Report on SMART Essential trainings for DOPAM and Viet Nam SMART network

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Editorial note

The development and publication of this guideline is supported by the Programme on Conservation and Sustainable Use of Forest Biodiversity and Ecosystem Services in Viet Nam. The programme is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH together with the Vietnam Administration of Forestry (VNFOREST), and commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ).

The document is developed in a joint effort of leading national SMART experts and officials from Department of Protected Area Management (DOPAM), Vietnam Administration of Forestry (VNFOREST) and is part of the set of 8 technical guidelines which are: (1) Guideline for management and operation of SMART equipment; (2) Guideline for installation of SMART Desktop; (3) Guideline for installation and use of SMART Mobile; (4) Guideline for installation of Google Earth; (5) Guideline for importing data from GPS to PC; (6) Guideline for downloading and installation of QGIS; (7) Guideline for installation of MapInfo;1. Guide (8) Guideline for using GPS. These guidelines are sent together with SMART equipment to selected PAs which received the equipment support from the project to provide key instruction on installation, configuration, uses, and management of the equipment.

Along with harmonisation of terms used in Vietnam for SMART application, standardisation of the SMART data model and other capacity building activities, the set of guidelines is part of a larger effort of VNFOREST and GIZ in 2021 to strengthen the standardised and competent roll-out of SMART application across PAs in Vietnam. Improved monitoring and reporting on the status of protected areas contribute eventually to effective and efficient management and biodiversity conservation across protected areas in Vietnam.

EXECUTIVE SUMMARY

Spatial Monitoring and Reporting Tool (SMART) is a tool designed for measuring, evaluating and improving the effectiveness of law enforcement patrols and site-based conservation activities. It has been designed to improve management effectiveness. SMART offers a suite of best practices designed to efficiently collect, storage, analyze and evaluation of data on; patrol efforts, patrol results, human activities, flora and fauna observations, and natural features. The SMART approach allows a conservation/protected area manager to identify spatial and temporal trends in threats where attention is needed, helps empower staff, and provides useful feedback to ranger teams and management.

As part of the process of developing a national standard approach for implementing SMART in Vietnam, and to build capacity for the use of standard data models and reporting tools, GIZ-Vietnam organized a three-day SMART essentials virtual training workshop during 12-14 October, 2021. The course aimed to build the capacity of government and NGO staff in core SMART skills, and provide them with resources to support further training of protected area staff.

Twenty-nine participants in the training included DOPAM Central staff, protected area staff and conservation practitioners from NGOs. The workshop was taught by Dr. Antony Lynam, Mr. Bui Xuan Truong, Ms. Nguyen Thuy Linh, and Mr. Phung Khanh.

The training schedule included the range of core topics required by SMART users; how to download software and install backup file of the database, data model configuration, SMART Mobile data collection, query and summary building, design and formatting of SMART station and protected area reports, how to manage and archive files on the computer, and introduction to use of SMART Connect as a networking solution. A set of digital training materials including software, the training handbook, presentations, and additional resources were distributed via Google Classroom and Zalo app to the participants.

Overall, at least 76% of participants agreed or strongly agreed that SMART is useful for protected area data management, analysis, reporting and adaptive management, that their skills with SMART software had improved with the training, and they were able to use SMART in their work.

RECOMMENDATIONS

1. DOPAM has agreed to test the SMART standard data model and report forms at a set of pilot sites. Staff participating in the training can assist with the introduction of the data model and report forms.
2. It is important that conservation NGOs support the piloting process and allow DOPAM to lead the process. GIZ can encourage the NGOs to provide technical support to sites they engage with. GIZ can provide direct support for pilot sites not supported by NGOs by providing training, guidance documents and technical support.
3. GIZ has now provided basic training to protected area staff to build their capacity for using the SMART tools. Building capacity for SMART is an ongoing process so it should be important to identify a set of next steps for the SMART training programme including; refresher basic training for all protected area staff, advanced network administration with SMART Connect, designing surveys with SMART Ecological Records.
4. Once SMART has been adopted and integrated into the cycle of adaptive management in the Vietnam protected areas, the SMART system can be upgraded to the upcoming new version 7. SMART 7 includes a default Vietnam language option which may help complete uptake of the system across the network.

TABLE OF CONTENTS

LIST OF FIGURES

INTRODUCTION

The Spatial Monitoring and Reporting Tool (SMART – www.smartconservationtools.org) has rapidly become the global standard for protection monitoring and management and presently SMART is used in more than 1000 terrestrial and marine conservation areas and 80 countries worldwide. The "SMART Approach" uses patrol monitoring data in management cycles that are aimed at step-by-step improvements in patrol quality. Effective data management is at the core of Law Enforcement Monitoring (LEM). The data needs to be maintained, analyzed and reported. All personnel involved in protected area management and conservation activities need to understand the data management procedures, and ensure it is adhered to.

Building on previous basic and advanced training courses, DOPAM together with GIZ hosted a SMART online training workshop. The workshop was organized by GIZ. The course brought together the network of users of SMART in Vietnam to learn SMART skills and prepare for a SMART database management training. This report details the outcomes of the training course and follow-up steps that are needed for the next phase of implementation of SMART by DOPAM and other users in Vietnam.

TRAINING OBJECTIVES

The objectives of the training were

- Update SMART users with the latest version of the SMART software and applications
- Enhance the capacities and competencies of SMART resource persons in Vietnam
- Streamline the training approach and approach for introducing SMART in protected areas
- Prepare instructors to teach SMART basic training to SMART users in the protected area and national / PA level data managers

EXPECTED OUTPUTS

Participants were expected to have the following competency as a result of completing the training:

1. Understand the use of LEM as a tool to support conservation area protection activities.
2. Configure SMART Mobile-equipped smartphones to collect relevant patrol data in the field
3. Collect patrol data using SMART Mobile-equipped smartphones and wirelessly import to SMART Connect
4. Be competent with the SMART data analysis (queries and summaries) and reporting functions including familiarization with how reports are designed for reporting by stations or the site.
5. Be familiar with centralized management of patrol data with SMART Connect.
6. Learn approaches to teaching SMART skills to others including use of online learning management platform (Google Classroom, Zoom, Zalo app)

TRAINING PERIOD AND VENUE

Three days online training course from 12-14 October, 2021 was held via Zoom Online Meeting (see in Annex 1).

PARTICIPANTS

The training workshop was taught by Dr. Antony Lynam and Mr. Bui Xuan Truong , Ms Nguyen Thuy Linh, and Mr Phung Khanh. The training was done in English language with interpretation into Vietnam language using Zalo app communications. Training participants included 1 Staff of DOPAM and 27 staff of conservation NGOS.

TRAINING MATERIALS AND SOFTWARE

The course employed the **Google Classroom** platform for sharing training materials. **Google Classroom** is a free online tool that aims to simplify creating, distributing, and grading assignments of the class. The primary purpose of Google Classroom is to streamline the process of sharing files between trainer and trainees. This was the first time participants had used this method of online delivery for training. The utilization of Google Classroom for the entire training was divided into sections as follows:

- Participant evaluation of training
- Overview: training schedule, security best practices.
- Presentations/materials for each days of training
- Support file of each module in the training
- Training handbook: handbook and manual glossary
- Software installation: SMART software and SMART Mobile application.
- Demonstration SMART Vietnam Training database including the standard national data model and sample report forms for stations and the protected area. The demo database included a set of dummy patrol data generated for the purpose of training.

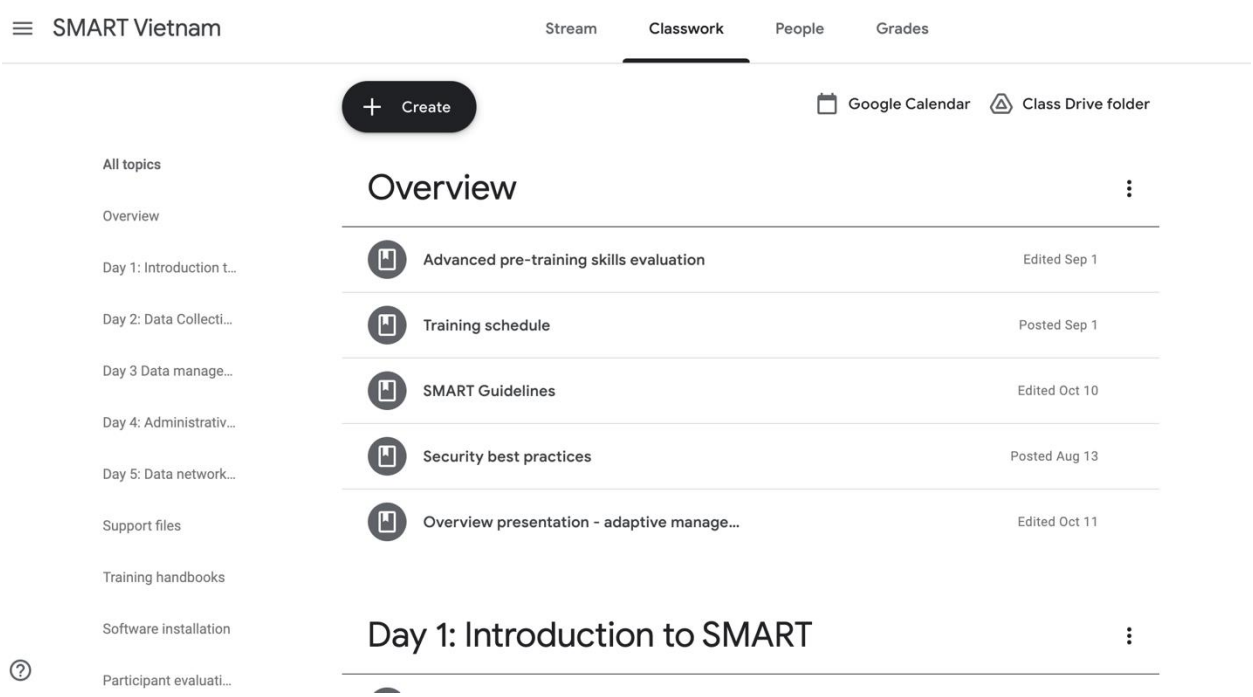

Figure 1. Landing page of the Google Classroom (English version) used to distribute training resources.

TRAINING FORMAT AND CONTENT

1. Downloading software and installing backup file of database
2. Data Model Configuration
3. SMART Mobile Data Collection
4. Advanced query and summary building
5. Design and formatting of SMART reports
6. Manage and archive files on the computer.
7. Introduction to SMART Connect usage.

Training consisted of online presentations, demonstrations using the SMART Vietnam Training database and some practice exercises where participants reviewed and were involved in learning about data models, configurable models for SMART Mobile with mock patrol exercises to collect data, and importing data from device to the database, analysis process (query and summary), SMART report design, and SMART Administration, as well as SMART Connect. The detailed descriptions of the training modules and skills associated with various SMART tasks presented in this training is given in Annex 2.

DATA MODEL AND CONFIGURATIONS

The SMART Vietnam standard data model was developed to meet the needs for protected area management across the network. Configurations of the full data model (configurable models) were designed for different purposes such as law enforcement, biodiversity monitoring and wildlife health/ disease monitoring. This training presented the finalized national data model which was approved by DOPAM. Participants learnt the categories and

attributes of the data model and configuration and learnt how to edit CyberTracker and GPS profiles in the configurable models.

SMART MOBILE DATA COLLECTION

SMART mobile is designed to improve the efficiency of collection of data in the field, and eliminate the need for manual data entry as data can be directly transferred from a mobile collection device into the SMART software. DOPAM will deploy Blackview rugged smartphones for field patrol data collection by ranger teams. Instructions on how to install the SMART mobile app on the device, how to collect data and then how to import it into the SMART desktop or connect.

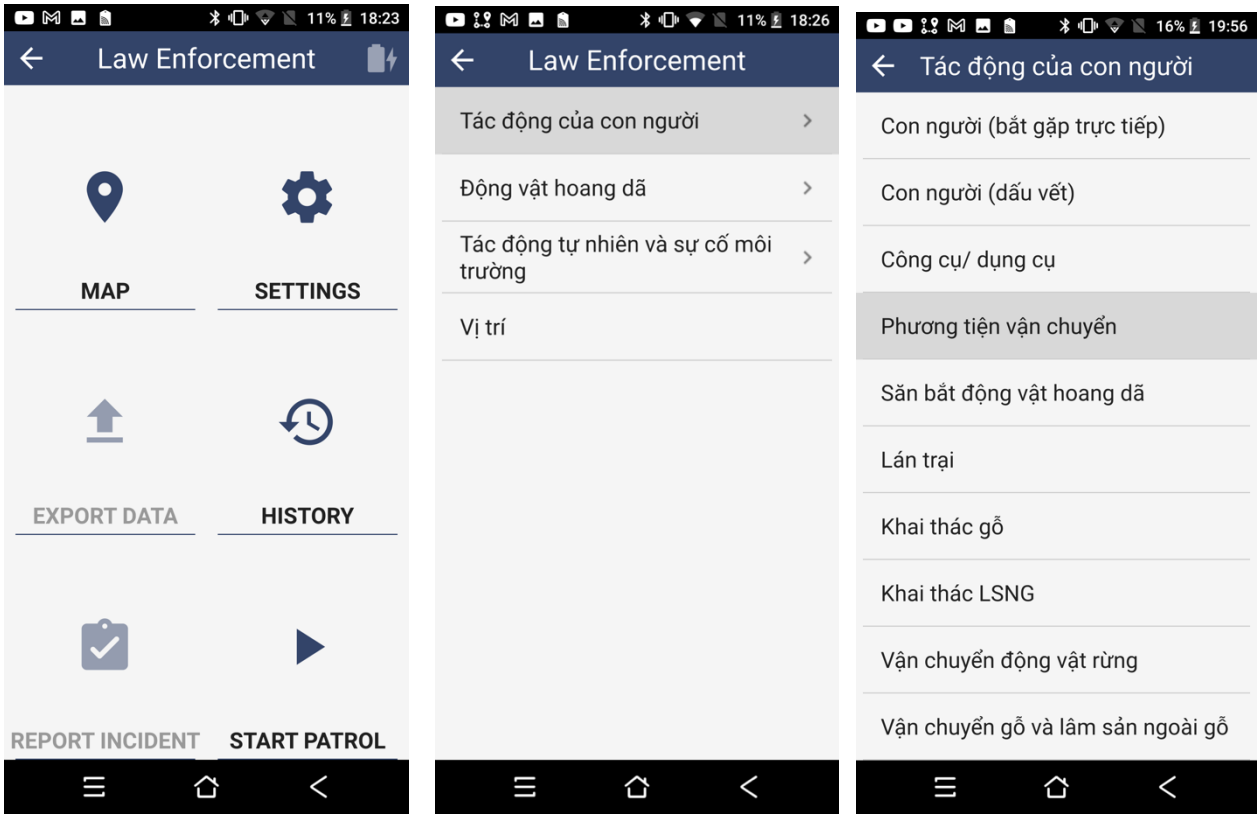

Figure 2. Design of SMART mobile interface with sample pages for field observation data collection.

SMART DATA ANALYSIS

Data analysis is an important component of the SMART approach. Queries and summaries are functions of SMART used to extract information from patrol data. A set of standard queries and summaries were created based on the information requirements for stations and protected areas. Instruction focused on how to select the queries and summaries to match the relevant questions about the data, how to run the queries and summaries, saving and deleting queries, exporting and importing queries and results of queries.

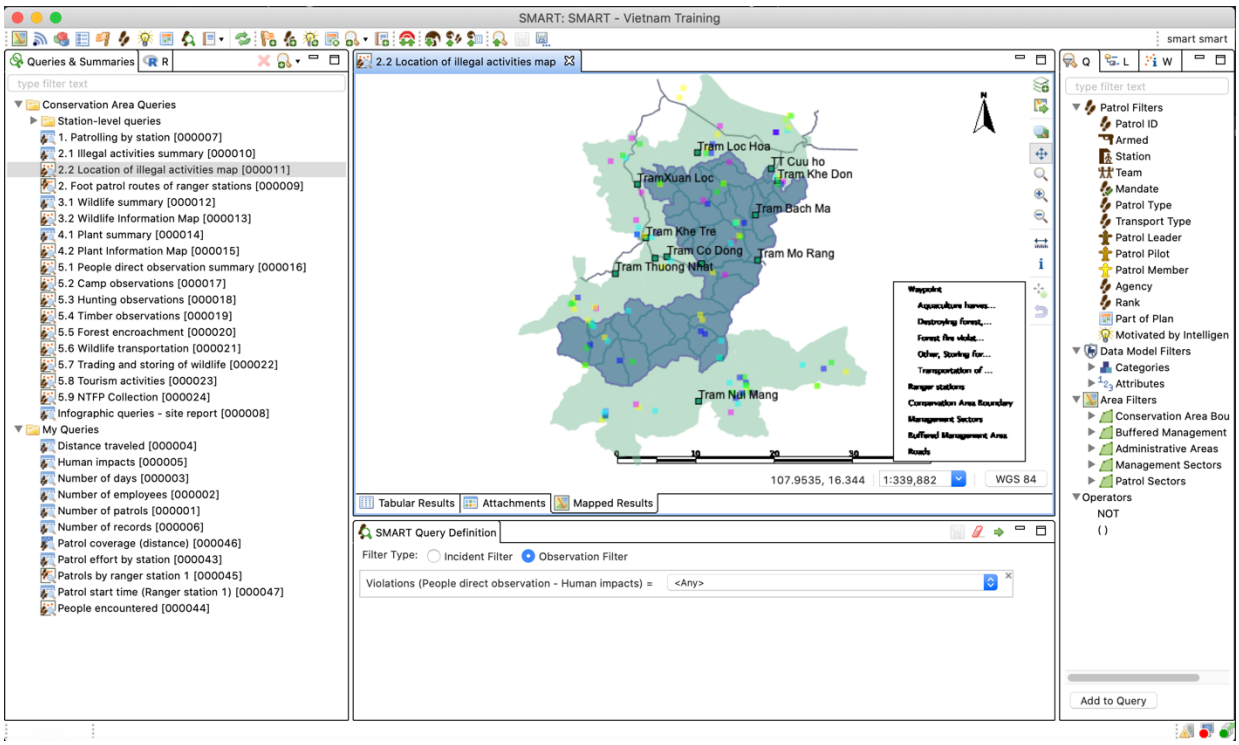

Figure 3- Demonstration and explanation on standard queries and summaries in the SMART Vietnam Training database.

SMART REPORTING

In SMART, standard reporting templates can be used to summarize key effort and results from law enforcement. For example, information from patrol-based monitoring is used to identify poaching hotspots and advise the deployment of field teams. Sample reports from KSWS, PPWS and SWS were presented and compared. A standard FiA SMART report is under development.

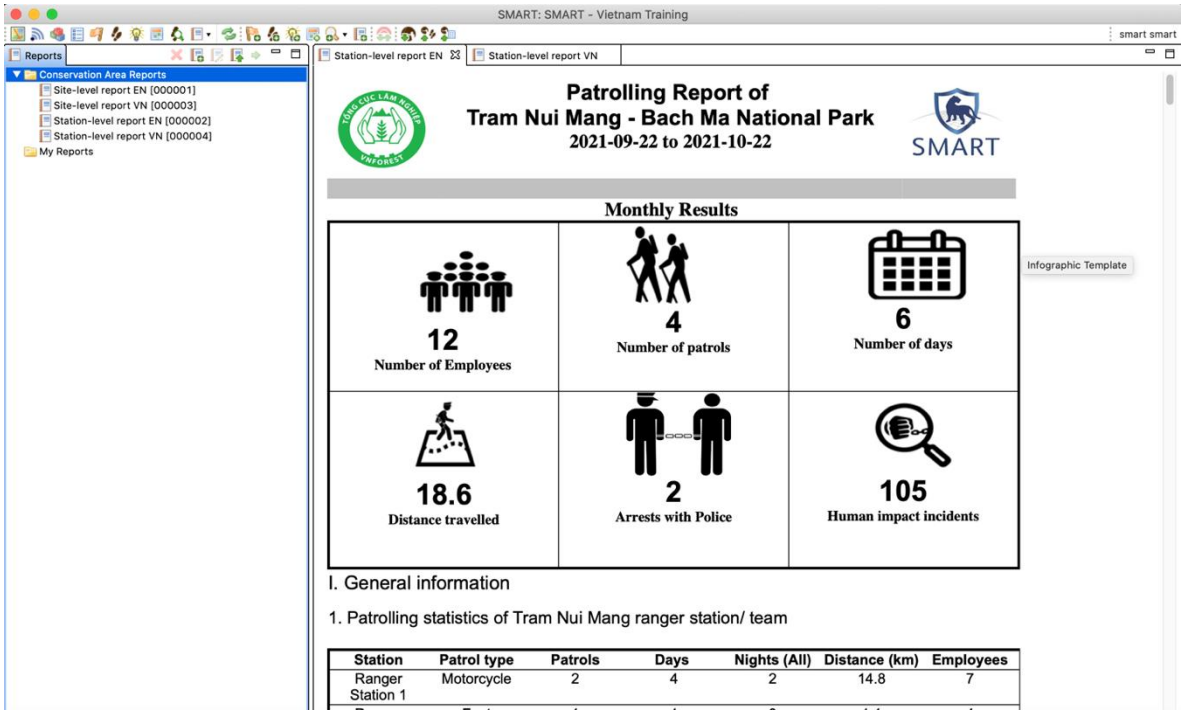

Figure 4- Sample station report showing infographic images effort table. The format for the reports was proposed by a technical working group which received inputs from the SMART user network.

SMART CONNECT

SMART Connect is a web application and an optional SMART plug-in that allow SMART users to store and manage data on a connected database. The database could be internal and held within an organization's servers or it could be connected across the web. Connect users can upload entire Conservation Areas complete with patrols, field data, queries, reports and all other associated data. SMART connect demonstration was presented on how to link SMART desktop to connect server, creating a user account, and showed the alert dashboard and setting up the alert. A practice patrol exercise was done to make observations of human activity, wildlife and natural features around the locations where trainees were joining the training.

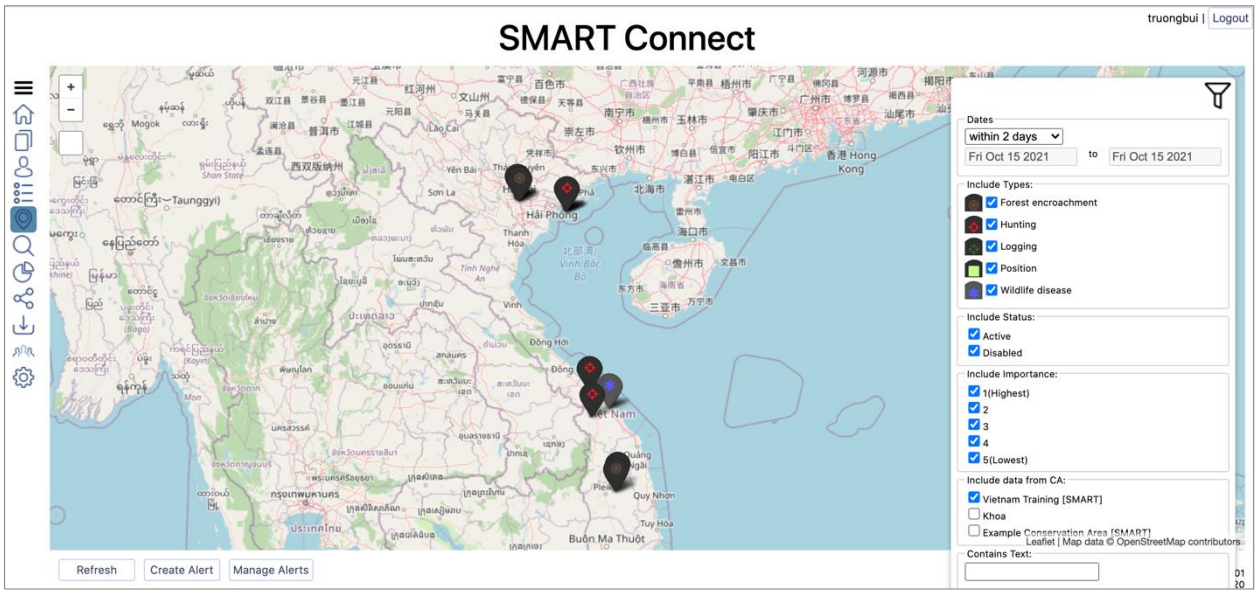

Figure 5- SMART Connect operational map showing the location of alerts triggered by teams of training participants doing their mock patrols.

TRAINER EVALUATION

The training was an opportunity for DOPAM staff and conservation NGO staff to advanced their skills using SMART, to learn the new proposed national standard data model and report forms, and to learn approaches for teaching and share experience of SMART usage to field based staff. The training included many users with little or no experience and a few users with extensive experience implementing SMART for specific purposes e.g. endangered species monitoring. The learning platform employed with our training included multiple online formats for sharing information (Google Classroom, Zoom) and individual follow-up and technical support (Zalo app). All participants now should be able to; 1) set up the conservation area database, and configurable model for mobile data collection tasks (law enforcement, research and monitoring), 2) upload the patrol package to the mobile device and collect data, 3) import patrol data into SMART, 4) run basic queries and

summaries, 5) run station and protected area reports, 6) manage and backup the SMART database, and 7) link SMART desktop to Connect server. It is expected that refresher training for this group should be done again in 6-9 months' time, and will include specific instruction on the upcoming soon to be released SMART 7 version.

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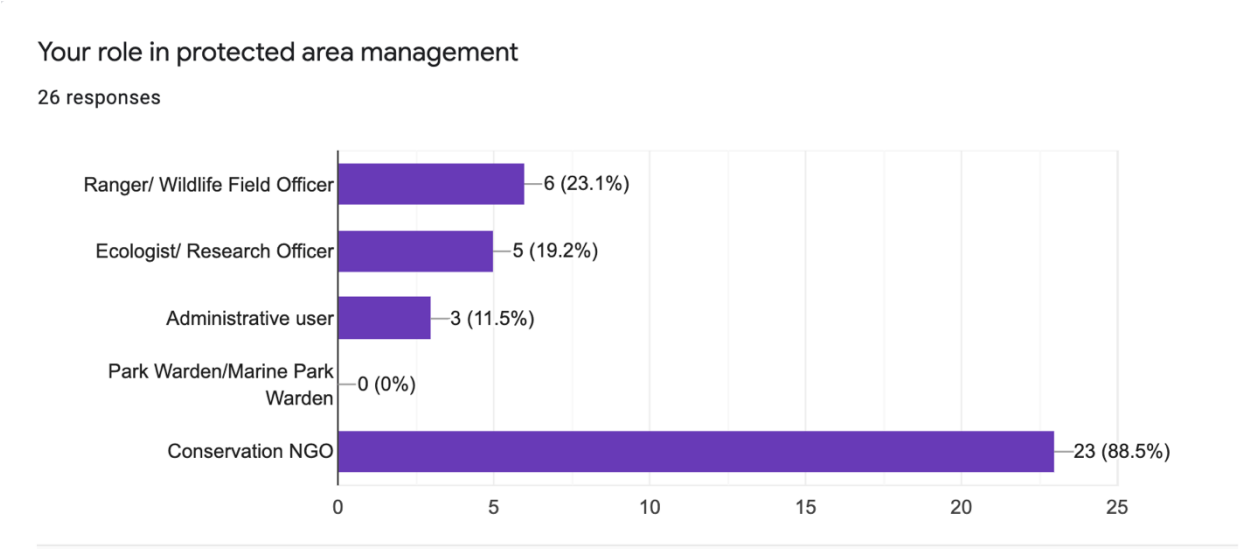
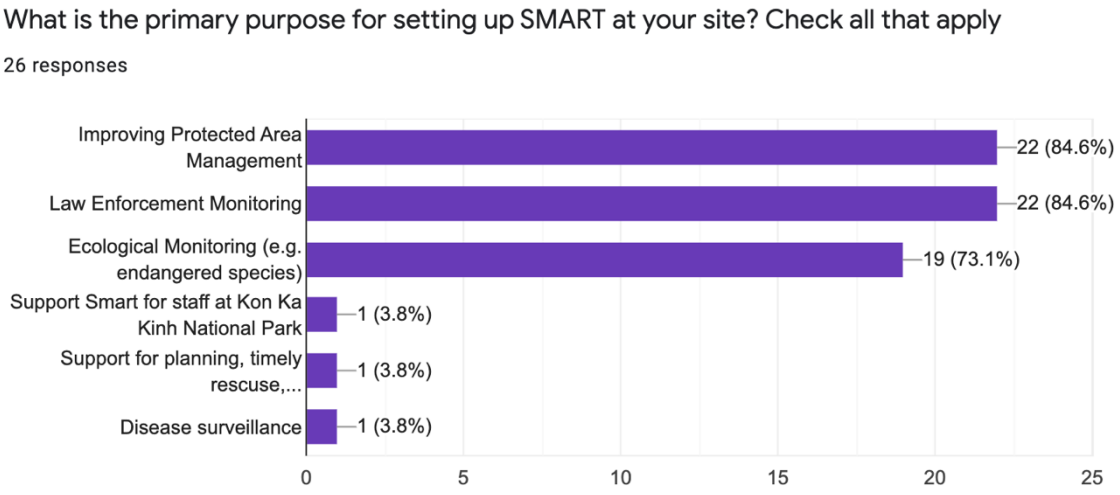
PARTICIPANTS EVALUATION OF THE TRAINING

An online training assessment was completed by the participants before and after completion of the training. Most participants (88%) were staff of conservation NGOs that support implementation of SMART in the protected areas, while 12% were government data administrative staff. Around a quarter had roles as rangers and 19% responded they had roles as researchers.



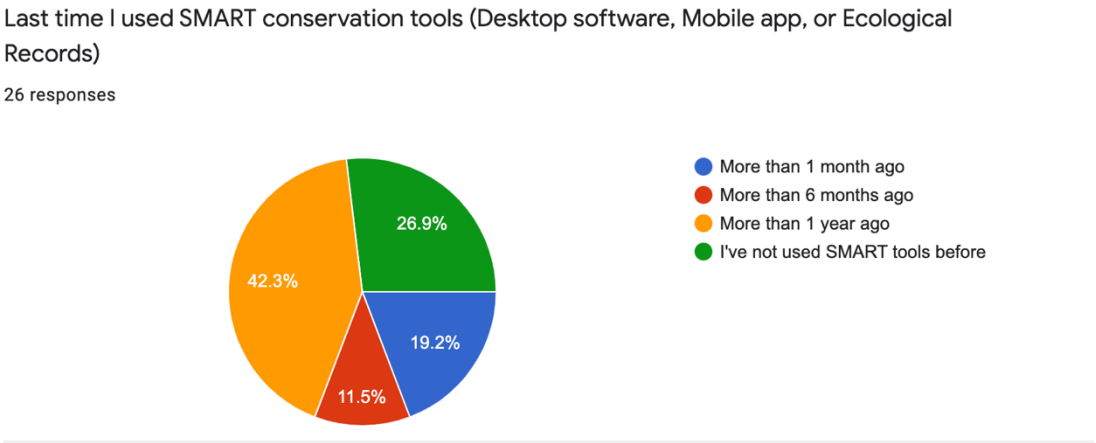
CURRENT USE FOR SMART

Participants mostly responded they are using SMART for improving protected area management (85%) or law enforcement monitoring (85%), ecological monitoring of endangered species (73%), with a few using SMART for disease surveillance.

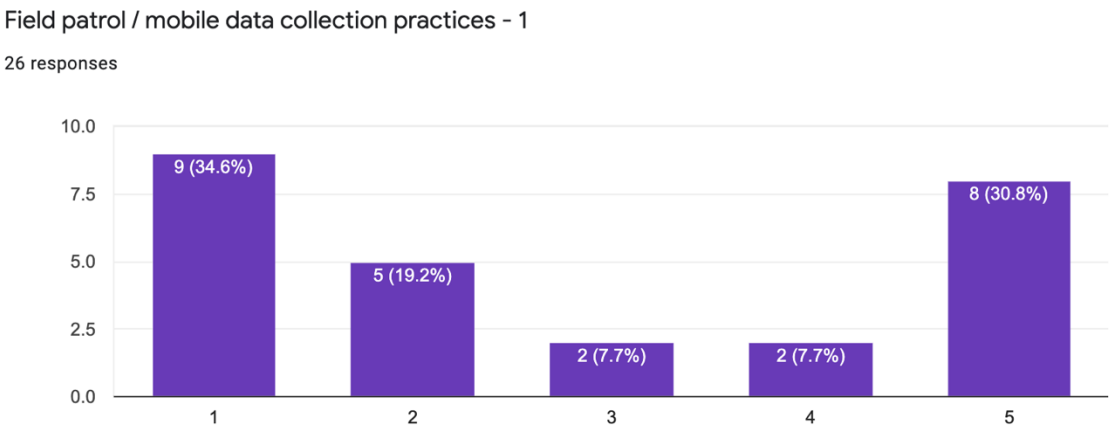


GENERAL INFORMATION FROM PARTICIPANTS

Just under a third of participants responded they had not used SMART before while 42% had not used SMART in more than 1 year. 12% had used SMART more than 6 months ago and 19% had used SMART more than 1 month ago.



Responses to the pre and post training evaluation were compared to assess the impact of training on skills levels in different areas. As an example below we see that before the training <38% of participants agreed or strongly agreed they were confident in using data collection procedures, designing and editing SMART configured data models. After the training the corresponding figure was 68%, suggesting an improvement of 30% (Table 1).



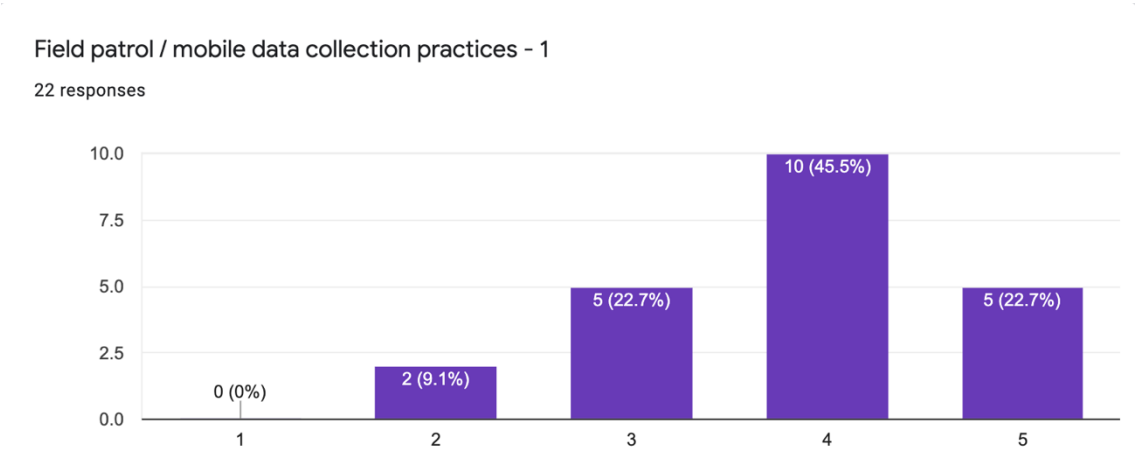


Fig. 1. Participant perception of skills level before (above) and after (below) training. Example is for field patrol/ mobile data collection practices.

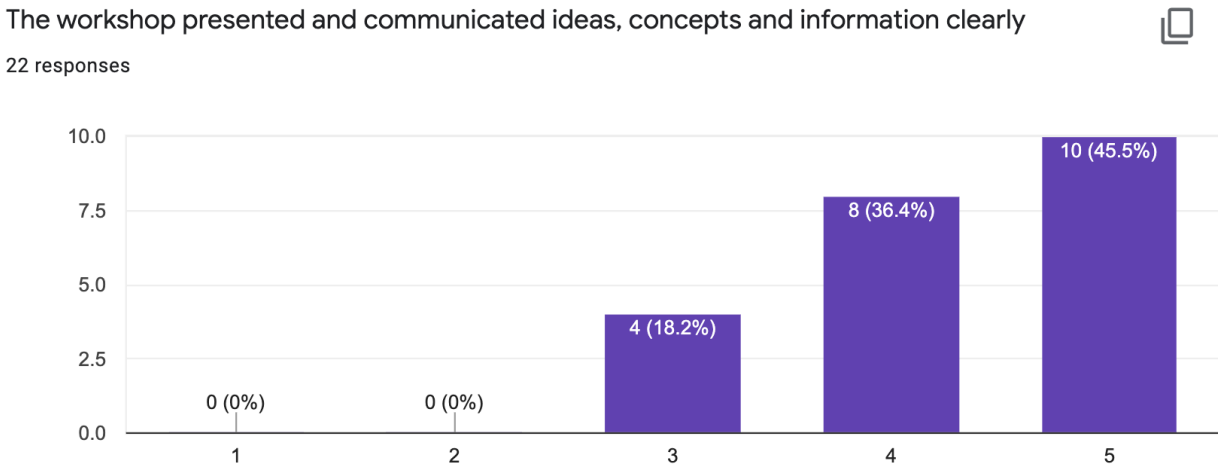
The self-evaluated improvement of skills with training ranged from 9 – 35% with data collection skills showing the highest level of improvement (individual skills 30-35%; overall 34%), data management (individual skills 10-28%; overall 33%) and data administration (individual skills 9-21%, overall 22%)(Table 1).

Table 1. Participant perception of improvement in skill levels due to training.

Skill area	Skill	Before training	After training	Improvement
Data collection 2	use of rugged handheld devices and the SMART mobile app for field data collection.	38	73	35
Data collection 3	importing patrols from SMART Mobile to the SMART database	42	77	35
Data collection 1	Using data collection procedures, designing, and editing SMART configured data models	38	68	30
Data management 2	designing queries and summaries to analyse SMART data	23	51	28
Data administration 1	create backup the SMART system, export the Conservation Area, change username and password, and assign roles to SMART users	43	64	21
Data management 3	creating formats for reporting on SMART data	27	41	14

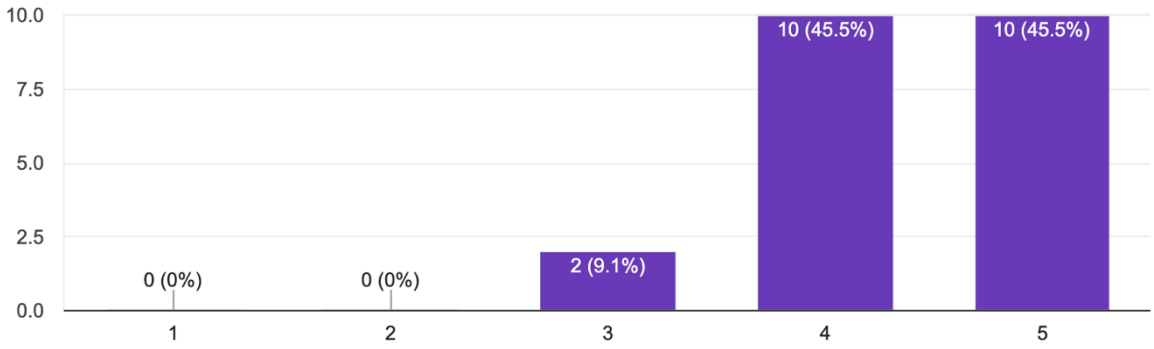
Data management 1	building SMART patrol data models, categories, and attributes.	38	50	12
Data management 4	using SMART reports to interpret where threats are occurring in the protected area, and to create patrol plans to set targets for field patrols teams.	31	41	10
Data administration 2	install the SMART connect plug-in, configure access using URL, username, and password, configure Connect on the mobile device through configured data model, download a conservation area from the Connect database	27	36	9
Overall	SMART mobile	38	72	34
	SMART desktop	35	68	33
	SMART connect	19	41	22

Post-training responses about the content and delivery of training



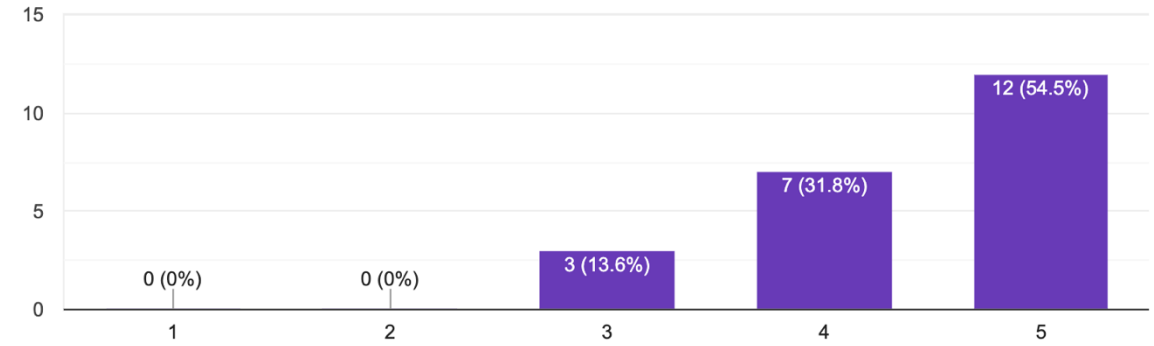
Questions raised during the workshop were adequately answered

22 responses



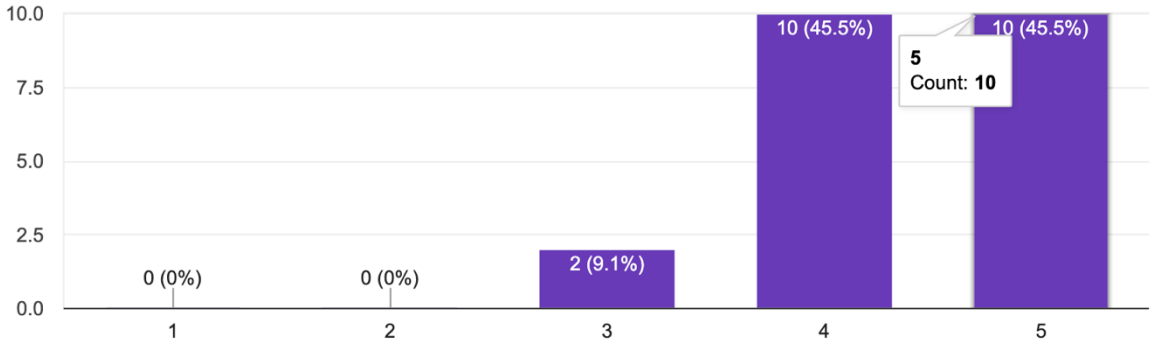
The workshop approach encouraged questions and participation

22 responses



There was a good interaction between the facilitators and participants

22 responses



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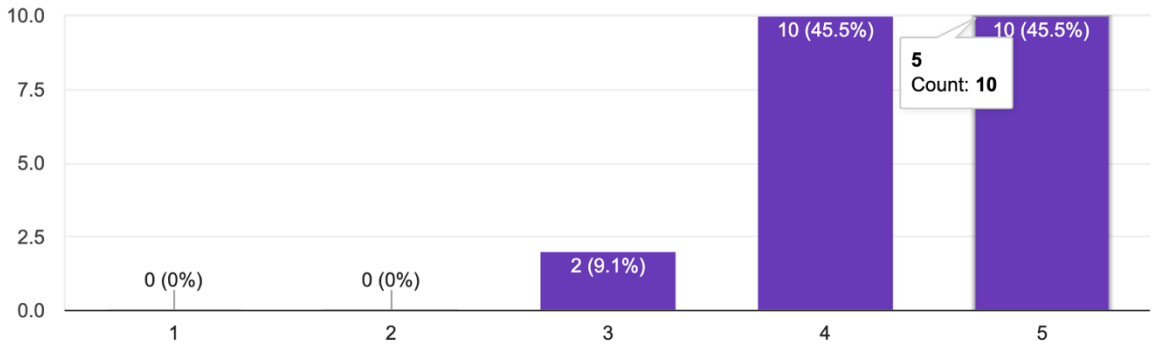
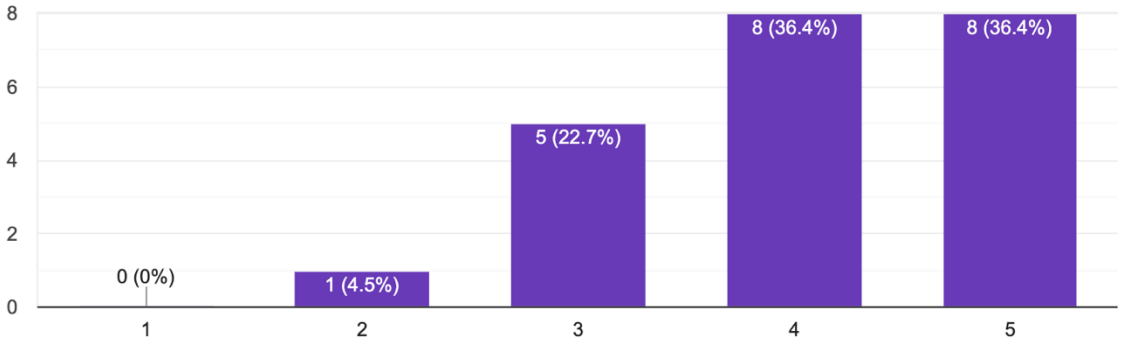


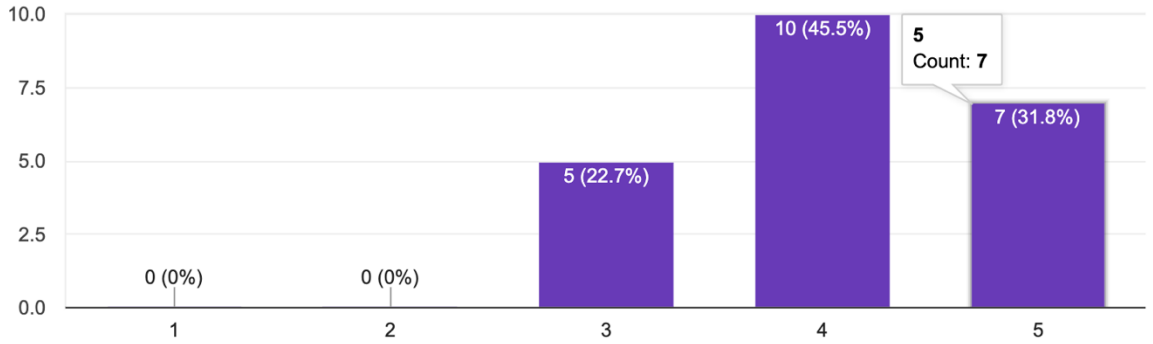
Pace of the workshop was appropriate

22 responses



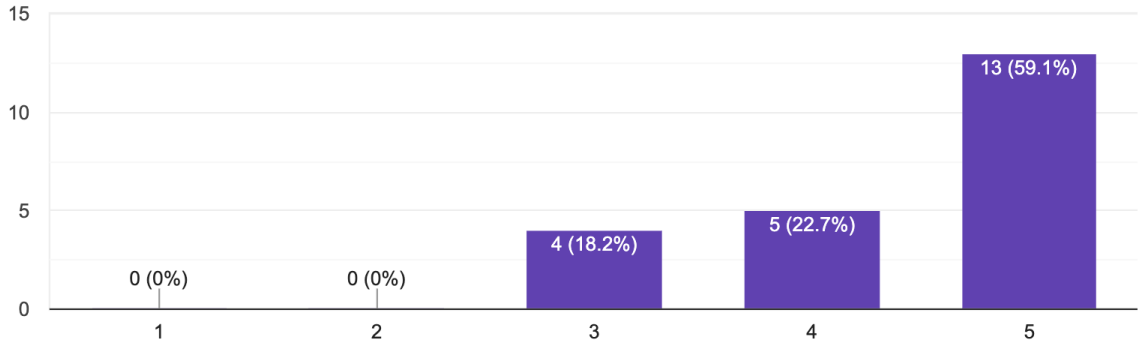
Duration of the workshop was appropriate

22 responses



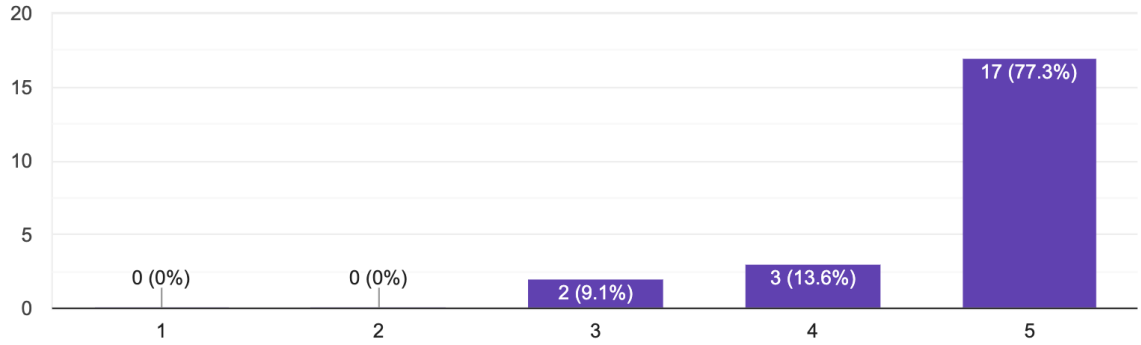
Illustrations, examples and datasets presented in class were useful

22 responses



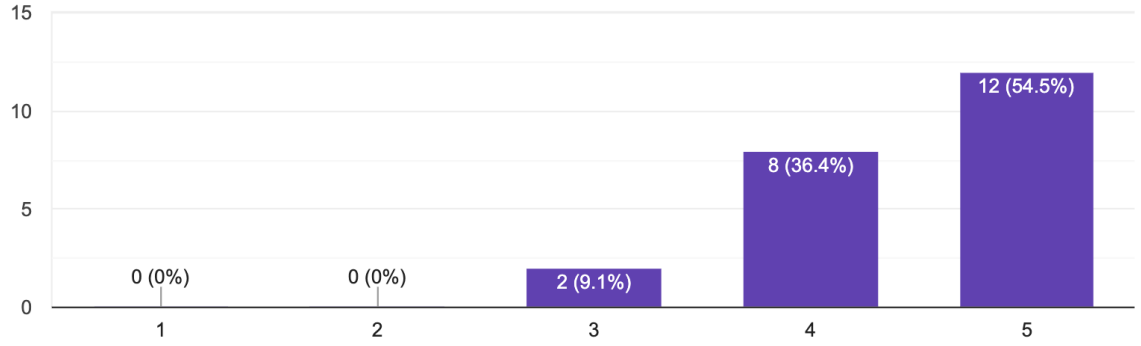
The training resources provided on the Google drive contained useful reference material

22 responses



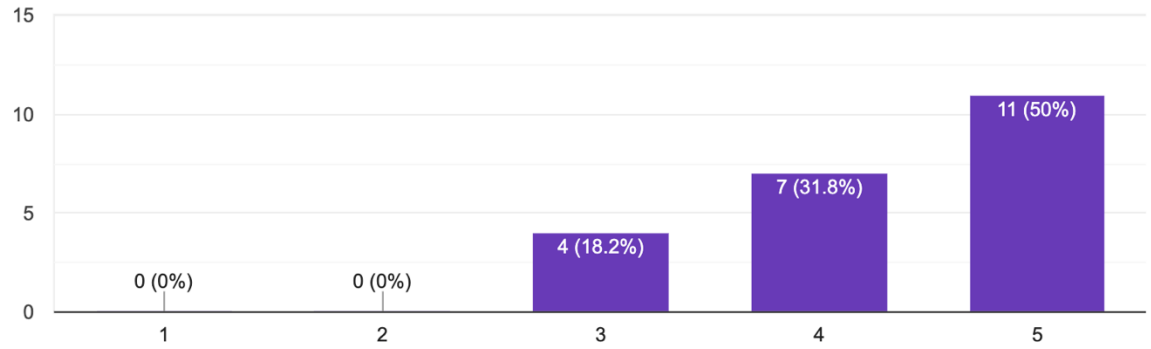
The practical exercises involving data collection and data transfer into the SMART database was useful

22 responses



Did the online delivery of the workshop meet your expectations?

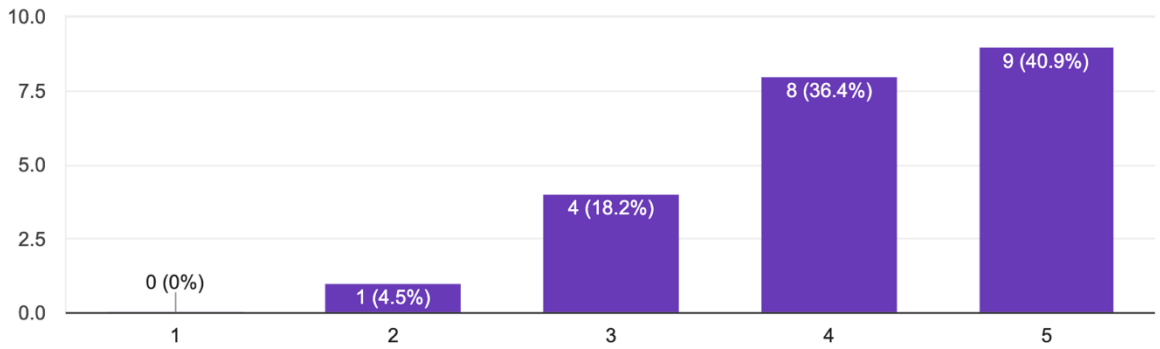
22 responses



OVERALL IMPRESSIONS OF THE TRAINING

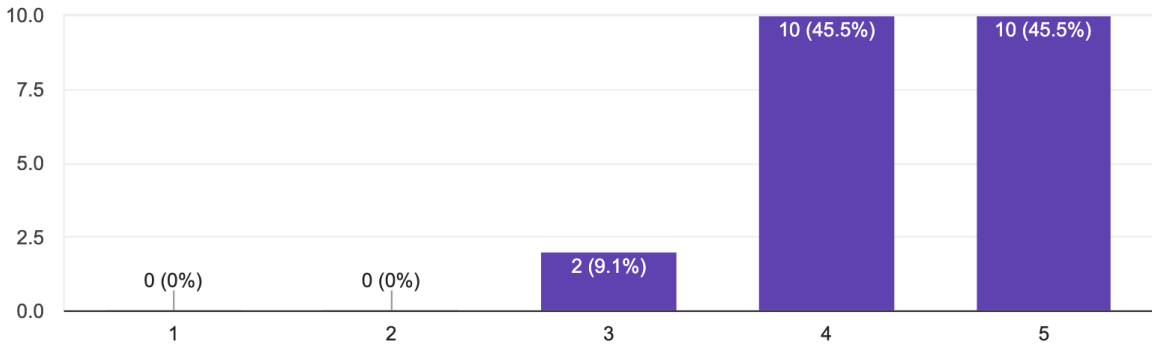
My skills with using the SMART software has increased as a result of what I learnt in the workshop

22 responses



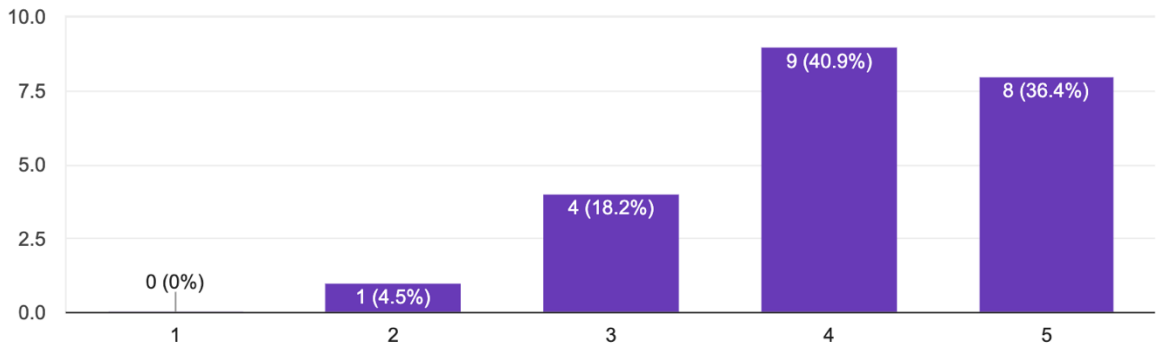
The SMART software tool is useful for protected area data management, analysis, reporting and adaptive management

22 responses



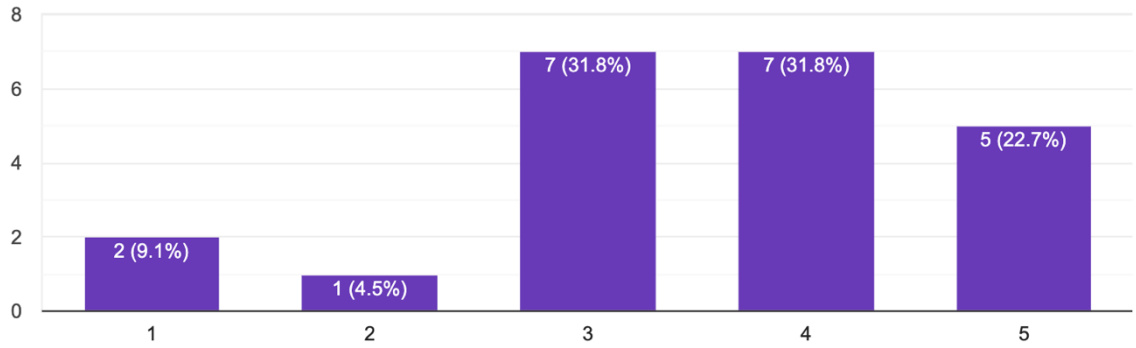
I can use the SMART tools in my work

22 responses



I feel confident to train other staff in use of the SMART tools

22 responses



ANNEXES

ANNEX 1: TRAINING SCHEDULE

Day 1: Themes – Introduction to SMART, data models, designing the conservation area, base maps, data collection with SMART mobile	
08:30-09:15	Participants login, welcome remarks, introductions and training outline
09:15-09:45	Presentation: Overview of SMART 6 desktop and connect – updates and improvements
09:45-10.15	Introduction of training manual and format for the training
10:15-10:30	**Break**
10:30-11:00	SMART national data model for Vietnam/ DOPAM
11:00- 11:30	Install the conservation area (CA) database from a backup[1]
11:30-13:00	**Lunch**
13.00-15.00	Overview of SMART Mobile for field data collection. Demonstration of SMART mobile data gathering plug-in and configurable model; GPS, Cybertracker and Connect settings
15.00-16.00	Self-guided field data collection exercise using SMART mobile equipped handheld devices (suggested 1-2hrs max)
16.30-17.00	Debrief from field exercise, question and answers, troubleshooting, importing SMART mobile data into SMART
Day 2: Themes – Data management with SMART mobile	
08:30-09:30	Managing patrol data**:** verification of data collected, correction of problems and issues.
09:30-10:15	Getting the information you want; basic analysis using queries and summaries, using the query wizard
10:15-10:30	**Break**
10:30- 11:30	Run the queries and summaries, see the results and interpret them
11:30-14:00	**Lunch**
14:00-15:00	Getting the information you want; creating, editing and formatting reports sample reports for fisheries law enforcement SMART national report formats for Vietnam/DOPAM
15.00-16.30	Self-guided practice running queries, summaries and reports and interpreting results

[1] For training new SMART users this section to cover the steps in setting up a database from scratch,defining parameters for the conservation area, patrol mandates, teams and transport types creating a basemap of the conservation area, add map datum, scale bar, north arrow and legend

16.30-17.00	Debrief from data analysis practice, question and answers, troubleshooting
Day 3: Themes – Patrol planning, administrative tasks for the data manager, making backups, SMART connect	
08:30-09:15	Debrief and feedback on the previous day
09:15-10.15	Patrol planning: setting targets for teams (spatial, numeric and administrative targets)
10:15-10:30	**Break**
10:30- 11:30	Networking and central management of data with SMART Connect Defining roles and actions in Connect Alerts map, visualizing queries and summaries
11:30-13:00	**Lunch**
13:00-15:00	Syncing desktop with Connect Database management (assigning user privileges, changing passwords, backing up the database, backing up data) Troubleshooting common errors in SMART desktop, SMART Mobile & Connect.
15.00-16.30	Next steps for SMART implementation - Planning for SMART database training with PA staff (Roles and responsibilities of trainers, Planning and scheduling for online/in person training) - Asking questions and getting help (SMART forum) - SMART 7
16.30-17.00	Post-training online evaluation

ANNEX 2: TRAINING MODULE

Module 1. Download SMART Software and Installing Backup File

***Content**:* This module covered how to download SMART software (version 6.3) from Google Classroom and also how to get it from www.smartconservationtool.org. Installing new SMART software, import the conservation area backup to SMART software, and preparing database.
***Competency**:* Getting software from online web and/or online storage, import conservation data backup to the new installation of SMART, and review on the patrol parameters as well as some core tasks of a basic database.
***Trainer's assessment**:* This is a core knowledge for all SMART administrators who are responsible for creating and managing a SMART conservation area (CA). Software download was assigned to be done before the training with additional instruction provided during the training session on Day 1.

Module 2. Data Model Configuration

***Content**:* Familiarization with the standard Vietnam national data model, categories and attributes, and add-ons. Demonstrate how to import the data model, editting categories and attributes, setting up options for field data collection, and editing the profile for SMART Mobile usage and GPS configuration.
***Competency**:* Know the standard Data Model of DOPAM, create a custom configurable model for field data collection, and understand the detailed usage options in the configurable data model process.
***Trainer's assessment**:* This is an important task for the data collector and data manager.

Module 3. SMART Mobile Data Collection

***Content**:* The SMART mobile plug-in allows users to directly import observational data recorded using a PDA or smartphone directly into SMART through a semi-automated system. The plug-in eliminates the need for manual entry of data into the SMART system. This module gives users an overview of how to install the plug-in and how to use the plug-in on a PDA or smartphone. Details of patrols are recorded including categories and attributes of data observations and associated images, waypoints and track data. SMART mobile is an advanced integration of CyberTracker with SMART. It has an improved user interface that permits use of both icons and text, Vietnam or English language.
***Competency**:* Review on the use of SMART Mobile -equipped smartphones for field data recording, uploading of configured models and downloading of patrol data, installing SMART Mobile software on the device, transferring configurable model package to smartphone devices, collecting data on the smartphone, exporting patrol data back to SMART database.
***Trainer's assessment**:* This is a core knowledge for SMART users responsible for patrol data collection and data entry. There was a practical exercise conducted by each participant with a mock patrol done to collect data. This data was then imported into the SMART database for subsequent modules on data analysis and reporting. After Connect settings were switched on in the configurable model a second patrol was done with data uploaded automatically to SMART via Connect.

Module 4. Advance Query and Summary Building

***Content**:* Learn about queries and summaries, a powerful tool that lets the user perform a wide variety of different analyses, for example define catch per unit effort statistics, and spatial distribution of threats, and export the results. The overall purpose is for users to extract patrol and observation information from the database. There was a standard set of queries/summaries defined for use within version 6.3. Knowing which queries to use can be understood using the Query Wizard.

***Competency**:* Familiarization with the set of standard queries/summaries for Vietnam protected areas. Use of simple observation query using patrol filters; creating compound queries using patrol filters; creating queries using data model filters; creating queries using spatial filters; understanding & changing query properties; saving & deleting queries; exporting & importing queries; creating simple summaries; and creating complex summaries. Users need to have an overall understanding of each query and summary type that can be created and how observation and incident filters can be applied.

***Trainer's assessment**:* This is core knowledge for SMART users whose task is data analysis for example staff involved in monthly patrol reporting, administrators and site managers. The queries/summaries were based around the types of reports that the working group determined should be used for stations or for the protected area. The queries/summaries reflect the set of questions of interest to managers.

Module 5. Formatting and Designing SMART Report

***Content**:* Presents the overview of populating a SMART report for a station or protected area. SMART reports are highly configurable and allow for a wide range of standardized reporting. The information on the reports can be dynamically generated based on the results of SMART queries and summaries. A major component of SMART is its mapping ability, and SMART reports allow maps to be included and customized to suit the report.
***Competency**:* Demonstration on the overall functionality of the reporting module in SMART layout presentation of reports for station or the protected area including embedded images (logo etc.), tables and charts associated with summary queries, and maps associated with observation queries.
***Trainer's assessment**:* Generating reports is a task for SMART users whose task is data analysis and information management..

Module 6. Manage and Archive File on Computer

***Content**:* Learn administrative functions to ensure a productive working environment in SMART. During this module, you will look at the export/importing capabilities, backing up and restoring of a conservation area, along with other best practices that will ensure a minimal amount of downtime if there is power or computer failure.
***Competency**:* Changing your username and password; exporting and importing patrols; exporting the data model; importing a new common data model template for your sites; exporting and importing a conservation area; system backup; configuring automatic backups; backing up and restoring the database.

***Trainer's assessment**:* This is core knowledge for SMART users who are responsible for administering or managing databases.

Module 7. Introduction to SMART Connect

***Content**:* SMART connect is an optional plug-in that allows the SMART CA to be shared with other desktop users via a network. This allows for central management of patrol data across all conservation areas in a national or regional network. The CA and associated data, queries, and reports is uploaded to a cloud-based instance where it can be visualized via a dashboard interface. Settings can be configured with alerts which may be visualized on an operational map. Mobile devices may also be configured to upload track-log and observation data at predetermined time intervals.

***Competency**:* Configure SMART mobile settings for automatic data upload at timed intervals. Linking SMART Connect serves with SMART desktop username and password to upload the CA to server instance. Visualize the alert and observations on the operation map.

***Trainer's assessment**:* Participants conducted patrols and visualized alerts they created appearing on the Connect dashboard.

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