TERM OF REFERENCE

< JOINT STUDY ADP AND WORLD BANK ON ECONOMIC ANALYSIS OF THE USE OF TECHNOLOGY IN HEALTH SECTOR (RAPID COST EFFECTIVENESS OF SMILE)>

UNDER

<HEALTH GOVERNANCE INITIATIVE> (<00106768 PIP>)

Title of Grant	Joint Study ADP and World Bank on Economic Analysis of The Use ofTechnology in Health Sector (Rapid Cost Effectiveness of SMILE)
Project Name	Health Governance Initiative Project
Grant Duration	from 01/02/2022to 31/12/2022
Work Location	Jakarta, Indonesia
Supervisor	Vidia Darmawi

I. BACKGROUND AND EXPECTED OUTPUTS

GUIDANCE: Indicate the followings

- *The problem statement or challenge the grant intends to address.*
- *The primary objective and specific objectives of the proposed grant.*
- *The description of the rationale (justification) for the project in order to have an overall understanding that the grant is not a standalone activity.*
- *The specific results or outputs that the grant will achieve.*

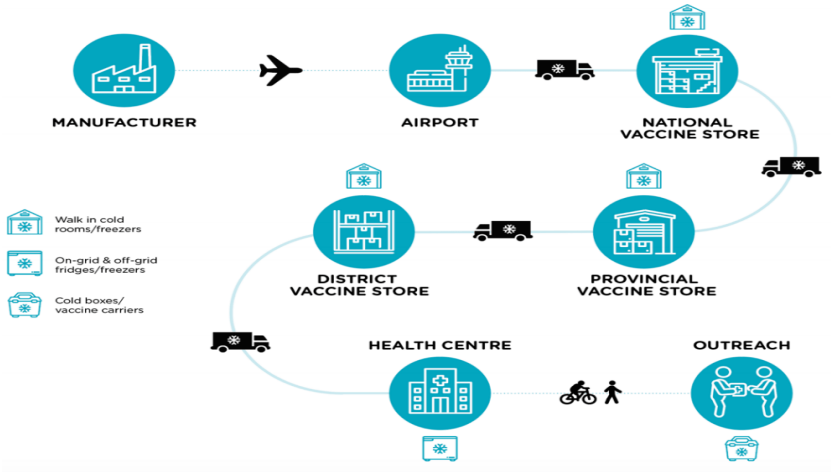
Immunization is a critical entry point for primary health care and investing in immunization saves lives, strengthens health systems, ensures health security, and advances universal health coverage. It is one of the Indonesian government's priorities which have been declared in Law No.36/2009 on Health and Law No.23/2014 on Local Government which state that immunization is a mandatory program and has composite indicators 1 for minimum service standard that have to be met by the government. The 2015-2019 National Medium-Term Development Plan (RPJMN) has also declared Immunization as a determinant program to prevent communicable diseases, underpinning the availability and distribution of drugs and vaccines. Many studies indicated positive effects of vaccination given in early stage of life for stunting prevention. Success stories of immunization program in Indonesia such as smallpox eradication in 1980, elimination of maternal and neonatal tetanus in May 2016, extinction of polio since 2016 indicated the government has attempted to prevent communicable diseases in Indonesia through immunization program.

Contextual factors negatively impacting the vaccine supply chain management in Indonesia (and immunization overall) include the decentralization of a complex health system, extreme geography imposing physical and logistical challenges for vaccine supplies and information flow and people factors. The later can be loosely described as including human resources landscape in the immunization program (supply side) and a range of social determinants comprising varying degrees of community awareness and acceptance of immunization (based on level of education, belief systems, agency and socioeconomics). Although it is playing a critical role, vaccine supply chain has received comparatively little investment. Pressed to meet its commitment to Universal Health Coverage by 2019, Indonesia is in urgent need of innovation to improve vaccine supply chain management.

1.1 Vaccines Supply Chain Management

The structure vaccines supply chain is given in the following organization diagram. It depicts a five-level flow of information and materials.

Figure 1. Mapping the vaccine supply chain



Source: Adapted from Council of Energy, Environment, and Water (CEEW) (2021).

As shown in Figure 1, at the top is the commercial supplier who supplies vaccines to National Vaccine Store. Most vaccines will be procured by BioFarma who will import and deliver vaccines to distribution hubs then onto service points and storage facilities against cold chain and transport capacity. From national buffer hub, vaccines then shipped directly to Provincial Vaccine Store and further supplied down to District Vaccine Store and lastly, distributed to Health Centres or last cold chain points.

1.2 Challenges Facing Vaccine Supply Chain Management and Logistics in Indonesia

The current paper-based routine reporting of vaccine logistics and storage is impeded by poor accuracy, validity and timeliness of the reports. Data are not available in real-time and electronically to all stakeholders, therefore very limited visibility in the pipeline at sub-national levels. The problem is likely to be aggravated and result in stock outs, poor quality of vaccines and overall negative effects on coverage outcomes as well as high yet unnecessary operational costs.

There are many examples of the unexpected outcomes from improper logistics management and less-monitored storage temperature. For instance, in 2018, Diphtheria, Pertussis and Tetanus (DPT) vaccine shortages were reported across Indonesia for outbreak responses (Media Indonesia &Kabar Bisnis). During January and February 2019, there were several shortages of polio vaccines in West Java (27 districts), Banten (8 districts) (SMILE), Papua and other areas for anticipated outbreak responses. One shortage even lasted for 2-3 weeks. Over-stock of measles vaccines was also reported in mid-2018 due to inaccurate and untimely information on the stock balance at sub-national levels. MR introduction was re-scheduled after the Central Level found out a significant amount of measles vaccines have not been consumed, and MR could not be introduced when measles vaccines were in stock. It had been recorded that a number of vaccines were discarded due to improper storage and handling. Temperature excursions might have been happening in many health facilities without them realizing it during weekend or hours in between the twice-a-day daily temperature reading schedule.

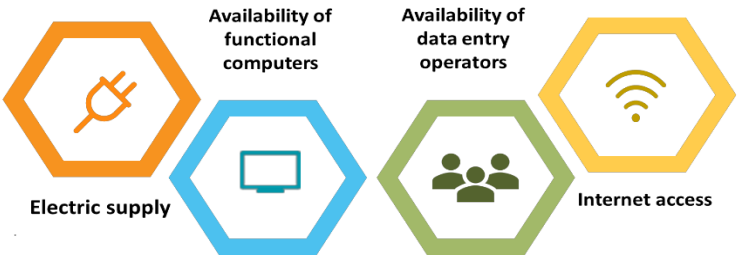
The MoH has carried out a cold chain equipment inventory to assess gaps across Indonesia and found deficiencies particularly at sub-national government level. Such findings are corroborated by a recent UNICEF assessment of

9,750 health facilities which shows that 27 (of 34) provinces need to upgrade their cold chain equipment, and 447 (of 514) districts lack adequate equipment to accommodate the expected volume of vaccines (UNICEF, 2021). Other challenges include lack of equipment for temperature monitoring, (equipment is unavailable, not computerized, or inadequate), and capability to maintain cold chain in times of power outages, especially if a natural disaster strikes. Assessments of the vaccine Supply Chain Management in Indonesia reveal (among other issues):

- Poor visibility and unreliable stock monitoring (no real time stock monitoring) leading to poor planning, unequal distribution and delivery (e.g. demand-supply mismatch) and reactive management
- Suboptimal cold chain monitoring leading to wastage
- Substandard reporting, data flow and quality assurance on data
- Immunization workforce capacity (distribution, skills set, workload, etc.)

These issues, in turn, cause delayed progress, limited impact (by constrained coverage and prolonged stock out), stalled new vaccine introduction and suboptimal immunization at population level.

Figure 2. Challenges at the level of health facilities



Source: Techno-Economic of Electronic Vaccine Intelligence Network (eVIN) (2018).

1.3 SMILE (Sistem Monitoring Imunisasi dan LogistikSecaraElektronik)

SMILE (Sistem Monitoring Imunisasi dan Logistik Secara Elektronik) or known as the Logistics Management Information System for Immunization is an application and software that was initially a pilot program from Electronic Vaccines Intelligence Network (eVIN), an initiative that was adopted in India. SMILE is developed by UNDP Indonesia and has contributed significantly to the data flow within the 'One Data' system. It is a cloud-based digital solution that strengthens the immunization supply chain system, by providing a customized end-to-end tracking of vaccine inventory, from the central storage point to the 'last mile' at the primary community health center level. This includes live monitoring of stock distribution, consumption and storage temperature at each service delivery point. SMILE is also equipped with an online dashboard which provides real-time visibility and data analytics of the entire vaccine supply chain, and informs decision-making to optimize vaccine distribution and management. At any given time, SMILE can provide program managers and decision-makers the answers to three critical questions about the vaccine supply chain:

a) Where is the location of every batch of vaccine;
b) What volumes of stock have been distributed and consumed; and
c) Are the vaccines stored in the correct temperature range

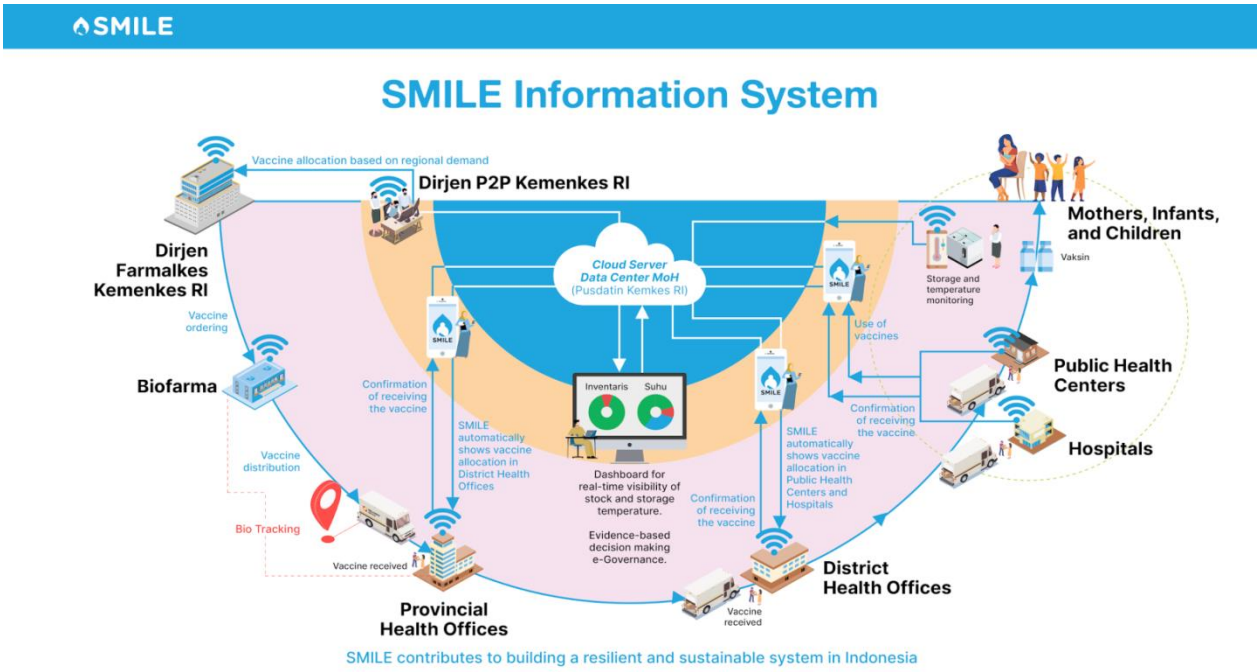
Before being used thoroughly in all provinces in Indonesia, SMILE has been initiated in two districts, Bogor and South Tangerang in West Java and Banten Provinces, respectively. A pilot project in those districts —with the support from UNDP — was using SMILE to track storage temperature of vaccines through SIM-enabled temperature loggers attached to the cold chain equipment. In July 2018, the system has been set up in 54 Community Health Care Centre (Puskesmas) in the two Provinces. The project engages with stakeholders at all levels: Ministry of Health (MoH), Provincial Health Office (PHO) and District Health Office (DHO).

UNDP is scaling up the SMILE solution across 600 Community Health Centers in Indonesia in 2020 to improve vaccine cold chain logistics system, as part of the GAVI Post Transition Engagement grants for the Government of Indonesia. Moving forward, UNDP has now been asked by the Government of Indonesia to expand SMILE implementation to further include 3,000 cold chain points in 12 additional provinces by end of 2021. The final intent is to expand the SMILE implementation to all cold chain in Indonesia in a phase wise rollout during 2020-2024. For the past 2 years, UNDP has facilitated the immunization sub-directorate on the use of technology and capacity development for vaccine store (pharmacy) and immunization program officers to optimize delivery of vaccines.

Cold chain data and vaccine stock data is simultaneously updated in the SMILE application and uploaded on a cloud server which can then be viewed by program managers at district, province, and national level through online dashboards.

SMILE usage for vaccination program becomes essential as it can be used to ensure vaccine distribution; whether vaccines are distributed in good condition, timely, and cost-efficient manner. Realizing the importance of a centralized data system to manage information supporting the COVID-19 vaccination program, the Government of Indonesia requested UNDP to help develop an information system that enables a better and timelier decision-making in stock management, vaccine storage, and administration across an archipelago of 270 million people, across 17,000 tropical islands, making it a uniquely complicated rollout.

Figure 3. How SMILE works



SMILE eliminates stock abnormalities (especially stock out and over stock) due to old data, minimizes vaccine wastage and degradation due to temperature excursion during storage and reduces time consumed for cobbling together information to create reports from all levels of vaccination managers. Real time data from temperature data logger that was installed in refrigerator and inventory reports from lower level will be processed by SMILE system and can easily be seen on a dashboard based on which data is needed at each level. Required information for vaccine forecasting, order to manufacture, distribution planning, national inventory management and cold storage assets management may be received faster and meet expectation on transparent, efficient, effective, and comprehensive support to vaccines program one gate policy.

To ensure that SMILE will continue improving vaccine cold chain logistics system, SMILE Team is planning to conduct research on Cost Effectiveness on supply-chain digitization for immunization program in national and sub-national level.

1.4 What SMILE does?

SMILE works based on these seven pillars:

1) Improves efficiency of vaccine cold chain logistics management by introduction of state-of-the-art technology for digitizing vaccine stocks;
2) Strengthens the immunization system by developing trained human resources to districts for constant support to estimate vaccine requirements and provide supportive supervision;
3) Develops standard operating procedures for systematic record-keeping of vaccine logistics;
4) Informs policy and decision-making for immunization supply chain management at all levels;
5) Facilitates maintenance of optimum vaccine stocks by reducing instances of vaccine wastage and stock-out;
6) Ensures quality and safety of vaccines through real-time information on storage temperature with the help of SIM-enabled temperature loggers, and
7) Empowers the vaccine cold chain handlers at health centres through intensive training

1.5 SMILE's achievements in strengthening routine immunization

During SMILE implementation for routine immunization since 2018, it has accomplished several achievements which include reducing vaccine stock outs by 55 percent and the 'vaccine availability index' reached 99 percent. Significant cost savings have been achieved through reductions in over-stocking and stock wastage by over 50 percent and 90 percent, respectively. The efficient replenishment of stocks at district levels, whereby the lag in stock replenishment time went from 25 days to less than three days, means that vaccines are now reaching the session sites quicker and saving lives in doing so. The transition from a paper-based to digital management system has also significantly improved accountability, transparency and integrity of the vaccine distribution process, improving the productivity of health workers and providing them with a higher degree of control over stock availability. SMILE is currently being scale up nationally to support the distribution of the COVID-19 vaccine.

1.6 Rationale of the study

Currently, SMILE for routine immunization has been used in 26 districts across Indonesia and it has been implemented in 514 districts for COVID-19 vaccination program. As for routine immunization, SMILE scale-up is part of five year plan of the immunization program (2019-2024).

Specific area for 600 health services still to be discuss, however the territories will be divided according to urban and rural areas in Sumatra, Kalimantan and Sulawesi and remote areas in Eastern Indonesia, especially NTT and Papua. Because the pilot project has started in Java, all of Java will be included in this scaling up.

Studies on the implementation of SMILE and its outcomes have not been done before and this will be the first study on vaccine and cold chain management in Indonesia. However, similar study has been conducted in India which assessed the Techno-Economic of eVIN. Given this context, the "Rapid Cost Effectiveness of SMILE" was proposed to provide learning for scale up of the program in remaining districts. This study aims to provide evidence on programmatic and economic benefits of SMILE system.

II. KEY ACTIVITIES AND PERFORMANCE TARGETS

GUIDANCE: Specify the key activities that needs to be undertaken.

2.1 Research Objectives

Regarding to this research activity, here are all the objectives as detailed below:

- Assess the efficiency of SMILE in areas of vaccines logistics and management;
- Assess the health impact of SMILE regarding improved program coverage (Childhood Vaccination Program Coverage and COVID-19) and reduced Vaccine Preventable Illness;
- Conduct an economic assessment (Return on Investment) of SMILE on immunization programme as well as for the health systems as a result of disease averted due to improvements in vaccine delivery;
- Propose the recommendations to Ministry of Health to refine the SMILE business model and scale-up based on research finding;
- Provide key lessons that could help other countries in making similar policy decisions about implementing similar vaccine management and logistics systems.

2.2 Scope of Work

- Rapid review of literature, which includes:
  - Challenges and gaps of the immunization programme in Indonesia
  - The use of SMILE for vaccine distribution
  - Methodologies for economic assessment of SMILE or other non-digital vaccine distribution system
- Develop and analytical framework, quantitative and qualitative data collection tools and methodologies, and sampling approach that includes SMILE and non-SMILE districts in 6 provinces
- Test the data collection tools, refine the tools and conduct data collection
- Conduct data analysis, develop report and support the dissemination of the findings
- Provide recommendations on promoting the effectiveness and sustainability of SMILE

2.3 Research Questions

- What is the return of investment for SMILE implementation in terms of cost benefits, cost saving, and increased efficacy?
- What are the health impacts of having SMILE implementation? (e.g., missed opportunities for vaccination)
- Has SMILE improved the programmatic/operational management of the logistics chain for routine vaccines and COVID-19 vaccines?

2.4 Methodology

- **Qualitative method:**
  In-depth interview and Focus Group Discussion (FGD) will be used with relevant stakeholders (national and sub-national) in 7 districts: routine immunization (4 districts), non-routine (3 districts) and COVID-19 vaccination (7 districts from routine and non-routine immunization districts). For economic assessment, two data sets are used:
  a) The data set from 21 randomly selected Puskesmas in 7 districts.
  b) The data set obtained for programmatic assessment.

- **Quantitative method:**
  Random sampling for pre- and post-assessment of SMILE for routine and COVID-19 vaccination in selected districts and Community Health Centres (Puskesmas) based on year of intervention. Random sampling in 4

SMILE-implemented districts and 3 non-SMILE-implemented districts for routine immunization. All of those 7 districts will also be used to assess SMILE for COVID-19 vaccination. Three sampling stages will be included:

a) **Stage 1** –Selection of districts (Intervention and non-intervention): we select 7 districts for each group which are in the same year of intervention and levels of immunization coverage (IPA vaccines and COVID-19 vaccines).

b) **Stage 2** – Selection of Puskesmas: 21 Puskesmas will be selected randomly from 7 districts.

c) **Stage 3** – Selection of beneficiaries: 30 vaccinated newborns will be selected randomly for routine vaccination and 15 adults for COVID-19 vaccination in each of the Puskesmas in the districts for the last one year.

2.5 Key Deliverables

- Literature review and detailed report on the rapid cost effectiveness of SMILE application
- Data collection methodology
- Report on rapid cost effectiveness and recommendations promoting on effectiveness

2.6 Constraints

- Unavailability of relevant data prior SMILE deployment
- Potential inaccuracy in identifying and quantifying costs and benefits.
- Increased subjectivity of intangible costs and benefits.
- Inaccurate calculation in cost and benefit analysis resulting in misleading analysis.
- Limited budget to conduct a study with more sample sites and/or longitudinal study

2.7 Tentative Timeline for the Joint Study ADP and WB

Chapter Description	Research writing and submission period			
	Mar	Apr	May	June
Literature review				
Research aim(s)				
Recruitment and training process (may add more time)				
• *1 validation and dissemination workshop*				
• *Recruitment of research team*				
• *Recruitment of international expert*				
• *Training of data collector*				
• *Testing of data collection tools*				
Material and methods				
• *Interview (in-depth and FGD)*				
• *Desk review*				
• *Data collection*				
Data analysis				
Results				
General discussion, conclusion, and future direction				
Proof reading				

GUIDANCE: Specify the performance targets, which includes indicators for measuring results that will be achieved using the grant. At least one indicator is required. More can be used if useful to more fully measure the results that are expected to be achieved:

2.8 Performance Target

INDICATORS	DATA SOURCE	OUTPUTs	February 2022	March 2022	April 2022	May 2022
1. Activity report on the literature review, series of Interview (in-depth and FGD), Desk review, and Data collection	• Report Activities • Photos • List of Participant • Document of Literature References	Literature review and Data Collection	Draft 1 with 50% progress		Draft 2 with 100% progress	Completed activity report with relevant data collection and literature review
2. Detailed report on the rapid cost effectiveness of SMILE application.	• List of participants • Photos • Report of activities	Cost Benefit Analysis		Draft 1 with 50% progress	Draft 2 with 100% progress	Completed Final Report on the effectiveness of SMILE platform with the cost benefit analysis
3. Recommendations to encourage massive acceleration of digitization for the health sector (SMILE scale up) and key lessons to help other countries in making similar policy decisions in vaccine cold chain management and logistics.	• List of participants • Photos • Report of activities	Policy Brief Recommendation		Draft 1 with 50% progress	Draft 2 with 100% progress	Completed policy briefs and key lessons to share best practices on vaccine cold chain management and logistics

III. LOCATION AND TARGET BENEFICIARIES

GUIDANCE: Specify the location of work and target beneficiaries.

3.1 Research Locations and Districts

Year of Intervention	Name of Districts for Vaccination Campaign		
	RI (Routine Immunization) 4 Districts	Non – RI 3 Districts	COVID-19
2018	Kota Bogor	-	ALL DISTRICTS
2019	Jakarta Barat	-	
2021	Kabupaten Magelang	Kota Padang	
	Kota Pekanbaru	Kota Malang	
		Kabupaten Balikpapan	

3.2 Research Beneficiaries

- Government of Indonesia
- Ministry of Health
- Health Services Facility (Puskesmas)
- Provincial and District Health Office
- Local Government

IV. ELIGIBLITY AND SELECTION PROCESS

4.1 Institutional Requirement

The grant recipient (civil society or non-governmental organization, academia) with experience in carrying out activities / programs in the field of:

- Scientific research and development;
- Public health research, particularly in Covid-19 Data Surveillance and Information management;
- Experience in handling national and local training
- Experience in training and supervising health workforce at the community health centre (Puskesmas);
- Experience in implementing research interview, focus group discussion, webinar, seminars and dissemination;
- Experience in the field of community empowerment and involvement of local governments and stakeholders in preventing the transmission of COVID-19

shall complete and submit the Grant Proposal in accordance with UNDP's Low Value Grant Proposal Template (**ANNEX A**) and the Request for Information (RFI) From CSO/NGO (**ANNEX B**).

All grant proposals shall be subject to grant selection processes, which consist of a Pre-screening against the selection criteria and Full Review by the CSO Steering Committee.

4.2 Selection Criteria

The Selection Criteria are as follows:

a) **Method (30%)**: Proposed methodology, workplan, approach, timeline, completeness of deliverables.

b) **Identity (30%)**: Registration status, having a specific status if that is necessary in the country context, etc.

c) **Capacity (30%)**: specialized knowledge and experience on similar engagement, standard operating procedure, financial report (audit report if available)

d) **Submission Requirements (10%)**: ideas presented including any requirements with regards to utilization of resources, reporting, duration, and other formal criteria.

Only those organization obtaining a minimum of **70%** in the technical evaluation will be considered for the financial evaluation round.

No	Description of the Criteria	Points Obtainable
1	**Proposed Methodology, Approach, and Implementation Plan**	**300**
1.1	Understanding of the aspects of the tasks, the proposed activities appropriate, practical, and consistent with the objectives and expected results.	35
1.2	Description of the Proposer's approach and methodology for meeting or exceeding the requirements of the Terms of Reference.	65
1.3	Details on how the different service elements shall be organized, controlled, and delivered.	50
1.4	Description of available performance monitoring and evaluation mechanisms and tools; how they shall be adopted and used for a specific requirement.	35
1.5	Assessment of the implementation plan proposed including whether the activities are properly sequenced and if these are logical and realistic	80
1.6	Demonstration of ability to plan, integrate and effectively implement sustainability measures in the execution of the contract. ***Sustainability:*** - The proposed action like to have tangible impacts to the target groups - The proposal likely to have multiplier effects. (Including scope for replication and extension of the outcome of the action and dissemination of information.) ***The expected results of the proposed actions sustainable*** - Financially *(how will the activities be financed after the funding ends?)* - Institutionally *(will structures allowing the activities to continue be in place at the end of the action? Will there be local "ownership" of the results of the action?)* - At policy level (where applicable) *(what will be the structural impact of the action e.g., will it lead to improved legislation, codes of conduct, methods, etc?)?* - Environmentally (if applicable) *(will the action have a negative/positive environmental impact?)*	35

2	**Identity and Eligibility of the Organization**	**300**
2.1	Reputation of Organization and Staff Credibility / Reliability / Industry Standing	50

2.2	General Organizational Capability which is likely to affect implementation: management structure, financial stability and project financing capacity, project management controls, extent to which any work would be subcontracted	50
2.3	Relevance of specialized knowledge and experience on similar engagements: • At least have 5(five) years' experience in the field of scientific health economics, public health research and development • Experience in handling Covid-19 Data Surveillance and Information management • Experience in the area of community development, particularly in handling national and local training • Experience in training health workforce from health facilities • Experience in implementing research interview, focus group discussion, webinar, seminars and dissemination • Experience in the field of community empowerment and involvement of local governments and stakeholders in preventing the transmission of COVID-19	50
2.4	Permit to work in Indonesia (eligible legal status)	50
2.5	Quality assurance procedures, risk mitigation measures and management plan	50
2.6	Organizational commitment to sustainability. It demonstrates significant commitment to sustainability through some other means, for example internal policy documents on women empowerment, youth engagement, or membership of institutions promoting such issues on tolerance and respect for diversity.	50

3	**Capacity**	**300**
3.1	Composition and structure of the team proposed. Are the proposed roles of the management and the team of key personnel suitable for the provision of the necessary services?	75
3.2	Qualifications of key personnel proposed	
	1.Lead Researcher • Strong knowledge and at least 5 (five) year-experience of research management and successful performance in implementation of research in economics, public health program, social studies and other studies • Experience in needs assessments, analysis, and development of logical framework, as well as formulation of realistic activity implementation plan. • Experience in team management, mentorship and on the job capacity building with specific focus on epidemiology and emerging pandemic threats • Experience in the data surveillance in handling Covid-19 would be an advantage • Languages required: Indonesian, English	75
	2.Research Associate • Specific skills and minimum 3 (three) year-experience in public health research and programs. • Experience in project management and report writing. • Involving in community empowerment and community customary project is desirable.	75

3	**Capacity**	**300**
	3.Enumerator • Sound knowledge and experience in public health research and program • Sound knowledge and experience in developing results monitoring framework and plan, as well as managing monitoring and reporting processes. • Strong experience in report writing • Familiar with research, data collection, analysis, and management. • Languages required: English, Indonesian.	75
4	**Utilization of Resources and Value for Money**	**100**
4.1	Price offered based on the price schedule format	
	Total	**1000**

V. REPORTING

GUIDANCE: Specify the reporting requirements.

The Institution/ NGO/ CSO will provide a finalized work plan prior to implementation.

- The Institution/ NGO/CSO needs to provide monthly progress update in cumulative updates on implementation progress, results against targets, challenges and mitigation, gender targeting, changes introduce during implementation on the ground (if any), within 7 days following the end of the month.
- The reports should be provided with relevant evidence and supporting documents such as attendance lists, minutes of the meeting (MoM), high resolutions photos documentation, media coverage, etc to support the activities reported.
- The Institution/ NGO/CSO will submit a comprehensive narrative and financial completion report at the end of the assignment, March 2022.
- The Institution/ NGO/CSO will maintain regular communication with UNDP Health Governance Initiative Cluster (HEART) to provide regular feedback on implementation progress, results, challenges, and bottlenecks; as well as collaborate with UNDP to facilitate regular or ad hoc monitoring visit. The Institution/ NGO/CSO will provide periodic (monthly) and submit a final report to UNDP at the end of assignment period.

Report	Submission of Activity and Financial Report	%
Activity 1. Literature Review and Disseminate Study Design Workshop	15 March 2022	10%
Activity 2. Training for Data Collection and Data Collection	30 April 2022	35%
Activity 3. Data Analysis and Report Writing	31 May 2022	30%
Activity 4. Dissemination and Publication	30 June 2022	10%