding population, and the limited resources available to run the health system in Sudan.

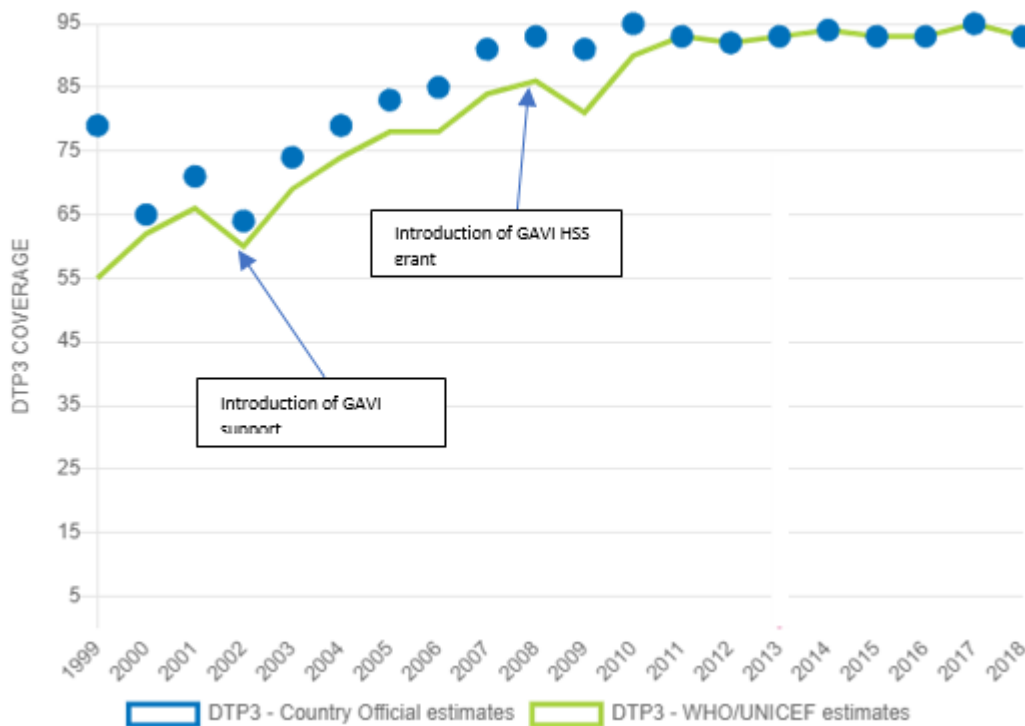


Figure 7: timeline of the introduction of different GAVI Grants and the impact on immunization

6.4.6. Sustainability

The evaluation report of the HSS1 grant concluded that “the program mainly financed soft HSS components (such as planning and budgeting, M&E and information systems, leadership and management), and not on service delivery. The gains made so far may not be sustained at the current level without some external support” (31). However, there are indicators of the sustainability of the impact and indicators against it; on one side, the GAVI HSS grant has overall contributed to building stronger institutions (e.g., ministry of health, EPI, AHS) and to creating an enabling operational environment by supporting evidence generation (plans & policies), and data management (DHIS2)(29,72,73). GAVI HSS extensively supported the capital for building these systems. However, the running cost of these systems could be hampered if the GAVI HSS grant would be stopped. Especially that there is no clear exit plan developed and that the devaluation of the local currency makes it more difficult to administer such systems. Sudan has achieved very high immunization coverage rates in the same vein, but the services were massively interrupted during the COVID19 pandemic response period. These positive results could be hampered if the system is not resilient enough, as interruption of services could threaten outbreaks and increase morbidity in the population(28). Furthermore, GAVI has invested a lot in human capital, especially at the different managerial levels; however, the political change in the country came at the cost of several changes at all levels of management. The health sector in general, and EPI in particular, were not exceptions as the turnover rates were also very high(28).

In conclusion of this chapter, GAVI’s HSS support was established to support immunization programs in Sudan. It has indeed contributed a lot to strengthening the health system in Sudan. Despite the several bottlenecks, the funding was relevant to the country’s/system’s needs, coherent with the institutional working environment and other stakeholders. However, the elements of effectiveness, efficiency, and impact are not very optimal. Despite the successes, GAVI’s HSS grant is not sustainable on its own.

Chapter seven: Discussion, Conclusions, and Recommendations.

7.1. Discussion:

Historically, there has been a long global debate on the comparative advantages and disadvantages of vertical healthcare services against strengthening healthcare systems. Following a long and hard debate on the contribution of Global Health Initiatives (GHIs) in strengthening national health systems, the GAVI board decided to include HSS as one of their funding components, allowing countries to organize activities that could support their national systems improve immunization coverage. As a middle-income country located in the northeastern part of Africa, Sudan has been receiving immunization support from GAVI since 2000. Since 2008, Sudan has applied for three cycles of HSS support grants from GAVI to support the different parts of its health system; HSS1 (2008-2013), HSS2 (2013-2020), and HSS3 (2021- 2025). In general, the country is marked with consistent and constant economic downturns that increased countries' fragility and created political instability. Sudan has witnessed a drastic change in its national politics and international relations following the ruling party's downfall in 2019. On the positive side, GAVI HSS grants (together with HSS grants from other donors) were critical in supporting and developing the national health system on different levels and components.

The problem statement highlighted that the donor funds' overall contribution to the CHE is not very high, yet it plays a critical role in providing the recurrent cost of certain programs such as immunization, MCH, and health emergencies. Likewise, these funds play a role in strengthening the governance institutions and improving the building blocks of the health system. Nonetheless, delayed approval of some activities from the secretariat, the low disbursement of these activities' funds, and the lack of effective utilization have been persistently highlighted as a challenge in several annual review reports. There has been minimal further analysis of these reports; since the introduction of the grant, there was only one evaluation study conducted in 2015. I argued that this research would thoroughly evaluate the GAVI HSS grants in Sudan and generate evidence for policymakers and stakeholders. To do so, I had first to describe the health system in Sudan, then compare the vertical approach against HSS in general and how that has been reflected in GAVI's policies over time. These two elements would set the stage for the evaluation of the HSS grants in Sudan.

Just like several other lower and middle-income countries, the health system in Sudan is performing suboptimally. It has several challenges from within the system and from outside of it. Generally, the issues from within the system could be divided into three main categories.

The first category is limited or scarce resources, such as the deficiency of HRH, especially in rural areas, reduced health sector finance, and unavailability of equipment and technologies at the PHC level.

The second category is the poor governance and management of the available resources due to the poor design of general health policies or sector-specific ones and the lack of translation of existing policies to actions and activities. Besides, the interplay of fragmentation of power and resources across different departments at the ministry, the hierarchical structures at the federal ministry and decentralized levels, and the high turnover rates within the FMOH also contribute to poor management of available resources.

The third category is the inequitable distribution of existing resources, reflected in the urban-rural maldistribution of resources (more resources on urban populations despite being only one-third of the population), and the low resources allocation for primary care.

These categories are strongly associated with the country's general situation; the separation from South Sudan, the political volatility, the general fiscal policy of the government, and the subsequent economic downturns have weakened the system further by minimizing resources allocation for the health sector the increased waste of resources. However, It could be argued that EPI -as a vertical program- is successful; the general health system's challenges were not echoed in the EPI; EPI managed to reach 95% coverage of the DPT3 vaccine in 2018 and lower OPV coverage in the same period, it had a functioning parallel information system and vaccine distribution system.

In this challenging situation, healthcare provision must carefully be designed to ensure the most effective utilization of resources and the best possible impact. The vertical approach presented a unique window for external support as resources would be poured particularly to support all the health system functions for that program (e.g., capacity building, equipment, information system). However, it comes with a very high cost. In contrast, the horizontal approach is cost-effective for providing a complete service package and sustainable solutions for the bottlenecks of the health system, yet the impact is often more intangible. That being considered, GAVI decided to support health systems as an additional funding component besides its original vaccine mandate. This support brought many disputes amongst GAVI's board and management globally, between a strong proposition of the importance of such fund to improve immunization outcomes and vehement opposition of it as they were concerned with altering GAVI's mission. GAVI decided to introduce the first HSS grant in 2006 as a "light touch," but the amount, magnitude, and the number of recipient countries of the GAVI HSS fund have constantly increased over the years after. Concurrently, other GHIs had similar ongoing projects to strengthen national health systems. The success of the GAVI HSS grants varied across recipient countries. In most countries, the proposed activities responded to the countries' needs (relevance) and were aligned with the national plans (coherence). The efficiency and effectiveness levels of the grant differed across countries, but most countries have had efficient utilization of resources and conducted all activities to support different parts of the health system. All countries reported improved immunization coverage and reported the direct and indirect impact of the grant on strengthening national health systems. However, the sustainability of this impact is often dependent on the continuity of the donors' funds. Ideally, there should be further analysis of the counterfactual situation and the level of attribution of the fund to the impact. Literature collected for this study (including evaluation reports) poorly examined these elements, making it is one of the limitations of these impact findings.

The GoS sought GAVI HSS support to improve the system issues and to increase service coverage and efficiency. Several bottlenecks were identified at different times; in the first proposal in 2007, the grant targeted different system components from the beginning, while the second grant in 2013 targeted sustaining and improving the achievements of the first HSS grant. Both grants had tremendous achievements and positively impacted the health system; the most notable examples were HRs (managerial and health workforce), finance, and health information systems. However, both grants faced enormous internal and external challenges, especially in the program management and finance or in the coordination between different stakeholders, or externally with the economic and political situations of the country and the COVID 19 pandemic.

In evaluating the GAVI HSS grants in Sudan, in terms of relevance: activities responded to the countries' needs. They were also timely and incremental in the nature of the proposed activities. The proposed activities were also coherent with the national health policies and goals. The activities were also catalytic in improving several components of the national health system (HRH, information system, and

leadership), it achieved most of its goals. However, delayed disbursements and activities reprogramming have affected the timeliness of most activities, which in turn reduced the overall effectiveness of the grant. Besides, the resources utilization was not very efficient for some activities, and high transaction costs marked the implementation of grants. The grant had a positive impact on immunization coverage and the different components of the health system. However, this impact may not be sustainable and is highly dependent on GAVI's HSS fund or any other donor.

Strengthening PHC is currently an important topic on the global policy agenda; the best mechanism for achieving such a goal remains controversial. While strengthening the health system improves the overall functions of the system at lower levels, verticality remains more appealing for donors in planning and administration of funds for their program even if the implementation is integrated. From an advocacy perspective, donors prefer concrete results and a demonstrated value for their money. Both approaches must coexist for services to run smoothly, especially in limited-resource settings where short-term achievements in a specific area and long-term improvement of the overall system are equally desirable.

In the case of Sudan, verticalization remained the policy option for most programs, and it is highly dependable on donors. Donors invested in improving the health system functions of their programs (i.e., in their parallel systems) and equally on supporting the health system functions generally. With the differences in the resources availability and system functions, the impact of such was that the donor-supported programs have immensely outperformed the government-funded ones, resulting in even more disturbances on the health system.

Another observation is that the grant planning and implementation are highly dependent on the GAVI secretariat. In the application of GAVI HSS support planning and implementation, for example, the proposals of the GoS had some sort of lack of alignment; they followed the donor's policy and values more than the country's real issues guided them. To illustrate: community engagement, equity, and gender were all concepts included in the proposals of 2013 and later as they have shown up in the guiding principles of GAVI. The budgeting and implementation of activities had to be approved by the secretariat, resulting in delays sometimes. That puts some of the agenda of Paris or Accra declarations in question (ownership, alignment, harmonization). It also reflects the powerlessness of the GoS to negotiate its options. It also shows the weak capacities of the senior leadership in the FMOH or GAVI PMU, which is further impaired by the high turnover rates, poor strategies, and weak governance structure.

Over the years, GAVI has provided additional resources to support both the immunization program and the HSS component. It has successfully contributed to creating an impact in both tracks. However, this impact might not be sustainable without the continuous availability of sources to cover this high cost. For example, the EPI program under GAVI's fund has improved immunization coverage to 95%. However, 50% of this coverage is supported by outreach teams (for which the high cost is covered mainly by GAVI). A similar trend was observed in Myanmar, a country with a similar program design, which reported the unsustainability of GAVI impact and the dependency on GAVI as a critical red flag. There should be an exit strategy prepared to ensure resources are available for the immunization program and HSS.

Lastly, the evaluation of GAVI's HSS grant is very complex. The interaction of different factors within the health systems must be thoroughly contrasted against myriad factors outside the health system. These include the political, economic, social factors and the general foreign aid policy in a

particular country. It should also be examined in the context of the donor and donors' interests and agenda.

7.2. Conclusions

This study concludes that Sudan's health system has faced several challenges over time to achieve HSS and, subsequently, UHC. They presented across different functions (HRs, information systems, governance & leadership structures, and finance and levels (senior leadership, mid-level management, and service delivery points). The repercussions of the country's deprived economic and political situation have perpetuated these challenges and exposed the weakness of the health system. Some of these issues negatively affected the EPI program, but it has remained well functioning over time, as the immunization coverage was sustained on very high levels. That is attributable to GAVI support.

It also concludes that the impact of a vertical approach to health services is often tangible, and the administration is often more manageable. The HSS approach is a more strategic and cost-effective solution for offering a comprehensive benefit package. However, it requires more resources and time to be implemented successfully. By introducing the HSS grants, GAVI decided to support national health systems to improve the EPI flaws. The development of the goals and the magnitude increased incrementally over the years. Generally, the HSS grants contributed significantly to improving national health systems in recipient countries and immunization services.

In Sudan, GAVI HSS grants contributed to several improvements in the health system. These include the production and support of the health workforce for rural areas, improving health information systems, building capacities, and supporting policy development at the FMOH. However, due to high turnover rates, poor communication, and other bottlenecks, the planning and implementation of the grant were hampered. According to the OECD-DAC evaluation criteria, the grants were relevant to and coherent with the country's needs. Despite reprogramming and the occasionally delayed implementation, most activities were implemented, while the resource utilization was not very efficient. The HSS grants created a significant impact on the health system and immunization program. This impact, however, might not be sustainable if donors withhold their funds.

7.3. Recommendations

1. **Sustainability:** The GoS of Sudan and stakeholders must ensure the sustainability of the impact of the GAVI grants. By advocating to keep the grant beyond 2025, improving the effectiveness and efficiency of the ongoing grants, and developing a clear exit strategy from the donor's dependency. The government must raise domestic funds to continue building the health system components. The contribution of GAVI to HSS support must be reduced gradually.
2. **Implementation and planning of immunization program:** in line with the previous recommendation. The strategic focus of the EPI program must shift towards expanding fixed sites immunization service and reducing the mobile service only to hard-to-reach areas. Fixed sites are more efficient as they provide sustainable service at a lower running cost. The mobile and outreach activities come with very high implementation costs. This strategy would preserve resources to improve the health system further. The government must also incorporate volunteer vaccinators in the employment system of the government.
3. **GAVI HSS activities:** as much as possible, GAVI HSS grants should focus primarily on service and sector improvement (see figure 6), given the limited resources available. The EPI is already well functioning, and there is a need to support the health system to improve other programs.

Therefore, the grant must be specific to ease it for planning and implementation and to increase the grant's effectiveness, efficiency, and impact.

4. **Integration:** While the efforts to strengthen the health system in Sudan must continue, the verticalization of effective and efficient programs (like EPI) must remain. The integration must take place strategically and gradually. For example, EPI's parallel health information system must continue while DHIS2 is still expanding to localities. The parallel systems must discontinue if the DHIS2 becomes an effective reporting tool in all states (including all the EPI reporting pillars).
5. **Administration and management:** the FMOH must rapidly develop actions to reduce the turnover rates amongst its leadership, such as proscribing staff dismissal for political reasons and increasing remuneration for critical positions to preserve its institution's functioning capacity. The PMU must develop standard formats for activities proposals for implementing units. On the other hand, the GAVI secretariat must develop mitigation strategies for delays in disbursement or implementation of activities.
6. **Future research:** Further analysis of the GAVI HSS2 grant must be conducted shortly, using more qualitative and quantitative methods (e.g., financial reports reviews and key informant interviews). Priority research questions could be (what was the impact of political changes in the country on HSS grant, and the impact of COVID19 on HSS?). The analysis should also include a study of the counterfactual situation. The lessons learned must be used to implement and evaluate HSS3 and other HSS grants in Sudan. Other vital research areas that researchers should consider include healthcare aid effectiveness in Sudan and SWOT analysis of the health system in Sudan.

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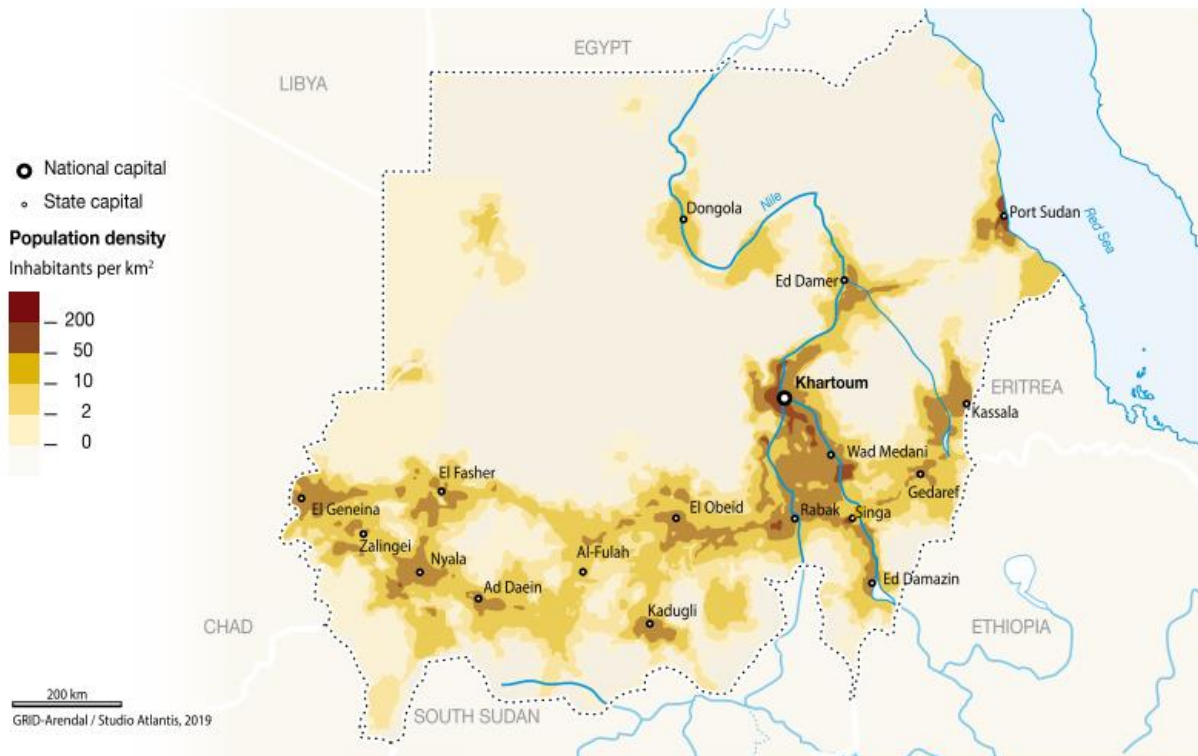
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Annexes

Annex (1): Map of Sudan and population distribution(5).



Annex (2): Search words selection

		AND	
OR	Afghanistan	GAVI	Building blocks
	Africa	GAVI: the Vaccine Alliance	EPI
	Asia	GF	Expanded program on Immunization
	Cameroon	GFATM	Health aid effectiveness
	Chad	Global Alliance for Vaccine and Immunization	Health Donor funds
	Eritrea	Global Fund	health finance
	Ethiopia	Global Fund for AIDS, TB and Malaria	health information system
	Ghana	UNICEF	Health leadership and governance
	Madagascar	United Nation Children's Emergency Fund	Health system
	Myanmar	WB	Health System Strengthening
	Nepal	WHO	health workforce
	Somalia	World Bank	horizontal approach
	Sudan	World Health Organization	human resources for health
	Tajikistan		integrated health services
	Yemen		products, technology, and essential medicine
			service delivery
		vertical programs	

Annex (3): GAVI HSS1-Sudan effectiveness:

This is reproduced from the evaluation of the GAVI HSS1 grant document(31).

No	Indicator	Baseline 2006	Target (revised 2013)	Achievement	Level of achievement
1	Maternal mortality rate per 100,000 LB	638/100,000	Contribute to reducing MMR by 50% of baseline	360*	
2	% Deliveries attended by skilled personnel	49.2 %	70%	77.7%	
3	Under five mortality rate (per 1000 LB)	102/1000 LB	Contribute to reducing IMR by 50% of baseline	68/1000 LB (33.3% of baseline)	
4	National DTP ₃ coverage (%)	66%	90%	93%	
5	% Districts achieving ≥ 80% DTP ₃ coverage	72%	100%	92%	
6	Use of Oral Dehydration Therapy (ORT)	54.57%	80%	90.4%	
7	% Children 6-59 months received vitamin-A supplementation within last 6 months	76.40%	90%	98%	

Annex (4): OECD-DAC evaluation criteria and sub-criteria:

The author made this based on the “Applying the evaluation criteria carefully” document(33).

