National Immunization Strategy (NIS)

Analysis of NIS roadmap, costing, budgeting and financing from NIS developed in 2021-2023

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1. Background

In May 2020, the World Health Assembly (WHA) endorsed the *Immunization Agenda 2030 – A Global Strategy to Leave No One Behind* (IA 2030)[1], aiming to address key immunization challenges over the decade. In 2021, building on the experience of the comprehensive multi-year strategic plan (cMYP), WHO and UNICEF published the National Immunization Strategy (NIS) approach and guidance[2] to support countries in their strategic planning. As part of operationalizing NIS with a costed roadmap, the NIS.Cost application[3] was developed. The approach of this application enables the user to cost the interventions, to map these interventions to budget heads and sources of financing available, and to estimate the financial gap for which resources need to be mobilized. A financial analysis and a budget dialogue are keys to better understand the affordability in implementing the NIS, to (re)prioritize strategic objectives and interventions and to evaluate potential threats to financial sustainability.

The current analysis of NIS roadmap, costing, budgeting and financing from NIS developed in 2021-2023 was conducted with the overall objective to understand requirements for NIS especially from financial perspective, with lessons learnt from countries that have completed their NIS using NIS.Cost application. Specific objectives of this analysis were as follows.

i. To collate the NIS roadmap, costing, budgeting, and financing information from the country NIS.Cost application for NIS developed between 2021 and 2023.
ii. To review and summarize strategic objectives, interventions and activities developed within the roadmap for the country NIS.
iii. To estimate the key unit costs for the country NIS (per capita, per child immunized, per EPI component) and compare the unit costs across countries using selected indicators.
iv. To review and summarize the budget section of the country NIS and compare across countries based on key budget parameters.
v. To analyze the available financing and financing gaps within the country NIS and compare them across countries.
vi. To develop recommendations based on the lessons learnt from the analysis.

This analysis consecutively helped to (1) assess the immunization financing at country level and compare across countries, and (2) provide the areas of deficiency in terms of completeness and robustness in preparing and using NIS.Cost. The analysis of both quantitative and qualitative information also enabled to understand how the NIS.Cost could inform essential strategic priorities such as equity, gender, integration, life course, zero-dose, but also all immunization system components.

[1] https://www.who.int/publications/m/item/immunization-agenda-2030-a-global-strategy-to-leave-no-one-behind
[2] https://www.who.int/teams/immunization-vaccines-and-biologicals/vaccine-access/planning-and-financing/nis
[3] https://immunizationeconomics.org/recent-activity/2022/4/1/niscost-app-and-user-guide/

2. Methodology

NIS.Cost is a dynamic google sheets application. Countries initiate NIS.Cost generally after a draft strategy has been put in place (which is developed based on a situation analysis). Resource requirements are estimated using NIS.Cost for the roadmap developed with the NIS. In step 4 of the NIS development process (Figure 1), activities are identified under each intervention for which the costs are estimated in NIS.Cost for the strategic period. Once the costs are estimated, resource requirements are mapped to the budgets from the previous years and to the expected and committed financing from government and donor agencies supporting the immunization activities. This helps to estimate the funding gaps for the interventions planned in the strategy. Thereafter, country conducts a budget dialogue to either look for more funding or adjust the priorities for the activities/interventions to lower priority conducting them in future years or dropping them. The NIS document prepared along with the resource requirements and financing analysis is expected to be endorsed by the highest authorities and adopted for implementation.

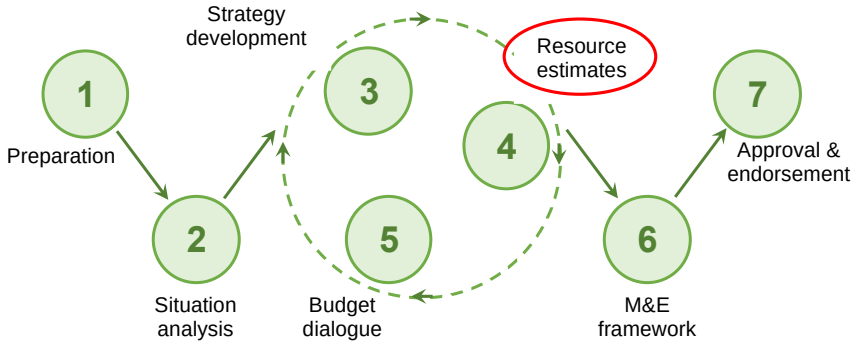


Figure 1. Process for development of National Immunization Strategy

Methodology for choosing the countries for the analysis. Since NIS.Cost is in dynamic google sheets, countries are expected to save a version which is the one approved for the NIS and is linked directly to the narrative of the NIS. In most cases, as budget dialogue and approval may take time, countries prepare a NIS which may be considered fully developed. In some cases, NIS.Cost may have been finalized, but countries may only have draft strategy document with or without financing strategy. In this analysis, only countries that have fully developed NIS and NIS.Cost were considered. Also, data were only analyzed for those versions of NIS.Cost which have similar total resource requirements as in the NIS for the strategic period. As on March 1, 2024, 32 countries reported completed NIS either fully developed, finalized, or approved in the NIS WHO-UNICEF tracking tool. However, 7 of these countries with a fully developed or approved strategy did not have the NIS.Cost and were dropped from the analysis. For 3 countries, NIS.Cost was still ongoing and therefore was also dropped from the analysis. Finally, the analysis was conducted for 22 countries which have NIS and NIS.Cost at least fully developed and available on March 1, 2024. For 3 of these 22 countries the strategy document was available, but financing section was missing, so the latest version of NIS.Cost was used. The following table provides all information regarding the selection.

Table 1. Countries with National Immunization Strategy with or without NIS.Cost

	NIS and NIS.Cost status*	List of countries
1	Countries having NIS with financing section and legally approved (6)	Bangladesh, Cambodia, Djibouti, Tanzania, Uzbekistan, Zimbabwe
2	Countries having NIS with financing section and fully developed/finalized (13)	Burundi, Côte d'Ivoire, Democratic Republic of Congo (DR Congo), Kazakhstan, Kyrgyzstan, Lebanon, Madagascar, Mauritania, Nepal, Rwanda, Senegal, Tajikistan, Togo
3	Countries having NIS with missing financing section but fully developed/finalized (3)	Burkina Faso, Comoros, Uganda
4	Countries with draft NIS or NIS.Cost but considered ongoing (3)	Jordan, Malawi, South Sudan
5	Countries with NIS narrative document but missing NIS.Cost (7)	Eretria, Kenya, Liberia, Papa New Guinea, Romania, Moldova, Zambia

** NIS status is based on WHO-UNICEF NIS tracking tool or expert judgement*

Methodology for conducting the analysis. The analysis was conducted by using the NIS.Cost version dates as specified in annexes. The analysis was conducted under the following thematic areas, for each of the 22 countries separately, and then combined for comparison.

- **Roadmap analysis.** The roadmap in NIS.Cost has 2 sections framework and dimensions. The framework provides a list of interventions and activities mapped to EPI components. The analysis was conducted at different levels in the framework on the number of activities with different dimensions such as new/routine; priority level; national/subnational; and activities for specific programs.
- **Vaccine structure and resource analysis.** The analysis was conducted identifying resource needs for routine, new and COVID-19 vaccines; resource needs for vaccines for each year; resource needs for vaccines per capita; number of vaccines with high wastage rates or with international freight and handling charges.
- **Resource requirements, cost analysis.** The analysis was conducted to find resource needs for NIS per year; resource needs per capita and per surviving infant; resource needs for each of the EPI components; resource needs for high priority activities; resource needs for new/routine activities; resource needs for campaigns; resource needs for recurrent and capital investment; resource needs for activities linked to equity, gender, zero dose.
- **Budget analysis.** The analysis was conducted to find number of years for which past budget data was available and number of budget categories used by the countries.
- **Financing and funding gap analysis.** The analysis was conducted for government and external financing available and funding gap for the countries. The funding gap was assessed for each year of the NIS. The share of government and external funding in total external resources was also assessed.

There were 168 indicators over which the analysis has been done for each country. Data were extracted from NIS.Cost using mapping of cells for most indicators. Statistical analysis for these indicators provided average and range. If there were extreme values for any variable, median was used for representing the average, otherwise arithmetic mean was calculated. While in most cases, the data could be mapped to different reports in NIS.Cost using a mapping or formula for a cell, in several cases individual records needed to be reviewed. While utmost diligence was taken for the data analyzed from NIS.Cost and several consistency checks were conducted, there were issues which could not be resolved and were identified under limitations in each section.

3. Quantitative analysis of NIS.Cost

The profile of the 22 countries analyzed (income, population, surviving infants, resource requirements, NIS.Cost version) could be found in annexes. The NIS strategic period for the 22 countries analyzed varied from 3 to 5 years. While most countries calculated resource requirements for 5 years, Burundi, Côte d'Ivoire, Kazakhstan, Togo, and Zimbabwe used a strategic period of less than 5 years. The start period varies from 2021-2024 and the end period is 2025-28. While 6 countries are low-income countries, 15 countries are low-middle income countries and only Kazakhstan is upper middle-income country.

3.1. Roadmap analysis

Countries prepare their roadmap using priorities and objectives they want to achieve in future years. The roadmap can have various levels for which the countries set their framework. NIS.Cost allows only 3 levels in the framework, therefore countries using 4-5 levels needed to include sub-levels. The terminologies used for different levels/sub-levels are provided in annexes.

Analysis of levels. Level 1 shows countries have on average 15 objectives/strategies/priorities/ strategic priority. The range is from 4 in Burkina Faso to as high as 37 in Nepal. For level 2, which is primarily the main interventions/specific objectives, the median number is 38 (range 13-167). For level 3, which is the planned activities, the median number is 160 (range 50-399), lowest being in Uzbekistan and highest in Nepal.

Classification of activities by EPI components. The number of planned activities for each country and the share for each of the seven-immunization program/EPI components is shown in Figure 2a and Figure 2b. In most countries, the largest number of activities are for vaccine supply, quality and logistics (median 38, range 16-72), followed closely by the number of activities for program management and financing (median 36, range 6-94). In Nepal, Côte d'Ivoire, Tanzania, Lebanon, Bangladesh, and Kazakhstan there are proportionately more activities for program management and financing, with highest share (42%) being in Kazakhstan. For human resources, service delivery, coverage and AEFI monitoring, disease surveillance, and demand generation, the number of activities is on average between 16-19. The share of demand generation activities is highest at 25% (34 activities) of total activities in Kyrgyzstan.

Limitations. *If the sum of the activities classified under EPI components did not match the total planned activities, the reason is either because an activity tab is chosen but no activity is listed, or*

the EPI component is not mapped to the activity, or the planned activities are overestimated. In case of Burundi, Côte d'Ivoire, Senegal, Tanzania and Zimbabwe, all activities are not mapped to EPI components.

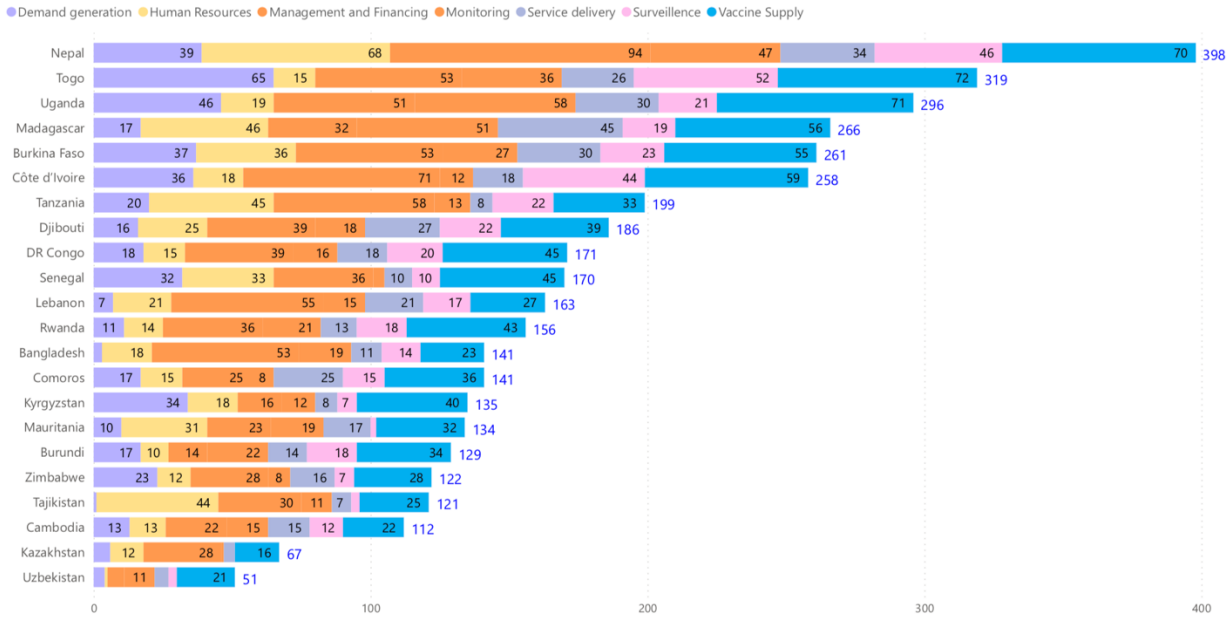


Figure 2a. Number of activities and share across EPI components

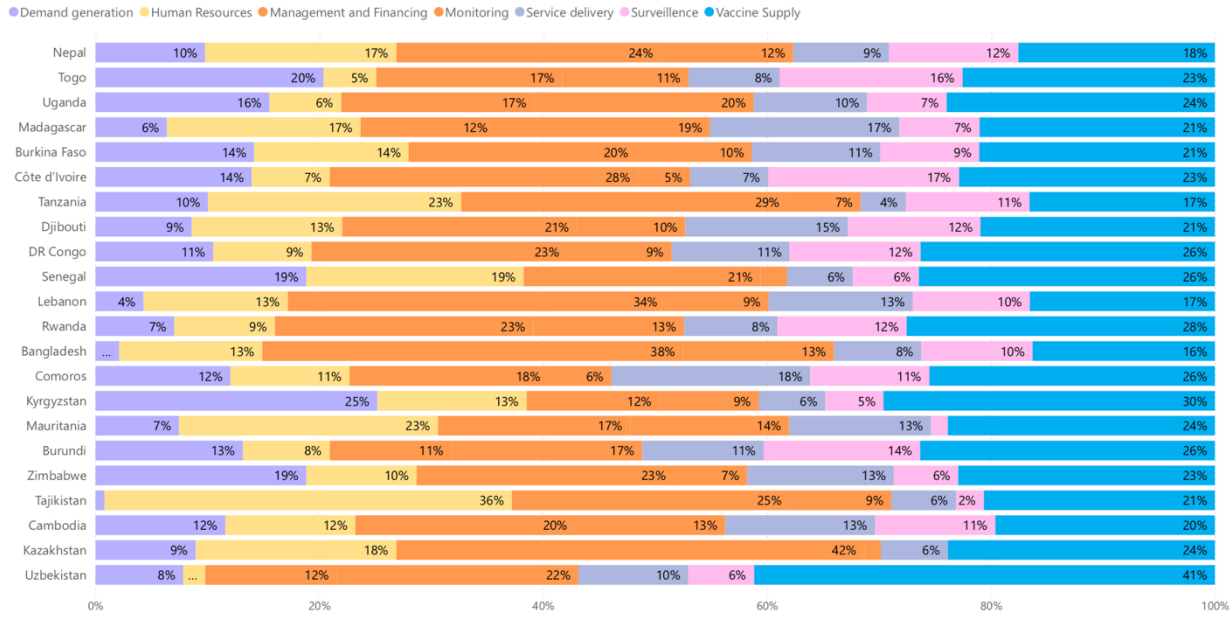
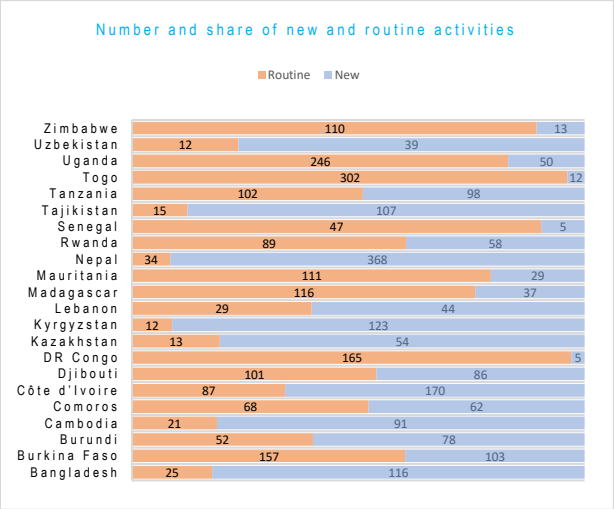


Figure 2b. Share of activities across EPI components (percent)

Classification of activities by new/routine, priorities and national/subnational. Only 8 countries classified their activities fully by these dimensions. Countries reported on an average 44% (range 9%-96%) of the activities as routine. DR Congo, Togo and Zimbabwe classified more than 90% of

their activities as routine. Bangladesh, Cambodia, Kazakhstan, Kyrgyzstan, Nepal, and Tajikistan report more than 80% of their activities as new (Figure 3a).

For prioritization, on an average 74% (range 0%-100%) of the activities considered are high priority. In Uganda, Rwanda, Kazakhstan, and DR Congo all activities are classified as high priority (Figure 3b). In Lebanon no activities are classified by priority. For classification by geographical level, most of the activities are classified as national (median 71%, range 13%-100%), with DR Congo, Kyrgyzstan and Mauritania at 100%. Classification of subnational activities are quite detailed in some countries, going down to provincial, district, community, and village levels. Resource requirements by these classifications are presented in section 3.3.



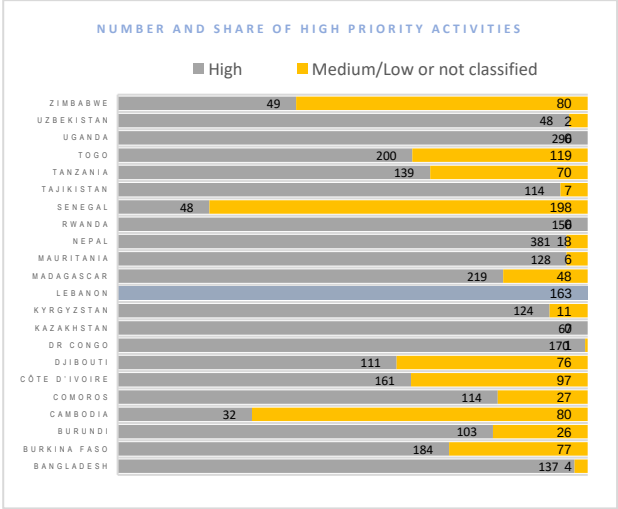


Figure 3a (left). Number and share of new and routine activities

Figure 3b (right). Number and share of high/medium/low priority activities

Classification of activities for vulnerable populations and selected program considerations. A word search methodology was used for the activities using English or French terms (see annexes). Kazakhstan roadmap is in Russian language, therefore this analysis could not be done. In Zimbabwe, none of the activities use the identified word for these program considerations.

Activities with terms “equity”, “gender” and “zero-dose” are analyzed to understand the focus on vulnerable populations. All countries except Uzbekistan have activities focusing on vulnerable populations. 5 countries have more than 10 activities, 7 countries have 5-9 activities and 7 countries have less than 5 activities targeting the vulnerable populations. There are on average 5 activities for zero dose with the highest at 24 in Burkina Faso (Figure 4).

Ten countries earmarked activities for life-course activities. Most countries except Togo and Zimbabwe have activities for integration. While 11 countries did not have activities with specific demand term, there are on average 21 activities (range 1-65) under the demand generation component (Figure 4).

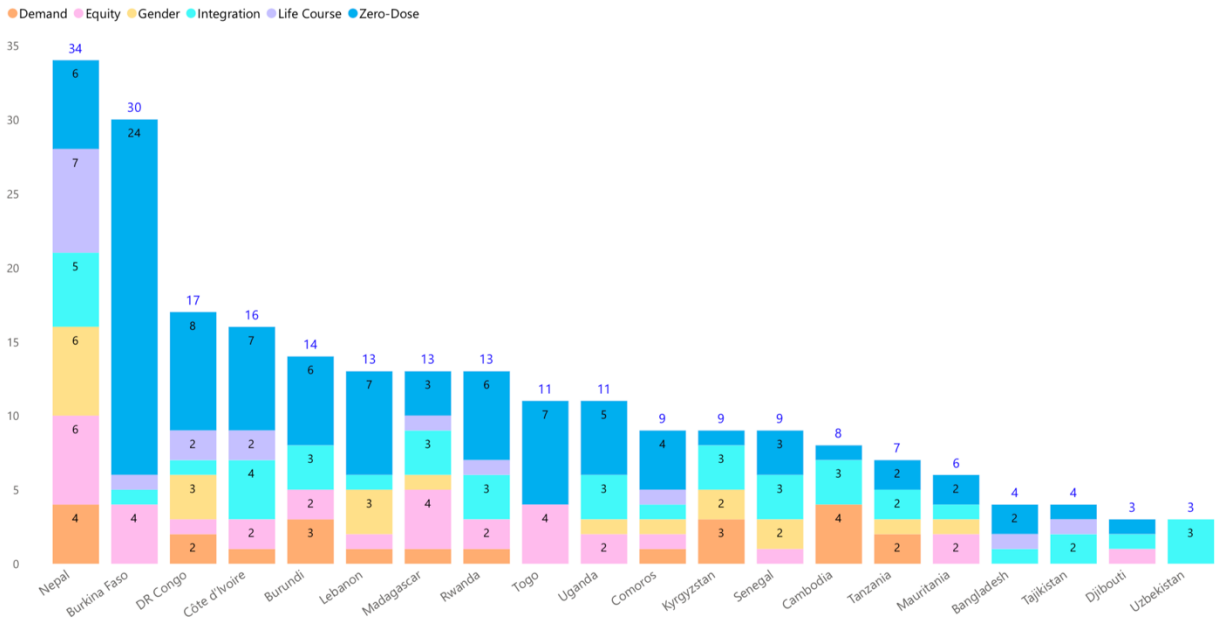


Figure 4. Number and share of activities across social and program parameters

Limitations. *Many countries did not classify all activities in the dimensions analyzed. In 11 countries out of 22, the sum of new + routine activities (French terms included) did not match the total planned activities, either due to incomplete mapping, or use of different terminology such as "replacement", "ponctuel". For Lebanon, Madagascar, and Senegal about 50% of the activities are not classified. Madagascar used "ponctuel" for several activities besides routine and new.*

For classification of activities into priority, Lebanon has no activity with priorities accorded. In 9 countries some activities have no priorities, and Senegal has 59 activities with no priorities. The data on activities with social and program considerations may be underestimated. In some cases, if the word appeared at level 1 or 2, it may not be captured. In other cases, if the word is spelled or stated differently from words in the search, it would be missed.

Under dimensions, shared costs and expense items are not analyzed. Countries used the shared cost terminology in many ways and terminologies used for expense items also varied.

3.2. Vaccine structure and resource analysis

Classification of vaccines as routine and new. All countries have at least 10 routine vaccines as part of their package with the highest number of routine vaccines at 18 in Togo. The number may be high if same vaccine procured from different suppliers are reported as separate entity (e.g. 4 suppliers are reported for COVID-19 vaccines in Togo as the costs vary across the suppliers). On an average, 13 vaccines formed a part of the routine vaccine package for the countries.

Of the 22 countries, 13 countries reported introduction of new vaccines. In Nepal, 10 new vaccines are included, but on further scrutiny it is found same vaccine (e.g. MR-10) for different populations and different modes of delivery (e.g. campaign) are classified as new. The new vaccines introduced across countries are DTP-HepB-HiB-10, Hep B-1, YF-10, COVID-19, Typhoid, IPV-5, Measles, HPV-2, Meningococcal ACYW Conj-1, TD-10, OCV-1, MR-5, MR-10, Rotavirus, TCV

and RTS. Only 7 countries reported resource requirements for COVID-19 vaccine, 4 reporting them as routine and 3 as new. The target group, resource requirements for COVID-19 vaccines and its share in total vaccines are shown in Table 2.

Table 2. Target population and resource requirements for countries reporting COVID-19 vaccines

Country name	Target population	New/ Routine	Total resources estimated (US$)	Share of COVID-19 vaccines in total vaccines cost
DR Congo	50% of population	New	704,172,893	43.2%
Madagascar	50% of population	Routine	137,486,233	35.5%
Rwanda	30% of population	New	7,772,555	7.8%
Senegal	8.2% of population	Routine	29,929,828	19.8%
Tajikistan	63% of population	Routine	340,268,315	82%
Togo	70% of population	Routine	250,633,752	79%
Uganda	70% of population	New	753,052,957	61%

Resource requirements for vaccines. Average share for vaccines in total resource needs is 67% (range 49%-99%) with DR Congo at 49% and Tajikistan at 99%. DR Congo however has the highest resource needs for vaccines at US$1682 million, followed by Uganda US$1233 million. Most of the countries with high vaccine share in total resource needs is due to either introduction of new vaccines or include COVID-19 vaccines (DR Congo, Uganda, Tajikistan, Madagascar) (Figure 5).

All countries have wastage rates greater than 25% for at least 1 vaccine. Only 5 countries report wastage rates greater than 50% for one vaccine. 18 out of the 22 countries reported international handling charges greater than 20% for their vaccines and 2 countries mentioned international freight charges greater than 10%.

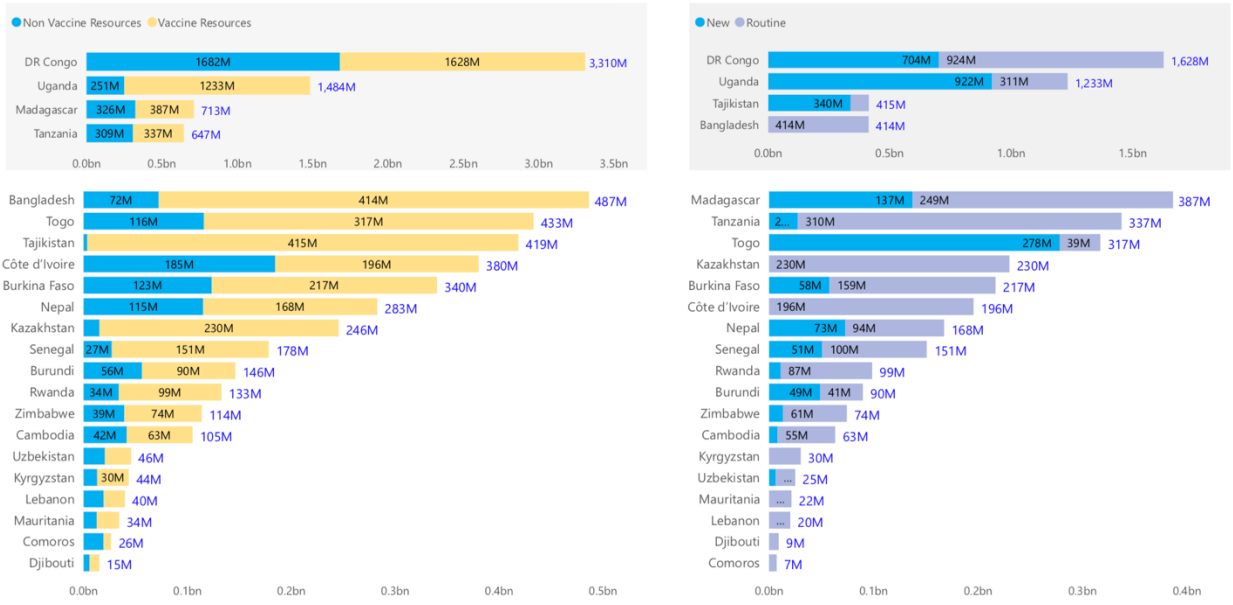


Figure 5a (left). Share of vaccines in total resource requirements (US$ million)

Figure 5b (right). Share of new and routine vaccines in total vaccine resources (US$ million)

Limitations. *Countries report same vaccines from different suppliers with different prices, modes of delivery and target groups. This increases the number of routine and new vaccines. Further COVID-19 vaccine is included in some countries and not in others, making erratic comparison. In case of Lebanon, the calculations for 11 vaccines are done outside the NIS.Cost and only one activity (procurement of vaccines) is mentioned under program management and financing.*

3.3.Resource requirements/cost analysis

Resource needs during the NIS strategic period. Resource needs for the NIS varied widely across countries with only US$15 million in Djibouti compared to US$3310 million in DR Congo (Figure 6). The variation for resource requirements can be attributed to the population targeted for vaccinations, number of vaccines given to the population, number of new and expensive vaccines included, inclusion of COVID-19 vaccines, target population for expensive vaccines, number of years for the strategy, number of and costs of programmatic activities.

Capital resources form a small proportion of total resources, with an average of 6% and rest 94% being recurrent expenditures. Burundi, Cambodia, Comoros, Lebanon, and Uzbekistan required more than 10% of their resource needs in form of capital investment (Figure 6).

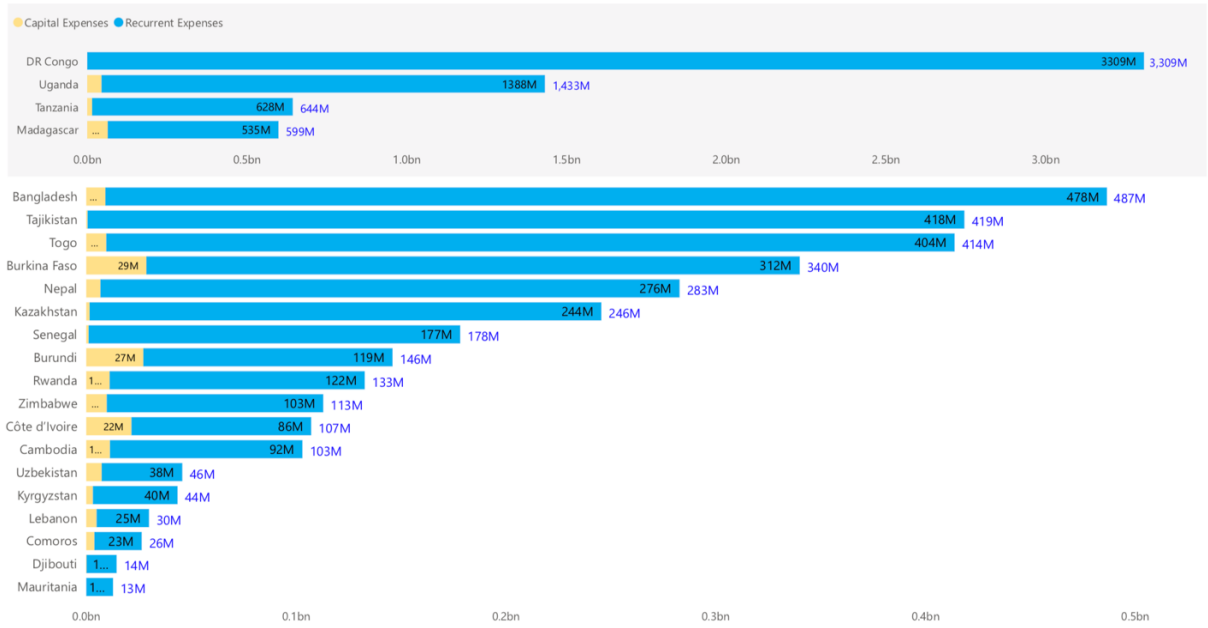


Figure 6. Share of recurrent and capital investment in total resource requirements (US$ million)

Resource needs per capita per year and per surviving infant per year. On an average, a country needs US$3.4 (range 0.3-12.5) per capita per year (Figure 7a). Vaccines form a major part of the resource requirements. The average resource requirement for vaccines is US$2.3 (range 0.1-9.2) per capita per year with highest in Togo and lowest in Uzbekistan (Figure 7b). Five out of 6 countries that need resources more than US$4.5 per capita per year are those that include the costs of COVID vaccines, which are 35%-82% of their total vaccine costs.

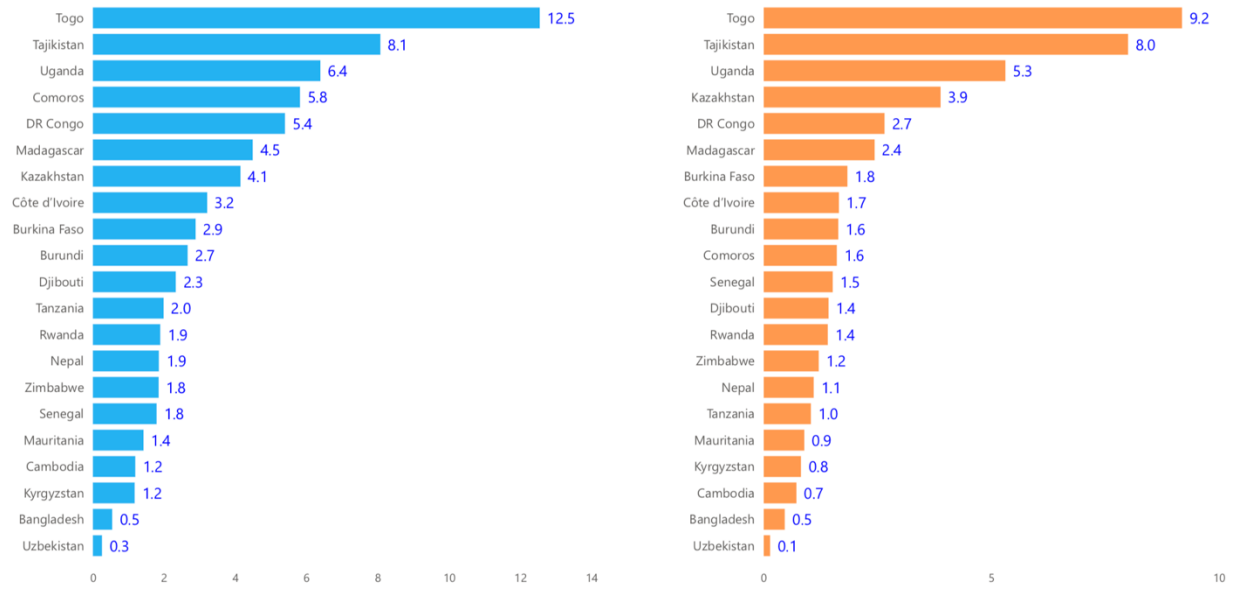


Figure 7a (left). Resources requirements per capita per year (US$)

Figure 7b (right). Vaccine resource requirements per capita per year (US$)

The average cost per surviving infant per year is US$115 (range 31-302) (Figures 7c). 5 out of 7 countries that require more than US$115 per surviving infant per year are the ones that included high cost new and COVID-19 vaccines in their strategy. Additionally, resources per surviving infants are higher in Kazakhstan due to lower number at the bottom in population pyramid and lower in Bangladesh due to a large population and a wider population pyramid at the bottom (US$0.5 per capita per year and US$31 per surviving infant per year). The NIS.Cost in Lebanon did not have the demographic information, hence per capita values could not be calculated.

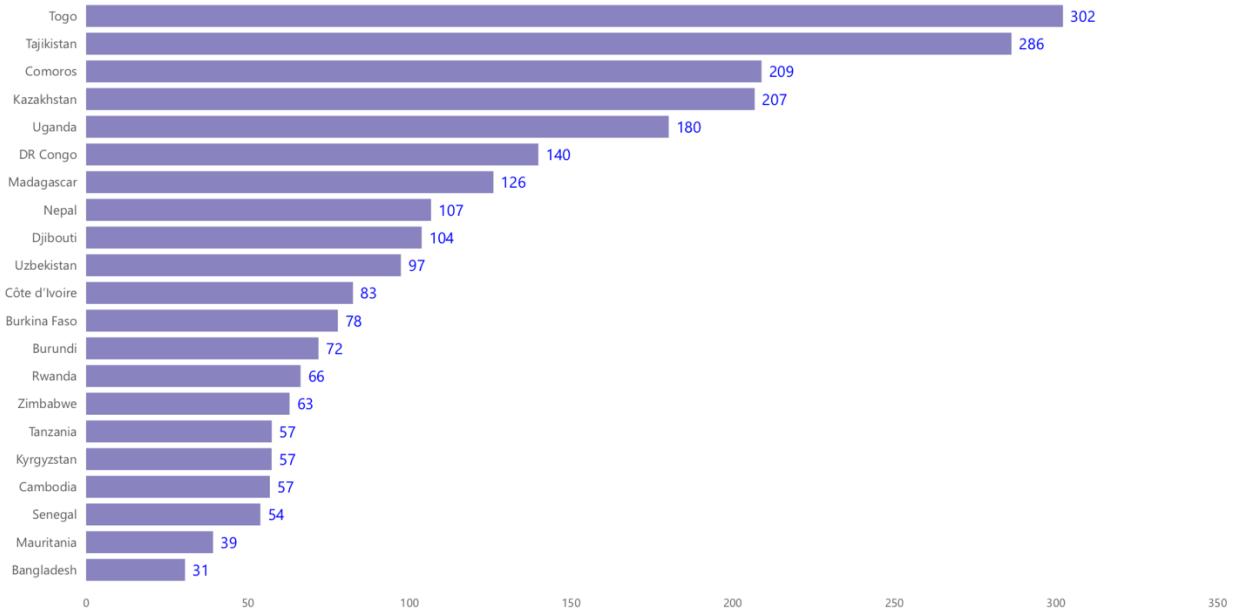


Figure 7c. Resource requirements per surviving child per year (US$)

Resource needs for new, high priority activities and for vulnerable populations. The average resource requirements for new activities are 26% of the total resource requirements, but the variation is from 1% in Tajikistan to 66% in Cambodia. While most countries allocate higher resources for routine activities (which are mainly for vaccines), Uganda, Burundi, Nepal, and Uzbekistan required more than 50% of their resources are for new activities (Figure 8a and 8b). Even though countries such as Tajikistan classify 88% of their activities as new activities, only 1% of the resources are allocated for these new activities, and rest are allocated for routine activities, primarily routine vaccines (99% of total resource requirements).

Countries classify on average 74% of total activities as high priority with an average 91% of total resource requirements for high priority activities. Zimbabwe, Togo, Côte d'Ivoire, Cambodia, and Burkina Faso allocate less than 90% of their resources for high priority activities (Figure 8c).

Limitations. *Countries did not classify all activities as new and routine, hence resource requirements of new and routine did not add up to total. Similarly, all activities have not been classified according to priorities.*

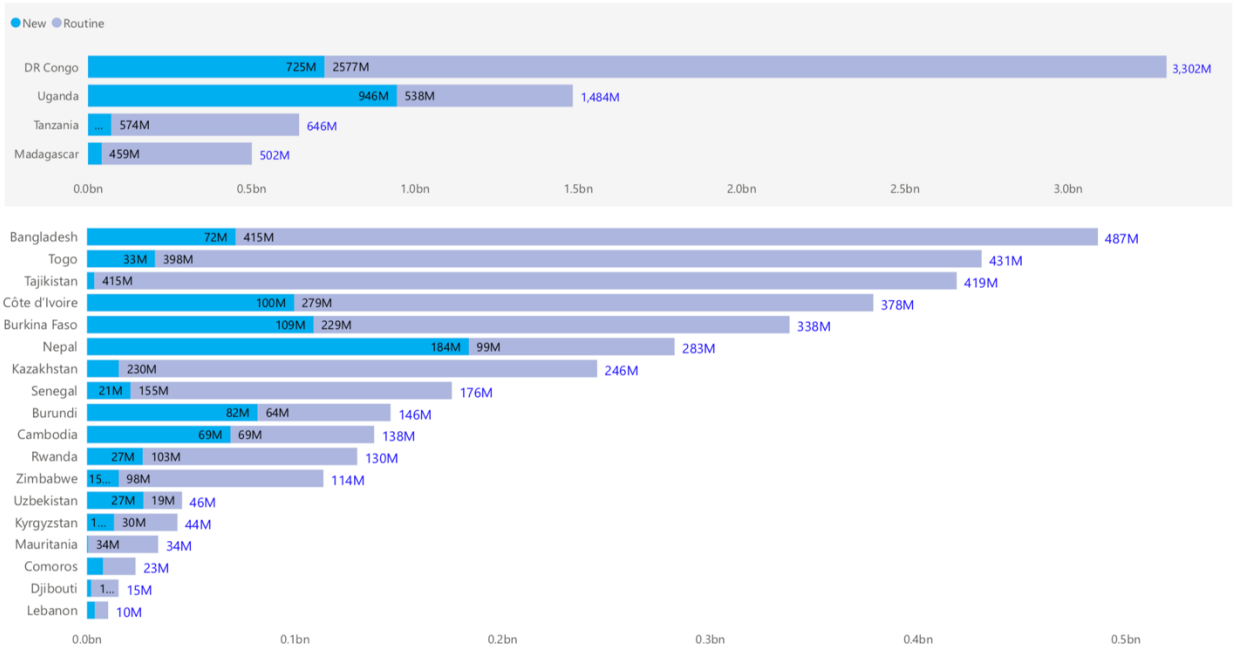


Figure 8a. Share of resource requirements for new and routine activities (US$ million)

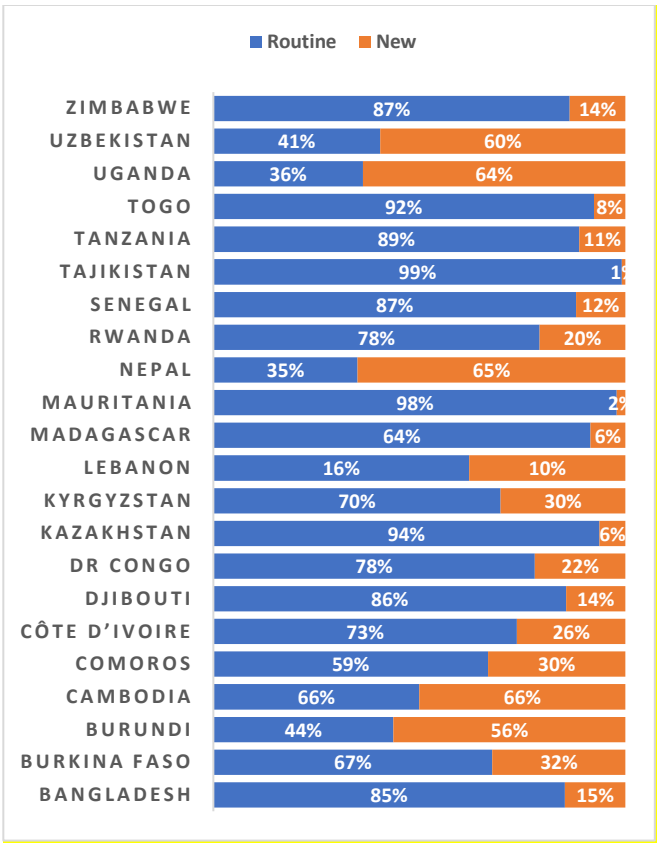


Figure 8b. Share of new and routine activities in total resource requirements

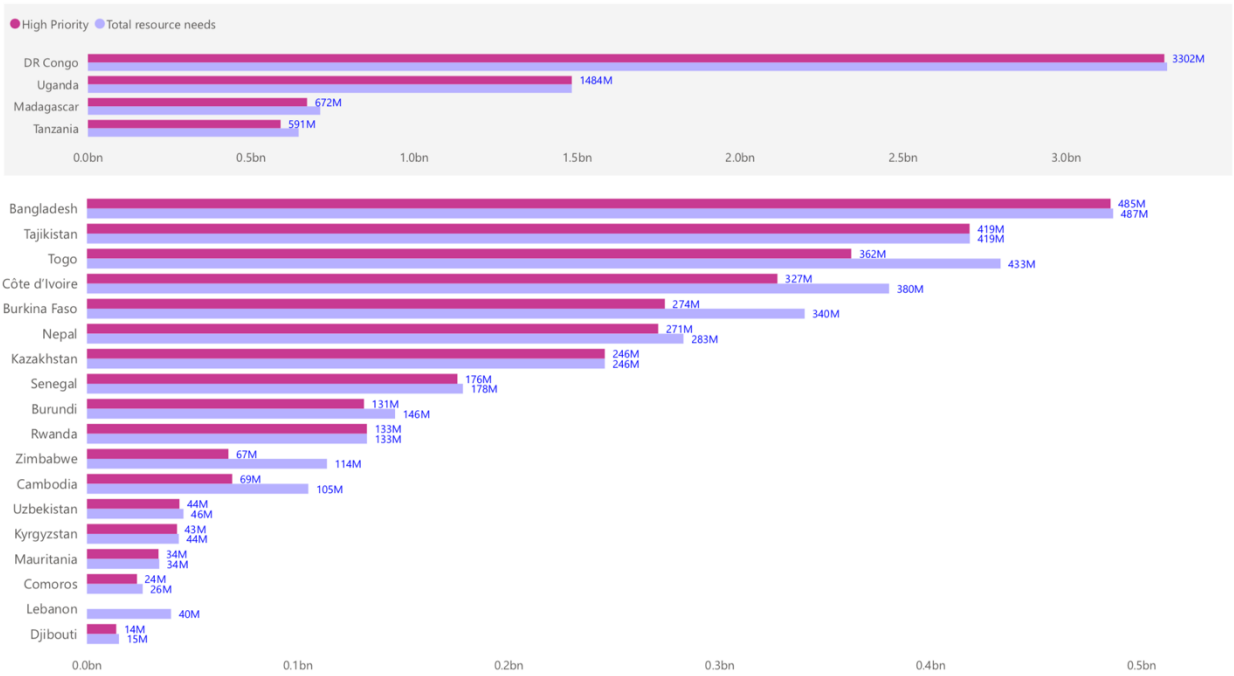


Figure 8c. Resource requirements for high priority activities versus total resource requirements (US$ million)

Resource needs for campaign/SIA activities. For most vaccines, the delivery mode is routine through fixed facilities, but countries also report vaccinations through supplementary

immunization activities (SIA) and/or campaigns. The cost of human resources at fixed facilities are generally considered health system shared costs and not included as part of the NIS, but the staff deployed for campaigns or for routine are included. Cost of campaigns is captured from 2 reports in the NIS.Cost. One, when country report campaign as a budget/expense item and second, when the term campaign/SIA is mentioned in the activities. All countries except Kazakhstan and Kyrgyzstan report campaign costs either as a budget/expense item or as a part of the activity. Costs corresponding to campaigns listed as part of budget/expense items show an average of 4% of the resource needs with the lowest share being in Tanzania (0.1%) and highest in Zimbabwe (10.5%). Resources for campaigns mentioned in activities are on average 4.6% (range 0.2%-16%) of total resource needs. Share of campaign costs in total resource needs for these two different methods are shown in Figure 9a and Figure 9b. More than 10% of resource requirements are for activities linked to campaigns/SIA in Nepal, Uganda, and Zimbabwe.

Limitations. *The way campaigns are listed in NIS.Cost make comparable resource requirements difficult to estimate. For example, in case of Nepal, some of the advocacy meetings, or capacity building activities with campaign term are included for campaign activities, while in Cambodia, Madagascar, Senegal, Tanzania and Zimbabwe campaigns are not mentioned in the activities but are part of budget/expense items.*

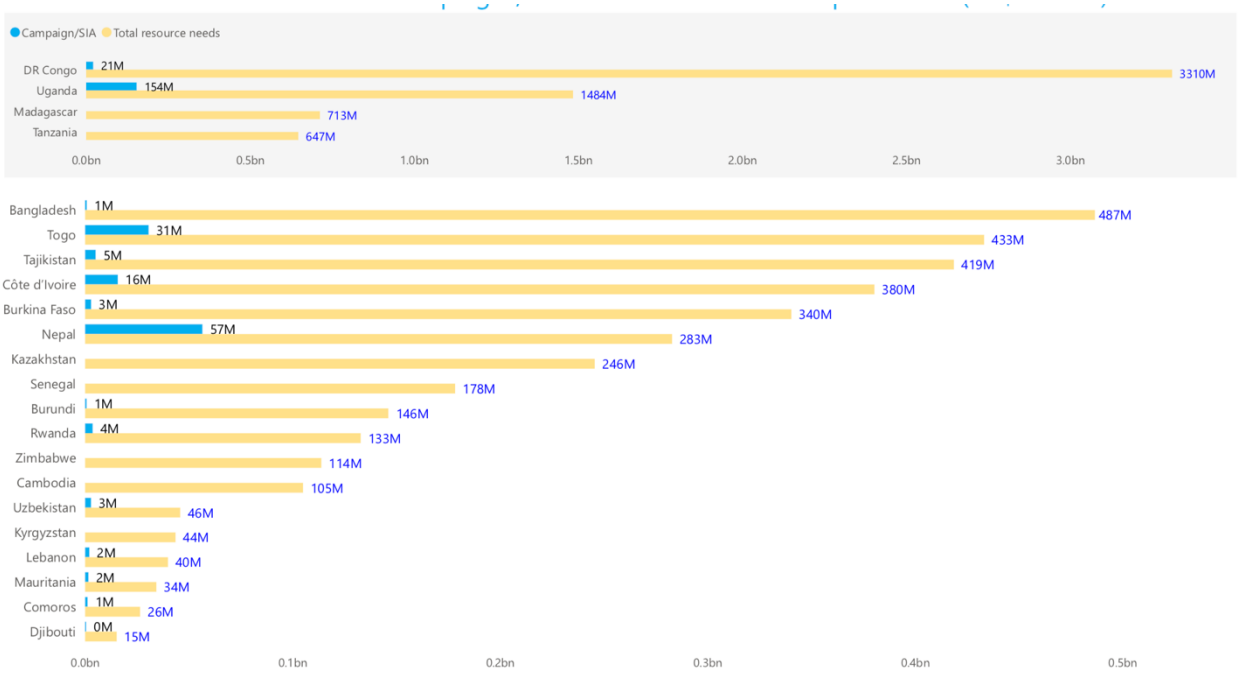


Figure 9a. Resource needs for campaign/SIA and total resource requirements (US$ million)

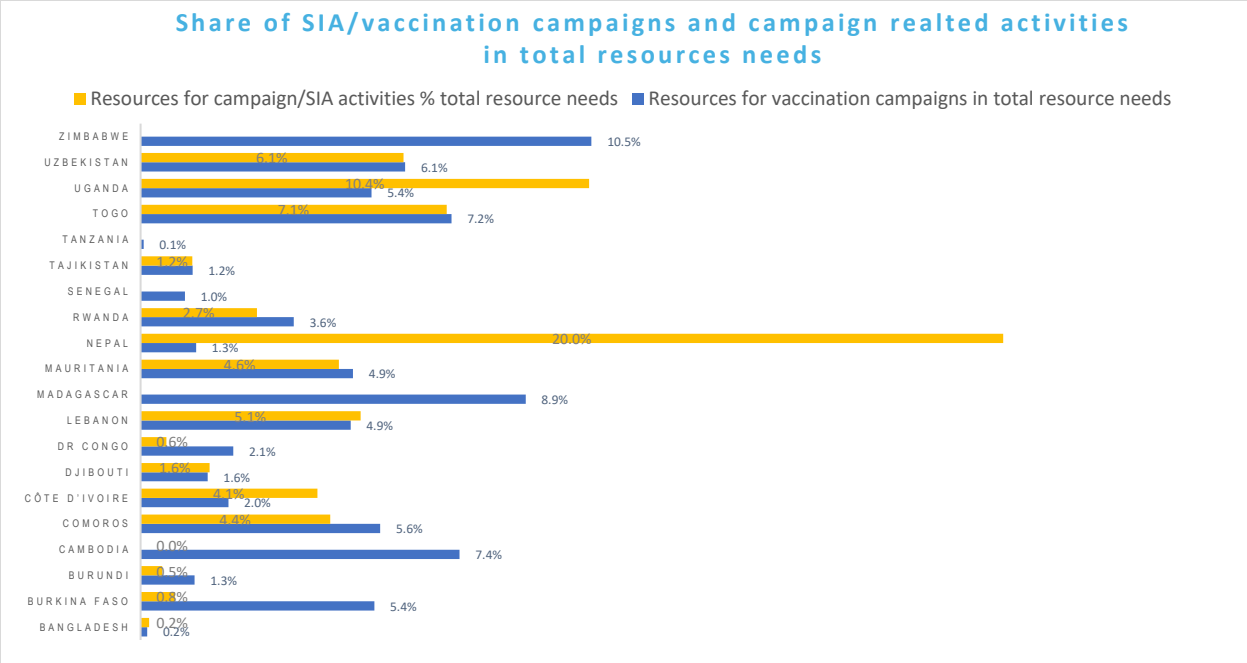


Figure 9b. Share of resource needs for campaign/SIA in total resource needs

Resource requirements by immunization components. Resource requirements by EPI components show, on an average, vaccine supply, quality and logistics 70%, service delivery 8%, human resources 5%, program management and financing 7% and all other components 3% of total resource requirements (Figure 10a and Figure 10b). As the share of vaccines in the total resource requirements is 67%, and vaccines are part of vaccine supply, quality, and logistics, on average 3% of the resource requirements are assumed for cold chain procurement and logistics. There is a wide variation in the shares of different components. Program management and financing is 0.2% for Uzbekistan compared to 66% for Lebanon. Vaccines supply varies from 14% to 99%. Resource needs share for surveillance is the lowest with more than 10% only in Comoros and Côte d'Ivoire. For demand generation only Kyrgyzstan allocate 13%, DR Congo and Comoros 7% and rest of the countries allocate less than 5%.

Resource requirements are also classified by subcomponents that cut across different EPI components. As some of the subcomponents overlap, countries tend to classify activities differently. For example, capacity building for waste management could be classified under waste management or capacity building. Resources for certain subcomponents are zero either because they are not mapped to any activities, mapped in another category or are part of health system costs. Predominant among these are partner coordination under program management; supervision and performance monitoring under human resources; waste management and transport under vaccine supply and logistics; session quality under service delivery; HR and systems, reporting and recording, and AEFI monitoring under immunization coverage; HR and systems, and performance under disease surveillance; and demand under demand generation.

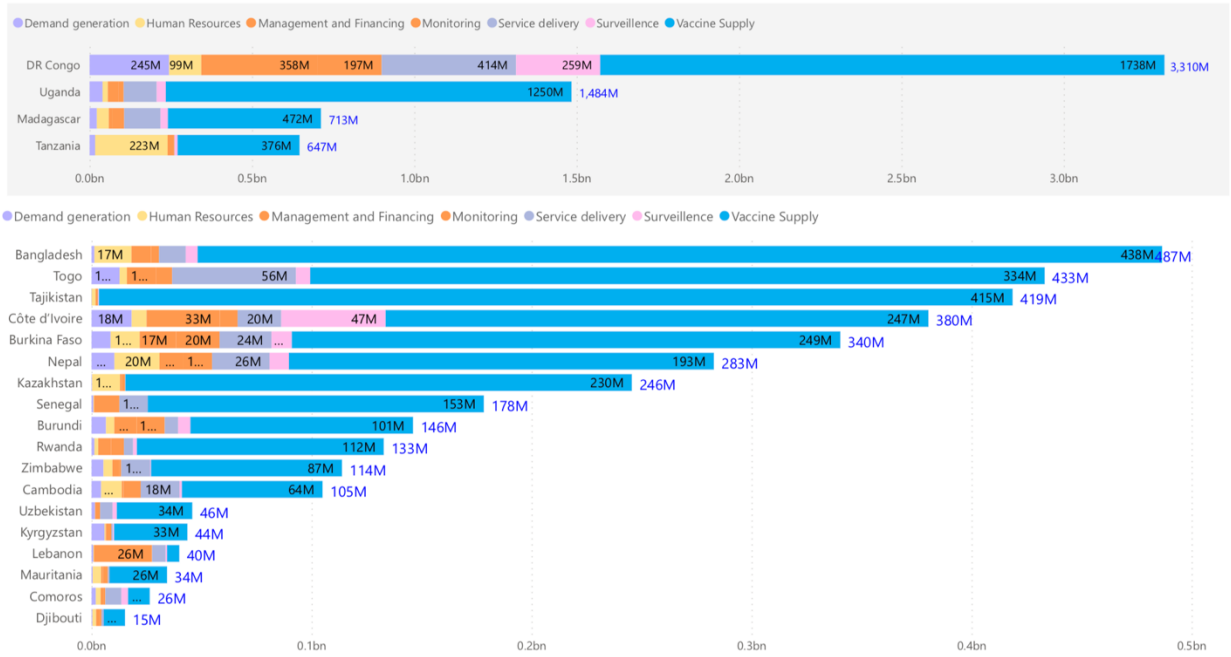


Figure 10a. Resource requirements and share across EPI components (US$ million)

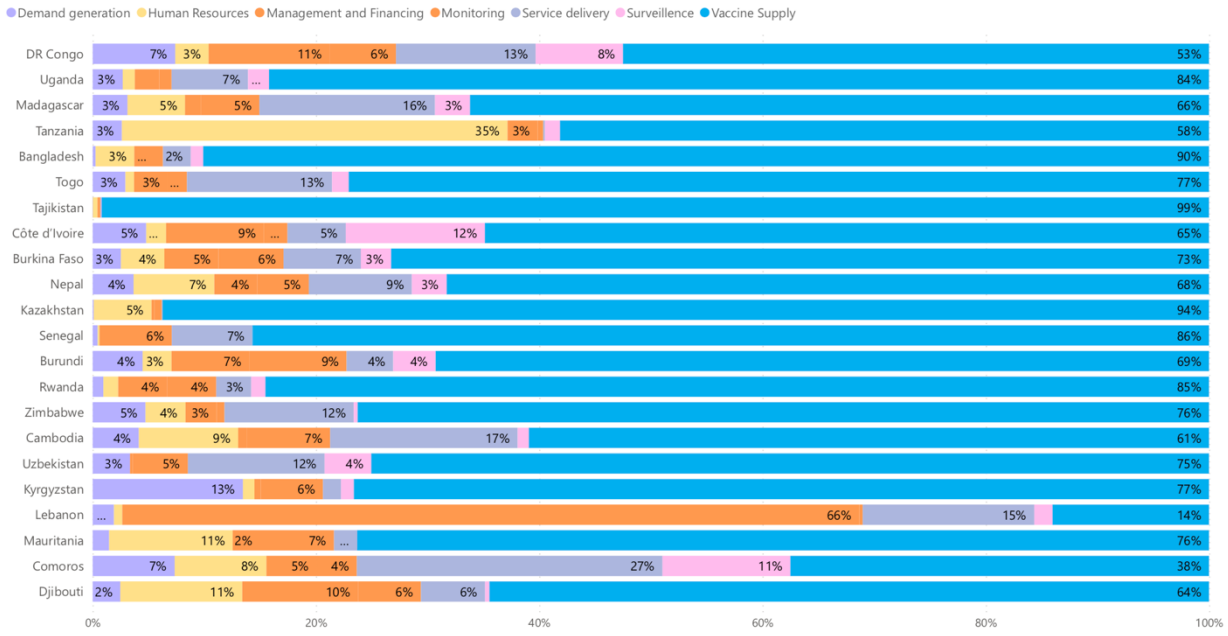


Figure 10b. Share across EPI components in total resource requirements (US$ million, %)

Limitations. *Classification of similar activities under different EPI components can lead to wide variation in resource allocation across countries. For example, in Lebanon, vaccines, cold chain procurement and campaigns were classified as program management and financing. In Comoros, vaccines for campaign are included in service delivery resources. Several subcomponents cut across different EPI components and countries tend to classify them differently, making comparison difficult. In some countries, many subcomponents showed zero resource allocations, prominent being transport and waste management, supervision, and performance.*

3.4.Budget analysis

Budget data for 2 years prior to the NIS start period can be reported in NIS.Cost, but only 8 out of 22 countries have budget data, with 6 countries reporting for 2 years (Table 3). All 22 countries allocate resource needs as per predefined in the NIS.Cost application or custom defined budget categories. The number of budget categories listed varied from 5 in Mauritania to 38 in Burundi (Figure 11). The number of budget categories to which resource needs are mapped varied from 1 to 22, with 22 in Togo. The budget resources for past year as a share of resource requirements for the first year of the strategy for 8 countries show that, except Côte d'Ivoire, all countries have very small budget compared to the needs for the first year of the strategy (Table 3). However, the variation may be due to what is included in the budget.

Table 3. Comparing budget categories and resource needs by country

Countries with past-year budget data	Number of past-year budget data	Number of budget categories	# of categories with budget data allocated	# of categories with NIS resources allocated	Budget as % resource needs in Year 1
Burkina Faso	1	32	1	16	0.004%
Côte d'Ivoire	2	15	14	14	102%
DR Congo	2	30	7	18	3%
Mauritania	2	5	5	5	17%
Nepal	2	19	17	18	66%
Senegal	2	30	9	7	6%
Tajikistan	1	12	1	1	4%
Togo	2	30	10	22	1%

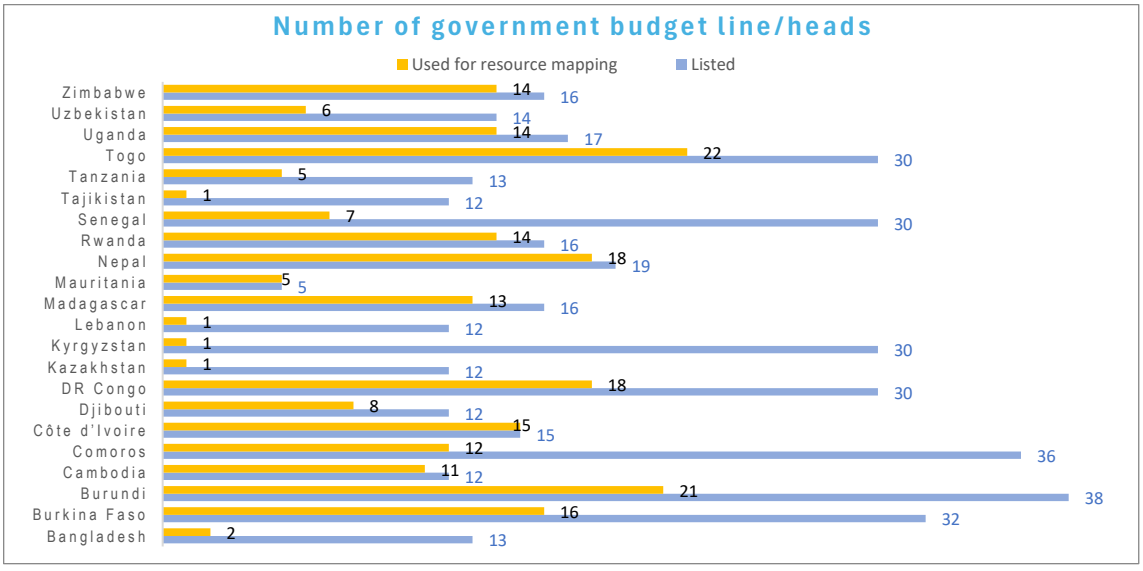


Figure 11. Number of budget line items listed and used for mapping resource requirements

Limitations. *Very few countries report budget data with some countries only reporting the vaccines budget. There is a variation in not only the number of categories in which the resources are reported, but also in what resources are included in the budget. Consistency in reporting of minimum budget heads and in reporting the budget is required. The expense items (under dimensions) could match budget items for ease of entering the data in NIS.Cost and for analysis.*

3.5.Financing and funding gap analysis

NIS.Cost links the resource requirements to the financing available from government and external partners. Out of the 22 countries analyzed, 7 countries (Cambodia, Djibouti, Kazakhstan, Lebanon, Rwanda, Senegal, and Uganda) have no financing information. In all 15 countries with financing information, government fund less than 50% of the resource needs for NIS (Figure 12). On an average government funding is 16% (range 0-49%) of total resource needs and external funds are 30% (range 0-81%) of total resource needs. External funding come from various sources, most dominant being Gavi. Gavi share in external resources is an average of 84% (range 50%-100%). Gavi provides more than 95% of the external resources in Bangladesh, Kyrgyzstan, Madagascar, Tajikistan, and Tanzania. WHO and UNICEF also provide funds for some activities in most countries. Countries with highest share of external resources are Burundi and Togo at 81%, followed by Zimbabwe (63%) and Burkina Faso (62%).

Funding gaps are relatively high for several countries, mainly as budget dialogue have not been taken place at the time of this analysis.

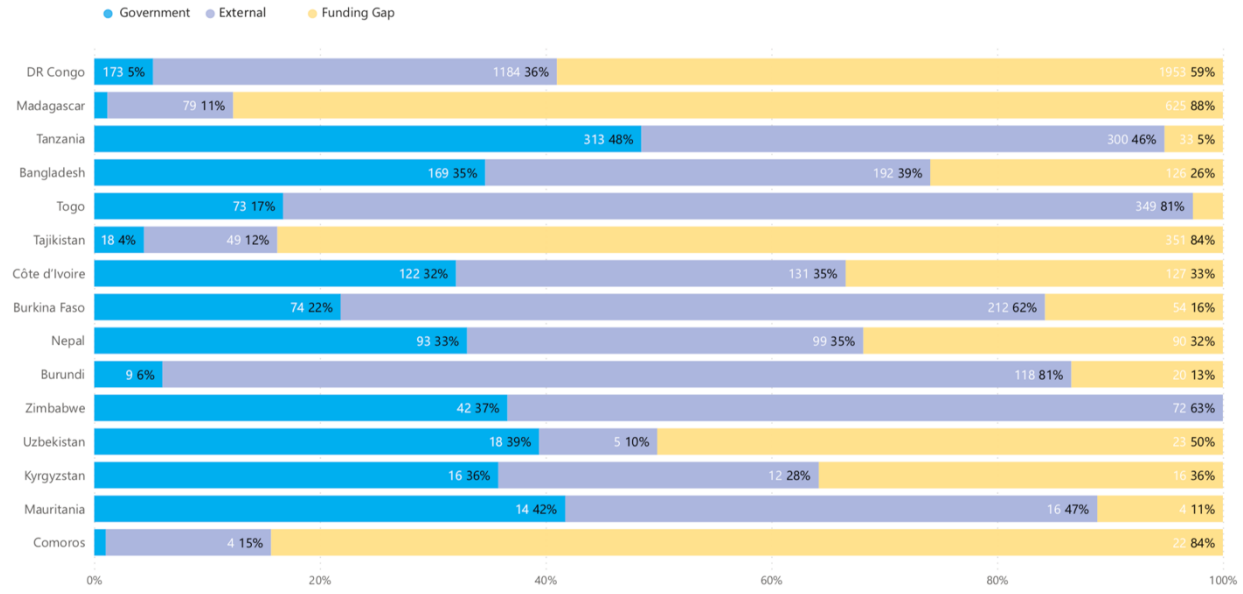


Figure 12. Share of government funds, external funds and funding gaps (US$ million, %)

Limitations. *Many countries do not have financing information available or have incomplete financing information in NIS.Cost, as the strategy and the version of NIS.Cost used for this analysis may be before the budget dialogue, or not have been updated after the budget dialogue.*

4. Qualitative analysis of NIS.Cost

A qualitative data analysis was conducted for the 22 countries based on the criterion used during a UNICEF study[4] conducted in 2021 assessing 8 costing tools prior to the NIS.Cost development. The same 22 qualitative indicators were used for the NIS.Cost analysis, as shown in Table 4.

Table 4. Assessment of NIS.Cost against 22 indicators/attributes

Indicators/attributes against which countries were assessed	# of countries where attribute met (n = 22)	Remarks/comments
1. Resource requirements for the program to run as usual	22	Resource need is available for routine activities but not all activities are classified in all countries
2. Resource requirements by activity	22	Resource need by activities available
3. Number of years for which the resource requirements are estimated: Short (1 year), medium (2-3 y.) and long term (> 3 y.)	1 medium term 21 long term	Kazakhstan has medium term strategy for 3 years and 4 countries for 4 years, and rest of the countries for 5 years
4. Future resource requirements for new activities	18	More than 10% activities not mapped as new or routine in 4 countries
5. Financing gaps	15	7 countries did not have financing information
6. Planner and payer perspective: Who finances what?	15	7 countries where no payer data is available: Cambodia, Djibouti, Kazakhstan, Lebanon, Rwanda, Senegal, Uganda
7. Adjustments to future requirements with available budget	Possible but information not available	NIS.Cost versions do not specify if adjustments to resource needs are after budget dialogue. 6 countries have legally approved report
8. Future resource requirements in the context of fiscal space	8	In 8 countries past budget is available, but not clear if resource needs adjusted to fiscal space
9. External resources for future requirements	15	7 countries mentioned in row 6 do not have the information
10. Program resource requirements and shared costs are separate	22	Shared activities are marked but shared costs are not estimated in NIS.Cost
11. Resource requirements at different administrative levels	9	9 countries had more than 10% activities classified by administrative levels

[4] *https://immunizationeconomics.org/wp-content/uploads/2024/05/ReviewofCostingtools_UNICEF_Final.pdf*

12. Human resources (e.g. salary cost for program staff and perdiem for shared staff)	22	Salary for program staff and perdiem for shared staff available under HR component
13. Consumables for the program (e.g. vaccines, fuel for cold chain or vehicles)	22	Item description under consumables (except vaccines) varies by country. Detailed analysis only for vaccines
14a. Capital/non-consumables for the program (e.g. cold chain equipment)	21	Cold chain is an EPI subcomponent Not available for Djibouti
14b. Uses actual (A), depreciated (D) or discount (O) rates for capital items	0	Not a part of NIS.Cost application
15. Human resources (e.g. salaries of shared staff cost for service delivery or supervision)	13	Salaries for shared staff costs not included but supervision cost captured under HR and service delivery subcomponents
16. Consumables shared across programs (e.g. vehicles)	14	Transport costs as EPI subcomponent
17. Capital/non-consumables shared across programs (e.g. buildings, office equipment)	21	Resource need is classified by capital and recurrent except for Mauritania. Shared building and office cost are not included
18. Planning and coordination – perdiem and meeting costs (excluding shared costs)	20	Planning and procurement subcomponent capturing this cost mainly is available for all except Madagascar and Zimbabwe. Also captured in other subcomponents
19. Supervision and administration – perdiem and meeting costs (excluding shared costs)	21	Proxy for this is taken as Governance and accountability subcomponent. Available for all except Uzbekistan. Also captured in other subcomponents
20. Operational activities (e.g. training, communications, demand creation, monitoring, surveillance), perdiem and materials, excluding shared costs	22	At least one of these are available under different EPI subcomponents
21. Estimates for quantities take wastage rates and buffer stock into consideration	22	Part of vaccine cost calculations. All countries have at least one vaccine with wastage rates recorded
22. Prices are differentiated for vaccines procured in domestic and international markets, with the latter including freight costs, clearance taxes, insurance, customs, handling, processing, and storage costs	16	Part of vaccine cost calculations. Kazakhstan and Lebanon did not mention any vaccines with international freight charges, even though they mention international procurement

5. Lessons learnt – Key planning considerations

Based on both the quantitative and qualitative analysis, following key points emerge:

1. NIS.Cost are dynamic google sheet applications, hence any change done by anyone having rights to edit a country file is captured in the file. The latest version of NIS.Cost may not match resource requirements in the NIS narrative. It was a tedious process to find the version matching NIS.Cost to the NIS narrative, hence consistent ways should be suggested to freeze and name versions of NIS.Cost to match the NIS narrative, or other versions considered important (such as before and after budget dialogue or approval from the government).
2. NIS.Cost does not allow more than 3 levels to present the framework, whereas some countries use more than 3 levels. While fixed number of levels are useful for analysis across countries, it may be useful to provide options for sublevels. The levels and sublevels should be captured with unique number in the roadmap framework.
3. Classification of activities by EPI components and subcomponents provides resources allocated for these components. For several countries, resources for certain subcomponents are zero either because they are not mapped to any activities, or they are mapped in another category or are part of health system costs. Proper guidance is required to classify the components and subcomponents to have proper comparison of resources allocated for activities under different EPI components.
4. Classification of activities for human resources are shown under the human resource management subcomponent. It should only include the human resource costs specific to immunization program and those shared with health system should be classified as shared costs. The shared cost under the dimension tab of NIS.Cost is not well understood. Shared cost can be interpreted in different ways, whether it is a shared cost with another activity in the framework or with health system component. Costs of shared activities are not estimated in NIS.Cost.
5. Activities are classified by shared cost and expense items in NIS.Cost but are not analyzed for this exercise as countries used different terminologies for expense items.
6. Many countries did not classify all activities in the dimensions analyzed. In such cases, resources allocated across different dimensions would not provide a proper picture. Clear definitions for each of the terminologies under dimensions will be useful for the countries to classify the activities. Also, if comparable information is required across countries, this classification should be mandatory to complete.
7. The number of routine or new vaccines reported by countries may be overestimated if same vaccines from different suppliers with different prices, different mode of delivery and different target groups are reported separately. COVID-19 vaccine is included in some countries and not included in others, making the comparison inconsistent. If calculations for vaccines are done outside the NIS.Cost, information is difficult to analyze. Consistency in reporting and classification is required to make effective comparisons.

8. To estimate comparable resources for campaigns across countries, it is important to provide guidance on what should be included as campaign costs and which activities should be classified as campaigns. It would be useful to have a budget and expense head for campaigns separately.
9. For past budget, government budget must be separated from external resources. It would be useful for countries to provide past budget at least for 1 year for vaccine resources and other programmatic activities. This can help in future resource planning.
10. Financing analysis in NIS.Cost is linked to activities, whereas it could be linked to the budget headings. It can be a tedious process to enter financing by activities for each of the strategy years, especially for countries with large number of activities. Also, budget headings provide areas where resources are required and what government and external agencies can fund.
11. NIS.Cost versions are not maintained with specific names to highlight if future resource needs are made based on available budget/fiscal space and/or after the budget dialogue. The status of NIS.Cost should be mentioned upfront.
12. The qualitative analysis shows that most of the indicators are covered across countries. There is incomplete information in some countries, already highlighted. NIS.Cost can have some consistency checks and assessments of the quality inside the application.

6. Annexes

6.1.Countries profile

	Country	WHO Region	UNICEF Region	Income level	Number of years for NIS	Population of first year of NIS	Population of surviving infants	Resource needs per capita per year for NIS	Version date of NIS.Cost analyzed
1	Bangladesh	SEARO	ROSA	LMIC	5	174,774,104	3,096,347	US$0.54	4-Apr-23
2	Burkina Faso	AFRO	WCARO	LIC	5	21,500,559	834,638	US$2.88	25-Feb-24
3	Burundi	AFRO	ESARO	LIC	4	13,097,399	484,604	US$2.66	28-May-22
4	Cambodia	WPRO	EAPRO	LMIC	5	16,873,794	352,662	US$1.19	19-Dec-23
5	Comoros	AFRO	ESARO	LMIC	5	850,694	24,527	US$5.81	30-Nov-23
6	Côte d'Ivoire	AFRO	WCARO	LMIC	4	27,789,928	1,078,088	US$3.21	5-Oct-23
7	Djibouti	EMRO	ESARO	LMIC	5	1,201,494	26,898	US$2.33	13-Oct-23
8	DR Congo	AFRO	WCARO	LMIC	5	111,579,000	4,329,297	US$5.39	13-Oct-23
9	Kazakhstan	EURO	ECARO	UMIC	3	18,755,666	375,488	US$4.27	12-Oct-23
10	Kyrgyzstan	EURO	ECARO	LMIC	5	7,163,901	146,053	US$1.17	13-Oct-23
11	Lebanon	EMRO	MENARO	LMIC	5	Not available	Not available	Not available	Not available
12	Madagascar	AFRO	ESARO	LIC	5	29,036,222	1,039,497	US$4.49	13-Oct-23
13	Mauritania	AFRO	WCARO	LMIC	5	4,475,683	159,663	US$1.42	13-Oct-23
14	Nepal	SEARO	ROSA	LMIC	5	29,703,675	515,514	US$1.85	5-Oct-23
15	Rwanda	AFRO	ESARO	LIC	5	13,051,778	378,858	US$1.89	8-Mar-24
16	Senegal	AFRO	WCARO	LMIC	5	18,275,743	606,537	US$1.79	1-Aug-22
17	Tajikistan	EURO	ECARO	LMIC	5	9,506,000	267,955	US$8.07	20-Feb-24
18	Tanzania	AFRO	ESARO	LMIC	5	59,441,988	2,116,289	US$1.99	12-Dec-23
19	Togo	AFRO	WCARO	LIC	4	8,159,620	338,624	US$12.54	13-Oct-23
20	Uganda	AFRO	ESARO	LIC	5	42,249,585	1,494,305	US$6.39	13-Oct-23
21	Uzbekistan	EURO	ECARO	LMIC	5	33,905,242	83,966	US$0.26	5-Oct-23
22	Zimbabwe	AFRO	ESARO	LMIC	4	15,025,671	440,177	US$1.85	20-Jul-23

Note. World Bank income classification (GNI per capita) for 2022 was used. Low income countries (LIC) with income lower than US$1136 per capita; Low middle-income countries (LMIC) with income between US$1136 and US$4465; upper middle-income country (UMIC) with income between US$4466 and US$13845.

6.2.Terminologies used for data extraction

Terminologies used for the different levels in the roadmap framework

Levels	English terms used	French terms used
1	Objective; Objective and strategy; strategic priority, priority, and objective; Pillar; Output	Axe stratégique; Objectif stratégique; Effet; Objectif
2	Interventions; Main interventions; Strategies	Produit; Objectif spécifique; Action prioritaire; Intervention principale; Principales interventions
3	Activity	Activités

Terminologies used for social and program activities

Word search	English terms used	French terms used
Equity	Equity	Équité
Gender	Gender	Genre
Zero-dose	Zero-dose, 0-dose	Zero
Demand	Demand	Demande
Life-course	Life course	Vie; Trajectoire de vie; Parcours de vie; Évolution
Integration	Integration	Intégration