



CORESMA - COVID-19-Outbreak Response combining E-health, Serolomics, Modelling, Artificial Intelligence and Implementation Research

WP 1 Enhancing public health preparedness and availability of impactful real time data through digital health surveillance with SORMAS
Deliverable D1.3

Title of Deliverable: SORMAS fully implemented at the points of entry in Côte d'Ivoire and Nepal

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D1.3: SORMAS fully implemented at the points of entry in Côte d'Ivoire and Nepal

**List of acronyms used:**

CdI	Côte d'Ivoire
CSRS	Centre Suisse de Recherches Scientifiques en Côte d'Ivoire
DoHS	Department of Health Services
EDCD	Epidemiology & Disease Control Division
EWARS	Early Warning, Alert and Response System
HZI	Helmholtz Zentrum für Infektionsforschung/ Helmholtz Centre for Infection Research
INHP	Institut National d'Hygiène Publique/ National Institute for Public Hygiene
MoH	Ministry of Health and Population
PoE	Points of entries
SORMAS	Surveillance, Outbreak Response Management and Analysis System
WHO	World Health Organization
WP	Work Package

1. Background/ technical information

CORESMA partner countries are Côte d'Ivoire and Nepal with two beneficiaries: the *Institut National d'Hygiène Publique* (INHP) in Côte d'Ivoire and the Ministry of Health and Population (MoH) in Nepal. While operations for Work Package 1 (WP1) have been carried out by INHP in Côte d'Ivoire, they have been carried out by EDCD, an affiliate of MoH, in Nepal. For Nepal, it is important to mention the tremendous support given by the local World Health Organization (WHO) office (WHO Country Office Nepal) who has been assisting EDCD with SORMAS trainings from the early beginning of the project. One step of implementing SORMAS in the piloting regions and provinces of both partnering countries within CORESMA project is the implementation at designated Points of Entries (PoE).

2. Methodology

In order to plan for the implementation of SORMAS at the PoE in both partner countries, HZI did regularly meet with the respective partners online via Zoom. Regular meetings took place between May 2021 and November 2023.

For Côte d'Ivoire, meetings had been set up on a bi-weekly basis with INHP, unless when preparing for the first SORMAS trainings, when weekly meetings were realized. As WP1 is



interlinked strongly with WP4 (Implementation research) in CORESMA, the regular bi-weekly meetings took place jointly. Participants from INHP were the Deputy Director of INHP and the Head of IT; from Swiss TPH three team members of WP4 did participate as well as an affiliate member of the Centre Suisse de Recherches Scientifiques en Côte d'Ivoire (CSRS). From HZI a project manager invited and did moderation; during certain time periods a SORMAS expert and trainer joined in as well.

For Nepal, meetings had been set up on a bi-weekly basis and for some time on a monthly basis (upon wish of EDCD) with EDCD and WHO. Again, for the interlinkage of WP1 and WP4 the regular meetings took place jointly. Participants from EDCD in the beginning were the Team lead (epidemiologist) and one to two further epidemiologists as well as an epidemiologist of WHO being stationed with the EDCD team to enhance close collaboration. After one year due to frequent turnover of the Team lead, one epidemiologist and one Public Health Officer took place from EDCD, again joined and supported by an epidemiologist of WHO stationed on site. Further regular participants from WHO have been the National Professional Officer from the department Health Information Management & Analytics and from early 2023 onwards a newly hired software developer took part, too. From HZI a project manager invited and did moderation; during certain time periods a SORMAS expert and trainer joined in as well. From WP4 three team members of Swiss TPH did participate as well as a researcher from Kathmandu University, supporting WP4 with implementation research.

In general, regular meetings with both partnering countries did pause for a couple of times during summer break or Christmas break and in the case of Nepal during important religious holidays, which can last up to four weeks.

Regular online meetings in 2021 when travel restrictions due to the pandemic were still in force mainly served to getting to know to the involved partners, understanding their work environment, the context of COVID-19 pandemic in their country, as well as imparting knowledge about SORMAS. Starting in 2022, regular online meetings covered among other aspects (e.g. bureaucratic topics such as budget, reporting, procurement of hardware and so forth) discussion, planning and preparation of PoE SORMAS trainings, too. This included providing a French and an English version of HZI's SORMAS user manual.

Partners involved in trainings to implement SORMAS at PoE were INHP in Côte d'Ivoire, and EDCD as well as WHO in Nepal. Beforehand, the beneficiaries themselves – equaling the partnering authorities (INHP and EDCD) – had chosen the relevant PoE that should implement SORMAS and trained for its use.

Training at these dedicated sites, at respective country borders was meant to be given to the corresponding “poste de contrôle”/ health care worker(s) at border crossings or (air)ports. For Côte d'Ivoire, the selection was the international airport Abidjan, the autonomous port of Abidjan, the port of San Pedro, as well as the control point or control station in Noé, in Laleraba & Pogo (also known as Ouangolodougou), in Ouaninou, and in Takikro (also known as Bondoukou). Côte d'Ivoire has borders to five countries (“Burkina Faso 545 km; Ghana 720 km; Guinea 816 km; Liberia 778 km; Mali 599 km”) (4). Besides its border to China, Nepal has



20 border crossings to India (5). Out of these, four are located in one of the two piloting provinces of CORESMA project: Sudurpaschim province.

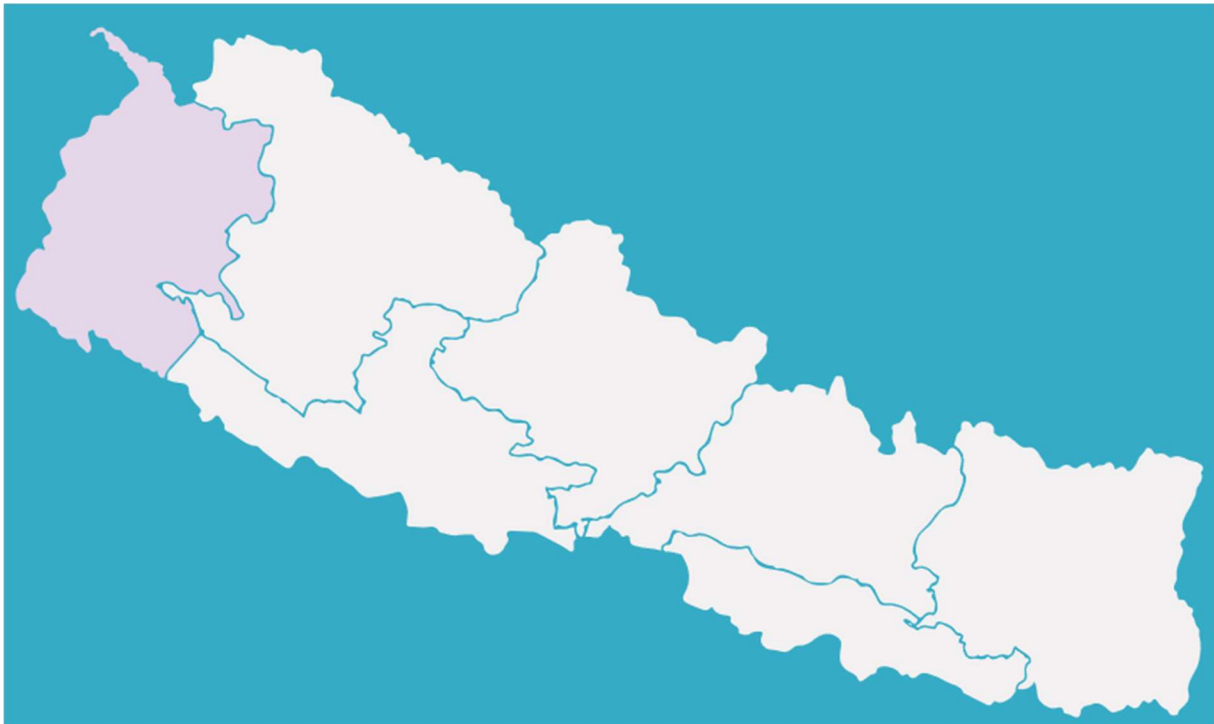


Fig. 1: Map of Nepal with Sudurpaschim province in the far eastern part of the country, highlighted in purple (3)

Based on the workload and flow of migrants at ground crossing borders, EDCD decided for two of the four PoE to train their health care agents in SORMAS.

3. Results

The SORMAS trainings at PoEs were carried out by local trainers of INHP in Côte d'Ivoire and by local trainers of EDCD and WHO in Nepal. The PoE trainings took place in November 2022 in both countries.

For Côte d'Ivoire, INHP trained the health workers in charge of the following PoE:

- International Airport of Abidjan
- Autonomous Port of Abidjan
- Port of San Pedro
- Noé
- Laleraba & Pogo (also known as Ouangolodougou)
- Ouaninou



- Takikro (also known as Bondoukou)

For each of the control points or control stations named one to two health workers/ staff members were trained in the use of SORMAS in mid-November 2022 (14-18 November) at the premises of INHP in Abidjan. 12 health workers in total were then trained. Trainers were the Head of IT of INHP and a statistician of the epidemiological surveillance service department¹. Both had been trained themselves to become SORMAS trainers during a train-the-trainer course carried out online (due to travel restrictions) by HZI in 2021.

In the case of Nepal, EDCD trained health workers of two PoE at the border to India. These ground crossing PoE are located in Sudurpaschim province as demonstrated in figure 2. Health care agents in charge of the following PoE have been trained in the use of SORMAS:

- Gaddachauki
- Trinagar

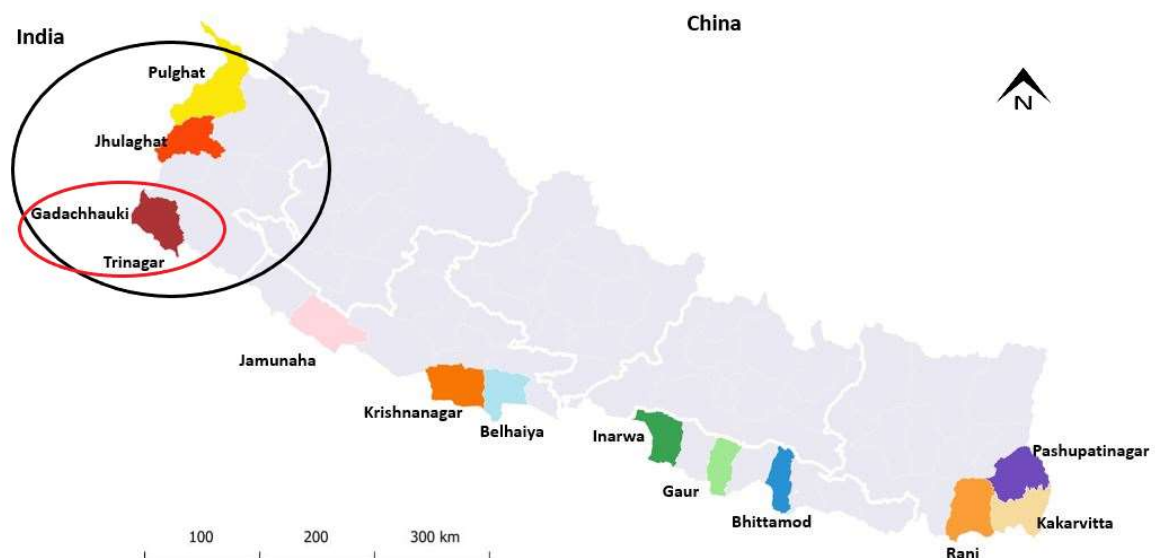


Fig. 2: Map of Nepal showing some ground crossing Points of Entry (PoE) between Nepal and India (5) with Sudurpaschim province circled in black and PoE trained in SORMAS circled in red

For each of the two PoE two health care agents/ staff members have been trained in in the use of SORMAS late November 2022 (29-30 November) in a provincial training center in Dhangadi, Sudurpaschim. Trainers were EDCD staff and WHO staff, all of which had been

¹ Service de surveillance épidémiologique.



trained themselves to become SORMAS trainers during a train-the-trainer course carried out online (due to travel restrictions) by HZI in 2021.

While the PoE training in Côte d'Ivoire did take place with health care agents from PoE only, the SORMAS training for PoE in Nepal was not exclusively held for health care agents at PoE but did include also other staff from the health care sector in Sudurpaschim province (e.g. laboratory staff, nurses, doctors and so forth). The total number of people trained was 26.

The PoE SORMAS training in Côte d'Ivoire did last four work days, while in Nepal it did last one and a half day stretched over two work days.

Each of the PoE health care agents in Côte d'Ivoire was given a tablet with SORMAS being installed and each individual did receive access with a separate, individual password. Participants of the PoE SORMAS Training in Côte d'Ivoire did start working with SORMAS at their workplace immediately after the training.

PoE health care agents in Nepal could not receive dedicated tablet with SORMAS being installed, due to procurement issue in 2022. Therefore, PoE and other health care staff in Sudurpaschim province did use their personal devices, e.g. a laptop computer to train for SORMAS usage. Procurement of tablets in a sufficient amount has been ensured only in 2023. Nevertheless, all participants did receive access to SORMAS with an individual password after the training in late 2022. Tablets with SORMAS being installed to be used at the PoE in Sudurpaschim province were delivered to the respective health care agents later in 2023.

HZI did attend the PoE trainings in both countries in November 2022, giving an introductory presentation about SORMAS to the participants, sharing experiences from other countries and answering questions. Concurrently, the presence on site allowed for monitoring the respective training as well as gaining a deeper understanding of the health care workers context and their (but also the countries') needs.

4. Discussion

For each partnering country, the involved authorities did decide to enable health care agents for a holistic use of SORMAS. This means using SORMAS would not be restricted to register cases and contacts of COVID-19 infections, but for capturing cases (and contacts, if needed) of all available infectious diseases in SORMAS. This decision was taken in the course of 2022 as in both partnering countries COVID-19 pandemic was not as heavy anymore as in European countries at the same time. In order to leave health care agents not at the risk of losing their know-how and practice in using SORMAS it was decided to allow them using the application also for registering data of other infectious disease cases. In Côte d'Ivoire, the first series of interviews (WP4) of implementation research had even shown that health care agents of other piloting districts that had been trained earlier in using SORMAS did request to use the application for all diseases instead of using it for COVID-19 solely.

Therefore, the impact of SORMAS on the efficiency and the digitalization and interconnectivity with e.g. laboratories and other parts of the respective health care system could be of importance. Above all, in case of another outbreak of any infectious disease, all piloting



districts (Côte d'Ivoire) and all trained health care agents in the piloting provinces (Nepal) could instantly use SORMAS to manage the latter. SORMAS users are playing an important role in cutting infections chains and enabling the respective authorities and (local or national) governments to take decision (e.g. containment measures, vaccinations and so forth) in a timely manner (which has been successfully demonstrated e.g. in Nigeria (4)). Analyzing data in SORMAS can help governments make better and more informed decisions. SORMAS therefore can be a “guiding system” at PoE “for early detection and containment of epidemics” (1).

Currently, in Nepal infectious diseases can only partly be captured via the Early Warning, Alert and Response System (EWARS), implemented by WHO (2). However, in EWARS only a limited number of diseases is available and it is not possible to capture events, e.g. large weddings, anniversaries and so forth which can be super spreading events, which are of relevance in infectious disease surveillance contact tracing and outbreak management. Related actions to managing outbreaks, e.g. quarantine notifications cannot be managed with EWARS. Further to this, the epidemiological surveillance and the laboratory surveillance in Nepal are not interlinked, currently. Information from the community has to be gathered informally via media (more than 48% of inhabitants in Sudurpaschim province have access to radio, while less than 1% has access to internet (3)), health workers and the general public (word-of-mouth). Also, EWARS is an Indicator Based Surveillance System not armed to enable Event Based Surveillance. Information for the latter is collected based on the personal network and there is no database for recording. In case of events, actions taken are based on phone conversations.

SORMAS, however, is an Event Based Surveillance System. SORMAS to date is featuring “more than 40 diseases” (1) for surveillance, analysis and outbreak management while EWARS captures data for six diseases, only (2). Moreover, further infectious diseases can easily be added to SORMAS in case of need.

In addition, the broad variety of features available with SORMAS implies that it can fill the current gap in Nepalese surveillance, also by linking the epidemiological surveillance and the laboratory surveillance. SORMAS is enabling “digital data exchange in real time, even horizontally across national or regional borders” (1). Health care workers as well as officials in a Ministry of Health or other connected authorities are able to inform themselves about the status of an outbreak simultaneously.

In general, for piloting a software application or a method in a health care setting, it has to be taken into account that partnering countries will be having procedures installed that might be just different or less efficient but that have still to be followed throughout the piloting period. In the case of WP1 for the implementation of SORMAS this meant that all health care agents, be it in Côte d'Ivoire or in Nepal, did have to do “double work” as they had to continue taking down notes manually in a paperbook (Côte d'Ivoire) or making data entries in another software system (MAGPI in Côte d'Ivoire; EWARS in Nepal) as it was required by their authorities. Only after the piloting period, of course, countries will be able to make a decision towards or against the new application, in this case SORMAS.



Further to this, which addresses the motivation of using SORMAS, another factor has to be considered with partnering countries: the health care system, its structure, and above all its processes might vary from country to country. This can be affecting the whole project, e.g. when fluctuation or job rotation in one country is high in the Ministry of Health or its divisions or departments. This applies also to the degree of literacy with digital tools, e.g. for reporting to European Commission. Potential delays in projects as WP1 can also be caused by political-administrative systems. If one partnering country is organized centrally in its political structure and decision making, and another partnering country is organized decentrally, the latter will need more time for decision making and also for advocacy. This came into play in Sudurpaschim province in Nepal where PoE health care workers have been trained. However, as all seven provinces in Nepal are autonomous, having their own Ministry of Health/ health care authority with large decision-making power for their respective province, kick-ing off working with SORMAS was subject to the local authorities` judgement and decision. Despite having agreed to let their health care workers attend the training, unfortunately, there was no agreement to be obtained between EDCD and the local provincial health care authority to use SORMAS right after the training at the two PoE (nor at the hospitals or labs of which staff had been participating in the training). It has to be pointed out, that advocacy which is always preceding SORMAS training and roll-out, does need an even higher attention in countries with decentralized governance. Nevertheless, another factor comes into account, which is a frequent rate of job rotation in Nepalese authorities (on a provincial level) including departments of Ministries (on a national level). This means that advocacy meetings before implementing SORMAS in Nepal or a country ruled in a similar way, does need repetition time and again in order to ensure constant information and consent of current ministers, and other leaders in place. As this fact was unknown to HZI and other partners until late 2022, efforts by EDCD staff to ask Sudurpaschim province for approval on kicking officially of the use of SORMAS at dedicated sites, remained vain. Consequently, only PoE in Côte d`Ivoire did work with SORMAS from late November 2022 onwards.

5. Conclusions

While full implementation at the selected PoE was successful in Côte d`Ivoire, it cannot be called a success yet in the two selected PoE in Nepal.

Nevertheless, the decision to focus also on surveillance of COVID-19 (and other infectious diseases) at border crossings was right and justified, given also the recommendation by WHO to monitor COVID-19 “among travelers at PoE to countries” (5). The exchange of travelers between Nepal and India for instance was described as active and daily (5). As EDCD in a joint publication together with WHO did comment in their descriptive study involving analysis of routinely collected data: “Strengthening surveillance processes at PoE is needed” (5). Especially “during the early phase of the pandemic, the majority of COVID-19 cases were imported from the neighboring country India, due to the daily influx of travelers crossing over at the Indo-Nepal borders” (5, 6).



Hence, SORMAS training with two PoE was a first step and with the experience from another piloting province (Gandaki) in Nepal repeated advocacy and further trainings could foster the approach of Nepal to strengthen surveillance at PoE for future pandemics.

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