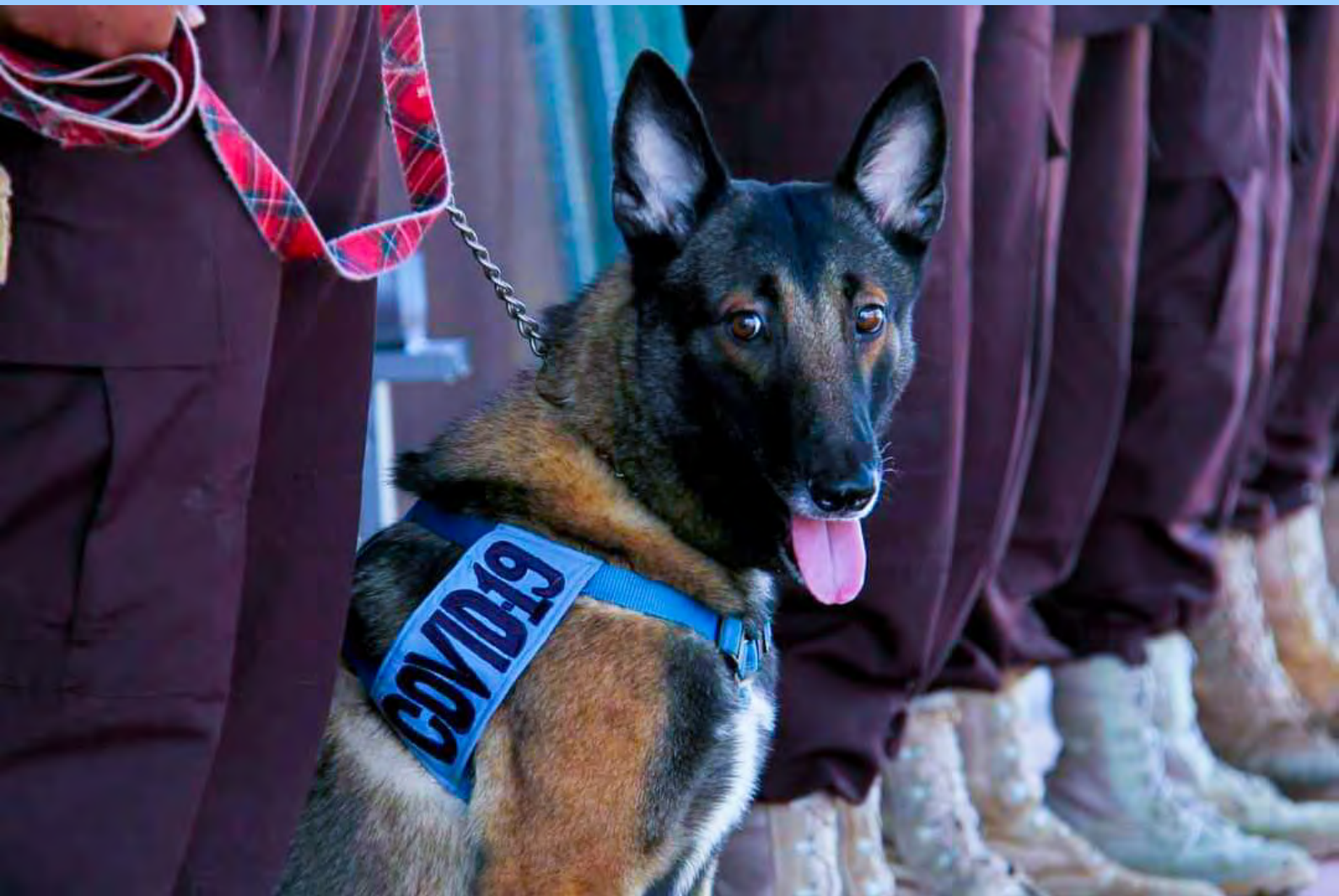


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CAMBODIAN MINE ACTION CENTRE

# ANNUAL REPORT 2021



Saving Lives and Supporting Development for Cambodia



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## GLOSSARY

ALIS	Advanced Landmine Imaging System
AP Mine	Anti Personnel Mine
APMBC	Anti Personnel Mine Ban Convention (Ottawa Convention)
AT Mine	Anti Tank Mine
AXO	Abandoned Explosive Ordnance
BAC	Battle Area Clearance
BAT	Battle Area Clearance team
BAV	Battle Area Clearance by Village team (pro-active BAC)
BC	Brush Cutters
BLS	Baseline Survey
CBAT	Community-Based Battle Area Clearance Team
CBD	Community-Based Demining Platoon
CBMRR	Community Based Mine Risk Reduction
CBURR	Community Based UXO Risk Reduction
CCM	Convention on Cluster Munitions
CMAA	Cambodian Mine Action and Victim Assistance Authority
CMAC	Cambodian Mine Action Centre
CMAS	Cambodian Mine Action Standards
CMC	Community Mine Clearance
CMVIS	Cambodian Mine Victim Information System
DFP	District Focal Point
DM	Demining Machine
DMR	Demining Robot
DU	CMAC Demining Units
EDD	Explosive Detection Dog
EOD	Explosive Ordnance Disposal
ERC	Explosive Remnants of War Clearance Teams
ERI	Explosive Remnants of War Intervention Teams
ERW	Explosive Remnants of War
GEJ	Good Earth Japan
GICHD	Geneva International Centre for Humanitarian Demining
GPR	Ground Penetrating Radar
GPS	Global Positioning System
HALO	Hazardous Areas Life-Support Organisation (HALO Trust)



HI-B	Handicap International – Belgium
HQ	Headquarters
ICP	Integrated Clearance Mobile Platoon
IDPs	Internally Displaced People
IED	Improvised Explosive Device
IMAS	International Mine Action Standards
IM	Improvised Mines
IMP	Integrated Multi-task Platoon
IWP	Integrated Work Plan
JICA	Japan International Corporation Agency
JICS	Japan international Cooperation System
JMAS	Japan Mine Action Service
LLD	Long Leash Dog
LR	Land Release
MA	Mine Action
MAG	Mines Advisory Group
MAPU	Mine Action Planning Unit
MDD	Mine Detection Dog/Short Leash Dog
MDR	Mine Detection Rat
MF	Minefield
MP	Mobile Platoon
MRE	Mine Risk Education
MRE-VA-PCD	Department of Mine Risk Education, Victim Assistance and Post Clearance
NGO	Non-Governmental Organization
NMAS	National Mine Action Standards
NPA	Norwegian People's Aid
NSSF	National Social Security Fund
NTS	Non-Technical Survey
PC	Provincial Coordinator
PMAC	Provincial Mine Action Committee
QA	Quality Assurance
QC	Quality Control
R&D	Research and Development
RCAF	Royal Cambodian Armed Forces
RGC	Royal Government of Cambodia
SHA	Suspected Hazard Areas
SIDA	Swedish International Development Agency



SLD	Short Leash Mine Detection Dog or see MDD/SLD
SOP	Standard Operating Procedure
SSA	Short Service Agreement
SVC	Safety Village Construction
TC	Training Centre
TCTP	Third Country Training Program
TIMA	Technical Institute of Mine Action
TNA	Training Need Assessment
TS	Technical Survey
TSC	Technical Survey for Clearance team
UN	United Nations
UNDP	United Nations Development Program
UNTAC	United Nations Transitional Authority in Cambodia
UXO	Unexploded Ordnance
WB	World Bank



## FOREWORD

It is my great pleasure to briefly introduce readers to the Annual Report 2021 of the Cambodian Mine Action Centre (CMAC). In the operational year 2021, not only did CMAC remove threats of landmines and UXO from the affected communities but also contribute to the socio-economic development in the post-clearance areas and to the infrastructural development for the country. All CMAC's activities ultimately brought about economic growth and poverty reduction on the whole. With those achievements, the Cambodian, especially those who live in or around the affected areas, have enjoyed living their lives with new hopes and prosperities.

In this report, the readers will see the key activities delivered by CMAC in 2021, ranging from the delivery of large-scale mine clearance to grassroots community, education activities, international training programs and corporate managements. All of those activities played very crucial roles in moving Cambodia forward to a new era of safety and prosperity and promoting Cambodia's prestige to the outside world.



The year 2021 commenced with the insurmountable difficulties posed by the COVID-19 pandemic throughout the country. There were 120,507 COVID-19 patients in Cambodia, and 3,012 of them died in 2021. Nonetheless, CMAC managed to safeguard its staff members from dying of COVID-19 even though 46 of them became infected. CMAC triumphed over the fighting against COVID-19 because all CMAC staff members abided by the directives from the Ministry of Health. More remarkably, all CMAC management and staff were prioritized by Samdech Techo Hun Sen, the Prime Minister of the Kingdom of Cambodia, to get COVID-19 vaccines so that they have had strong protection against serious illness and death. At the end of 2021, a number of 1,234 out of 1,446 CMAC management and staff got the third dose of COVID-19 vaccines, which was an accumulation of 85.33%, and the rest who did not get jabbed were due to some reasons such as allergy, chronic disease/illness, and pregnancy or plan for pregnancy. They will get jabbed later, though, when only allowed by the doctors.

In spite of the dire situation of COVID-19, CMAC managed to implement its humanitarian demining activities in accordance with the Integrated Work Plan 2021 (IWP-2021) and achieved favorable results, albeit a bit lower land clearance outputs than that of the workplan. CMAC achieved 101,040,252 m<sup>2</sup> of landmine/UXO contaminated areas throughout the country, which was equivalent to 88.92% compared to the annual target of 113,628,472 m<sup>2</sup> set out in IWP-2021.

Besides the disturb from COVID-19, there were some more reasons behind this shortfall. Some challenges such as numerous amounts of staff separation and retirees, environmental factors, heavy dependancy on donors, and dangerous nature of demining work were all contributed to impeding the clearance speed and productivities. However, those achievements were inevitably contributed to saving lives and supporting development for Cambodia, especially bolstering the Royal Government of Cambodia's ambition for the Kingdom of Cambodia's Landmine-Free by the end of 2025.

CMAC's work would not be possible without support from international donors, development partners, the Royal Government of Cambodia, Cambodian Mine Action and Victim Assistance Authority (CMAA), Provincial Mine Action Committees (PMAC), Mine Action Planning Units (MAPU), and local authorities. Therefore, I would like to take this opportunity to convey my profound thanks and gratitude to all these stakeholders for their continued support and cooperation with CMAC to combat against the legacy of landmine and UXO to save lives and support development for Cambodia. Moreover, I also wish to express my sincere appreciation to all CMAC management and staff for their ongoing dedication and commitment to removing threat, returning hope, and rebuilding a prosperous future for the Cambodian people.

**H.E. Heng Ratana**  
 Delegate of the Royal Government  
 in Charge as Director General of CMAC



## EXECUTIVE SUMMARY

CMAC's activities for a period of 12 months from January to December 2021 ranged from the delivery of large-scale landmine/UXO clearance to grassroots community education activities, community development assistance, international training programs and cutting-edge research.

The year commenced with the insurmountable difficulties of COVID-19 pandemic spread in the entire country. The Royal Government of Cambodia (RGC) thus imposed curfew prior to lockdown during that difficult time in efforts to call a halt to the spread of COVID-19 pandemic. Nonetheless, CMAC managed to conduct its tasks in terms of mine action activities in accordance with the Integrated Work Plan 2021 (IWP-2021) set out and achieved favorable results, albeit a bit lower land clearance outputs than that of the workplan.

CMAC field operations were successfully integrated by many types of demining tools—ranging from Mobile Platoons, Mine Detection Dog Teams, and Mine Detection Rat Teams to Demining/Brush Cutter Machines—so as to accelerate the clearance productivities. For a period of 12 months, CMAC was able to clear and release 101,040,252 m<sup>2</sup> of landmine/UXO contaminated areas throughout the country, which stood for 88.92% compared to the annual target of 113,628,472 m<sup>2</sup> for 2021. Those areas cleared and released included 60,035,136 m<sup>2</sup> of minefield areas, 35,831,367 m<sup>2</sup> of UXO-field areas, and 5,173,749 m<sup>2</sup> of areas cleared as so-called Survey and Spot Check for Safety without sketches.

Within the land areas thereof, CMAC teams found and destroyed a total of 88,803 items consisting of 17,293 anti-personnel mines, 337 anti-tank mines, 20 improvised-mines and 71,153 UXOs, collected 16,562 kg of small arms and 1,837,251 pieces of fragmentation, and responded to 3,752 emergency requests from local authorities and communities. The number of landmines/UXOs found and destroyed amounted to 88,803 landmines/UXOs, which is equivalent to 222.01% compared to the annual target of 40,000 items.

In addition to land clearance operations, CMAC also prepared for the underwater clearance operations. The Special Unit of Underwater Operations (SUUO), technically and financially supported by the US Government, was established by CMAC in 2013 in order to conduct the underwater clearance operations. Most of its achievements were the recent





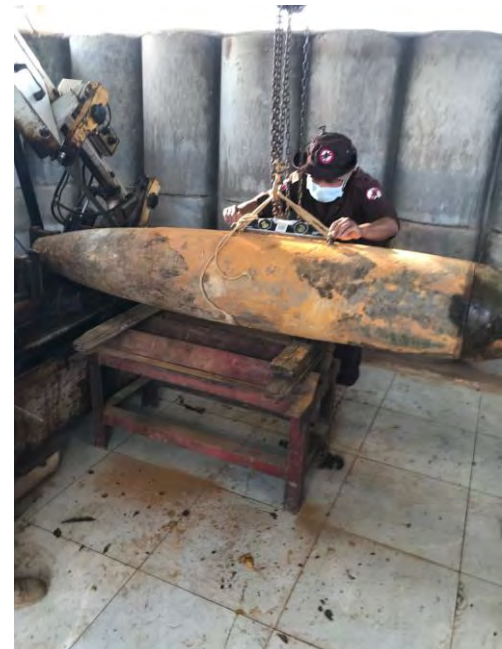
results of the operations in 2021 when SUUO gained trust from the government, particularly from the inter-ministries in charge of underwater clearance, to conduct the underwater clearance operations in the fourth site in the riverbed located in Boeung Krum Village, Boeung Krum Commune, Lvea Em District, Kandal Province. In the reporting period, SUUO found and destroyed a total of 51 items and 22 kg of small arms.

Not only does CMAC conduct detection, removal, and neutral of landmines, but it also does the same to UXOs. CMAC, in cooperation with Golden West, established the Explosive Harvesting Program (EHP) since 01 March 2005, aiming at collecting all types of UXOs from all CMAC DUs, Demining NGOs, and communities as well as defective bombs in the RCAF's warehouse and National Police's warehouse to be recycled into new explosives for using to explode any landmines or UXOs that cannot be unearthed, removed, or transported to unharmed places.

Since its inception from 2005 to 2021, EHP achieved eminent results such as cutting 42,278 ordnances, destroying 168,907 items of ordnances, recovering 209,985.57 kg of FFE metals and 76,111.1 kg of explosives, and producing 574,311 blocks of newly recycled explosives. Nonetheless, for a period of 12 months from January to December 2021, EHP was able to cut 2,975 ordnances, destroy 40,399 items of ordnances, recover 9,180.06 kg of FFE metals and 4,289.09 kg of explosives, and produce 37,500 blocks of newly recycled explosives.

In spite of the difficult context of COVID-19 that everyone was required to keep social and physical distancing, the experts of CMAC Dog Centre practiced self-quarantine and obeyed the Ministry of Health's directives of hygiene in order that they gathered to train the dogs. For a period of 12 months in year 2021, there were 157 dogs trained to be Mine Detection Dogs (MDD). Now, more than ever before, Dog Centre, in cooperation with the University of Health Science, spent 9 months training 12 dogs to successfully become the first-ever COVID-19 Detection Dogs in the Kingdom of Cambodia.

Technical researches in order for the enhancement of clearance speed and productivity were still prioritized, albeit in a difficult situation of the COVID-19 pandemic spread worldwide. CMAC Research & Development (R&D) teams, in cooperation with University, NGO, and Company from Japan, developed 4 different tasks in 2021.







The first one was the research and development on the capacities of the 6 sets of the Advance Landmine Imaging System (ALIS) in minefields and UXO-fields in Cambodia. This type of mine detection machine, provided by the Tohoku University of Japan, is dual sensors. In addition to detecting the objects under the ground by signaling the sound, it also has a screen attached with the machine to show the shape and type of the objects detected.

The second study was the cooperation with APOPO to evaluate the capacity of 20 rats before certifying their demining capacity as Mine Detection Rats (MDR). The research on the innovation of the Demining Robot (DMR) was the third task that CMAC R&D, in cooperation with the Innovative Operations System (IOS) from Japan, conducted in 2021. CMAC and IOS have innovated DMR by using air pressure to unearth landmines, UXOs, and other detected objects.



The fourth task was the research on Electro-Magnetic Shovel that CMAC R&D expert team invented itself. It differs from normal shovel in its ability to absorb the pieces of metal fragmentation when deminers dig it to where the mine detection machine signalises. With the Electro-Magnetic Shovel, deminers take less time to recognize whether the object is piece of metal fragmentation or landmine, or UXO. By virtue of its success and effectiveness, CMAC will use Electro-Magnetic Shovel to help deminers accelerate the speed of clearance in 2022.



On its mission of saving lives and supporting development for Cambodia, CMAC, in addition to land clearance work, also tasked the teams of Mine Risk Education (MRE), Victim Assistance, and Post-Clearance Development to conduct landmine/UXO awareness activities, help casualties, and enhance post-clearance development.

CMAC's MRE teams, in 2021, conducted a total of 17,214 courses of mine risk education messages for 565,359 households with 924,692 audiences consisting of 377,105 men, 407,047 women, 84,187

students (in-school children), and 56,353 out-school children. Those MRE courses were organized by CMAC Mobile Teams and the volunteer network such as CBMRR, CBURR, and National Police, gathering in communities, pagodas, schools, and households. After each course, there were more residents who became more aware of the danger of landmines and UXOs, hence knowing how to send message to CMAC, volunteer network, or National Police when they encountered landmines,



UXOs, or other suspected objects. As a result, CMAC received and responded to a total of 3,752 emergency requests from local authorities and communities.

Despite the effort to accelerate land clearance and MRE programs, the Cambodian residents still suffered both physically and psychologically from the presence of landmines and UXOs. For a period of 12 months in 2021, there were a total of 33 case of landmine/UXO accidents, causing 44 casualties, and 11 of them died, according to the Cambodian Mine Victim Information System (CMVI) of CMAA, and in that regard CMAC remains committed to cooperating with local NGOs as a linkage with donors to provide assistance such as financial support and community development to benefit landmine/UXO victims. Nevertheless, this casualty data decreased 32.30% compared to 65 casualties last year.



After removing threats of landmines/UXOs in the heavily contaminated areas, CMAC has also attempted to return hopes and rebuild a prosperous future for the Cambodian residents, especially the landmine/UXO victims, by providing the agriculture research & development and the community development assistance. For instance, in 2021 alone, CMAC Community Development Centre (CDC) provided agricultural trainings and produced 4,310 young plants, planted 125 trees, repaired a total of

45,250 m of rural roads, a total of 450 m of the broken dams, and one drainage, restored 50 m of canal with planting flowers, constructed 120 m of canals with planting trees along its banks and 2 ponds, and removed one drainage. All those achievements were to serve the people living in and around CDC, located in Koas Krala District, Battambang Province.

There were another two projects supported by the People and Government of Japan, contributing to community development in 2021: the Project for Integrated Mine Clearance and Landmine Victim Assistance, Phase I (PIMV-I), implemented in Pailin Province with the cooperation of the Crown Agents Japan Limited (CA) and the Safety Village Community (SVC) implemented in Banteay Meanchey with the cooperation of the Japan Mine Action Service (JMAS).





PIMV-I constructed a total of 4,579 m of rural and farm roads, 3 places of water cross structure, and a community market in Pailin Province, while SVC constructed 3,928 m of new rural roads, 5,162 m of canals, a drainage, and 3 community ponds, repaired 2,239 m of laterite roads, and filled 10,000 m<sup>2</sup> of soil in the school yard in Banteay Meanchey Province. Besides infrastructure improvement, CMAC project teams also focused on providing agriculture and animal husbandry trainings to the communities in the project areas in order that they would become skillful farmers. To reiterate, all achievements thereof have contributed to bettering the livelihood of the individuals and communities living both in and around the post-clearance areas.

There would be no operational achievements thereof without a combination of strong corporate management that regulated how much the operation teams could perform their tasks at the grassroots level. In efforts to accelerate the speed and efficient productivity of landmine/UXO clearance, all relevant entities simultaneously contributed their hard works to supporting the operation teams.

For example, Department of Human Resources Department managed the staff deployment in a well-maintained condition so as to respond to the need of the field operations. In 2021, there were 324 CMAC retirees sent to get retirement pension from the Ministry of National Defense. The retirement of staff members would have brought a drastic loss of field staff deployment unless the top management had prepared the solution in advance to deal with. In doing so, Human Resources Department imposed a so-called New Demining Expert program, a recruitment of adult children of CMAC demining experts to replace the retirees. The program selected 242 candidates to train to be demining experts. Besides, Human Resources Department also focused on staff trainings in order to refresh their knowledge and know-how as well as new skills.

Staff health was also prioritized by human resources management as well so as to maintain CMAC's efficient clearance productivities. Despite the 6 deaths, the health division of the department coordinated with hospitals throughout the country to successfully provide the total of 88 sick staff members with hospital services in 2021. More remarkably, 1,234 CMAC staff members throughout the countries got jabbed with the third dose of vaccines at the end of 2021 in order to develop immunity against COVID-19. Plus, the health division provided anti-COVID-19 medicines to staff who got slight infection by COVID-19 and coordinated with Ministry of Health to hospitalize 46 staff members who got serious infection. Fortunately, no CMAC staff members died of COVID-19.

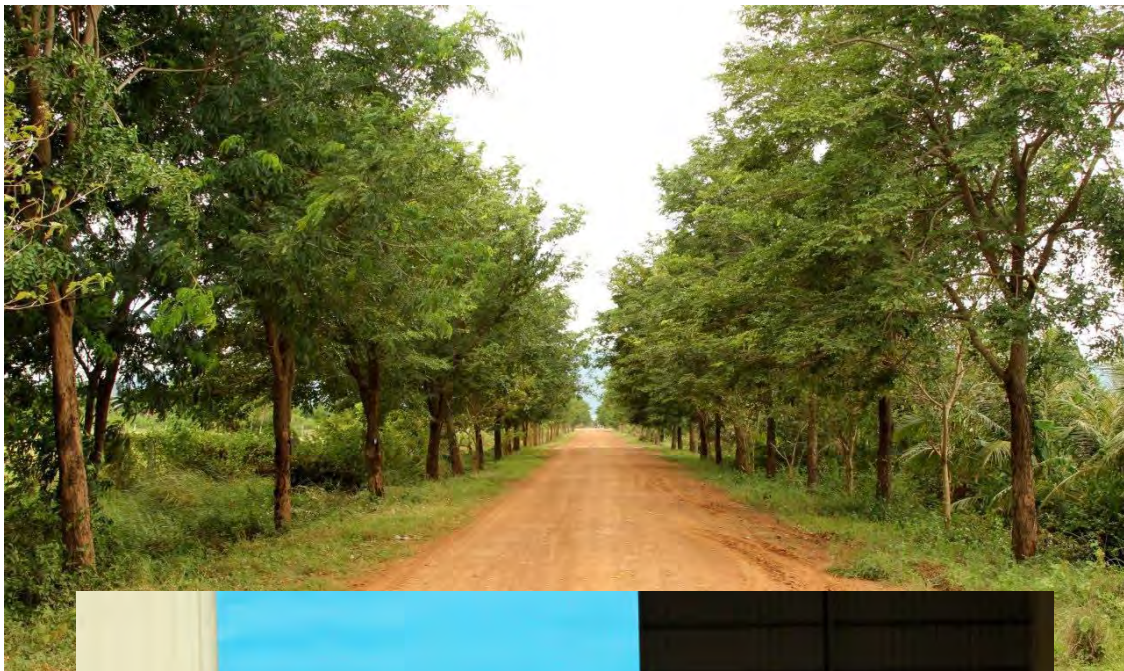


Department of Support also played important function in contribution to land clearance in 2021 since it could still manage to supply the operation teams with all equipment and logistical supports, albeit difficulties in transportation resulted from the curfew and lockdown of the country and the under-construction roads, particularly National Road 5.



In order to run the clearance operations smoothly, another inevitable need is the fund. The Department of Project Management and International Cooperation has been doing every effort to fund and monitor the projects. In 2021, the department gathered a total of 22 projects consisting of 15 bilateral projects, 3 bidding projects, and 4 contractual projects. Besides projects to support landmine/UXO clearance, the International Cooperation of the department, in the difficult situation of COVID-19 in 2021, also put effort to provide two types of online international trainings to UXO Lao: Information Management and Quality Management. The training program was called South-South Cooperation, financially supported by JICA, and aimed at exchanging experiences and sharing knowledge and know-how in mine action sector among the participants.

The good leadership of CMAC has undeniably relied on the Quality Management and Internal Audit since this function serves as a tool for top management in decision-making, prospective evaluation, and problem solving. Internal audit was also applied during the operational year on support services, operation function, and finance and found some deficiencies to correct for accuracy.





## 1. BACKGROUND

The presence of Explosive Remnants of War (ERW) problems in the Kingdom of Cambodia was undeniably on account of geopolitics of the region which ultimately resulted in internal political instability, thereby triggering the civil war in the country. The Vietnam War—and the US’s involvement—was the curse of Cambodia in no uncertain terms. In the war to support the South Vietnam, the US dropped millions of tons of bombs; however, the bombardment data have shown different figures by different sources.

The US used to officially release information for two times already about bombardment in Cambodia. The first was in 1973, stating that aerial bombs dropped in Cambodia amounted to 539,129 tons (about half a million tons). The second time was stated by President Bill Clinton in his official visit to Vietnam in November 2000 that the US dropped more than 2.7 million tons of bombs in Cambodia. The second release amounted to almost four times more than the first one. However, CMAC has recently looked up through the US Army Database namely “THOR Data Vietnam” and found that, between 22 June 1965 to 15 August 1975, the US dropped 4,038,265 tons of aerial bombs in Cambodia with 223,723 sites and 539,281 sorties.



That drastic bombardment resulted in an immense devastation for the Kingdom of Cambodia and thus led to the coup d'état in March 1970 by Lon Nol to overthrow King Norodom Sihanouk from the power as accused of involvement in the presence of the North Vietnamese troops in Cambodia’s territory to fight the South for integration.

Since Lon Nol led the state, it marked the change of Cambodia involvement in the Vietnam War, for he issued an ultimatum to the North Vietnamese forces to leave Cambodia, and from now onwards, the warfare in Cambodia escalated from day to day. In 1973, the proliferation of the rising Khmer Rouge troops started a military race for power from Kampuchea Republic Regime of Lon Nol. Inevitably, Khmer Rouge took complete control of Cambodia on 17 April 1975. Under the brutal leadership of Pol Pot, Democratic of Kampuchea became a fierce genocidal regime until Hanoi launched a major offensive in January 1979 in response to the Khmer Rouge incursions into Vietnam and the unfolding humanitarian crisis. This pushed the Khmer Rouge to the northwest region of Cambodia where they still continued to resist until 1998.

Even though the Khmer Rouge collapsed, the skirmishes had yet to end. The internal conflict for control of the country could be still unsolved, albeit historical general elections organized by the United Nations (UN) in 1993. Cambodia would have no complete peace and unity unless Samdech Hun Sen successfully applied his Win-Win Policy in 1998 to entirely cut off the roots of the Khmer Rouge political and military organization in Cambodia. During the internal warfare and skirmishes among those political entities, numerous amounts of ERW, especially landmines, were scattered all over the country.



Therefore, as a result of the US bombardment and civil war among its political groups competing for power over three decades, millions of indigenous people of Cambodia, both the involving and innocent residents, were physically injured, maimed, or killed, and the rests also have been psychologically suffered so far. Besides, all types of the country's infrastructures were badly damaged.

In spite of complete peace throughout the country in 1998, it did not mean that the Cambodian people would not be suffered anymore. In addition to mental suffering, they were injured, maimed, or murdered by the so-called hidden killers: landmines and unexploded ordnances (UXOs). This legacy of war has left Cambodia a big problem of landmines/UXOs which remains a constant threat to the safety and security of the people and a big hindrance for development of the country until these days.



Obviously, the landmines/UXOs casualties in 1979 amounted to 4,674 people. Nonetheless, since the inception of the Cambodian Mine Action Centre (CMAC) by the Royal Decree in 1992, the annual casualty data have dropped from 3,333 casualties in 1995 to 1,153 casualties in 1999 to 858 casualties in 2000 and further fell down to 65 casualties in 2020. Despite the drop in number of casualties thereof, Cambodia has been facing a huge problem of landmines and UXOs, causing daily threats to personal security, community and national reconstruction, economic recovery, and other developmental activities.

Thus, in an attempt to support the Royal Government of Cambodia (RGC) in dealing with landmine/UXO problem, CMAC, from year to year, has spared no effort to accelerate the clearance productivity in order for the reduction in contaminated land areas and to provide Mine Risk Education (MRE) messages to more Cambodian residents in order for the increasing awareness of the danger of landmine/UXO in the localities.

In fact, CMAC from 1992 to 2020 cleared and released approximately 1,168 km<sup>2</sup>, found and destroyed 550,194 landmines and 2,264,962 UXOs, collected 97,404 kg of small, 463,236,168 pieces of fragmentation, and 131,837 other munitions, and responded to 115,976 requests from the local authorities and communities. More remarkably, CMAC also found 73 locations of chemical drums dropped from the US aircrafts during the Vietnam War.

By virtue of CMAC's clearance productivities since 1992, plus those from RCAF, MAG, HALO Trust, CSHD, and NPA, the Cambodian Mine Action and Victim Assistance Authority (CMAA) updated the Baseline Survey of the recorded contamination data as of December 2020. On that basis, the Kingdom of Cambodia still has approximately 2,128 km<sup>2</sup> of contaminated land throughout the country. Among this, approximately 810 km<sup>2</sup> is contaminated by landmines, whereas the other 1,318 km<sup>2</sup> by ERW, especially cluster munitions.



## 2. CORE ACTIVITIES AND OUTPUTS

### 2.1. Planning and Operations

Landmine/UXO problems have become a direct security threat, both physical and psychological, to individuals and communities living in/around minefields and/or UXO-fields in the Kingdom of Cambodia. These problems also have posed significant obstacles to the social and economic development of this Kingdom—both in urban and rural areas. All types of infrastructure devastated during the civil war need restored and strengthened so as to assist the development in all sectors such as agriculture, tourism, construction, and so on. Therefore, the Royal Government of Cambodia thus far prioritizes landmine/UXO problems to be sorted out.

In an attempt to support the Royal Government in dealing with the problems thereof, CMAC, as a national humanitarian demining operator, has been working hard to speed up the clearance of landmine/UXO contaminated areas in contribution to saving lives and supporting development for Cambodia. Notably, CMAC continues to undertake a number of bilateral and counterpart projects to support its demining management plan as set out in IWP-2021 and in CMAC's 5-Year Strategic Workplan 2021-2025.

For operation 2021, CMAC planned to clear and release **113,628,472m<sup>2</sup>** of landmine/UXO contaminated areas, of which **59,718,480m<sup>2</sup>** were minefields and **53,909,992m<sup>2</sup>** were UXO-fields. In order to achieve this ambition, CMAC integrated and deployed all its demining tool boxes so as to accelerate landmine/UXO clearance in the Kingdom of Cambodia as well as to secure the individual safety and socio-economic development for the people.



Nevertheless, when it came to actual implementation, there were some insurmountable difficulties. In other words, although most projects successfully met the expectations as planned, few of them fell short. In fact, two JMAS projects—one in Banteay Meanchey province under Demining Unit 1 (DU1) and another in Steung Treng province under Demining Unit 6 (DU6)—were expected to commence in the early year 2021, but they were just approved and deployed at the beginning of March 2021, which were a bit late. Similarly, the Clearing for Results (CFR-Top Up) were just approved and funded to further support the clearance in Banteay Meanchey province under DU1, Battambang province under DU2, and Pailin province under Pailin Frontline Unit (PFU) in the early May 2021. Moreover, in late March 2021, DU3 office had been moved from Pailin to Pursat province to be responsible for the clearance operations in the latter instead of DU2.

More than that, since 2020, COVID-19 pandemic broke out and spread to the entire world, including the Kingdom of Cambodia. CMAC's operations were thus to some extent affected since the Royal



Government imposed the curfew and then become the complete lockdown throughout the country for 14 days from 7<sup>th</sup> to 20<sup>th</sup> April 2021 in an attempt to prevent the spread of COVID-19 pandemic.

For these reasons, the total annual productivities of CMAC's operations were lower than the expected yearly plan as CMAC in 2021 could totally clear and release only **101,040,252m<sup>2</sup>** of landmine/UXO contaminated areas, which is **88.92%** compared to the yearly plan of **113,628,472 m<sup>2</sup>**.

Regarding CMAC's operation working days from January to December 2021, all CMAC Demining Units (DU), Pailin Frontline Unit (PFU), Technical Institute of Mine Action (TIMA), CMAC National Dog Center (NDC), Development Demining Unit (DDU), and CMAC Phnom Penh Headquarters were obligated to work for 237 working days to respond to demining requests from the local authorities and communities, stakeholders, NGOs, and particularly the Royal Government of Cambodia in order for safe environments, socio-economic development, and landmine/UXO risk reduction. The rest **128 days** were for public holidays, weekends and compulsory annual leave days.

### 2.1.1. Resources Deployment

CMAC demining resources were assigned to various CMAC's Demining Units (DUs), Development Demining Unit (DDU), CMAC Technical Institute of Mine Action (TIMA), and CMAC Phnom Penh Headquarters to be responsible for the clearance at the target provinces. In the northwestern provinces, DU1 covered Banteay Meanchey province, while DU2 and DU3 were responsible for the clearance in Battambang and Pursat provinces, respectively. Besides, PFU conducted its operations in Pailin province, and at the same time, DU4 cleared and released landmine/UXO contaminated areas in two provinces Cambodia: Siem Reap and Kampong Thom. Regarding the clearance in the eastern Cambodia, CMAC tasked DU5 to conduct the operation in 8 provinces including Kampong Cham, Tboung Khmom, Prey Veng, Svay Rieng, Kratie, Steung Treng, MondulKiri, and RattanakKiri. In the north, DU6 conducted its operation in Preah Vihear, Oddar Meanchey, and 2 districts of Stung Treng province. For the rest parts of the country, TIMA covered Kampong Chhnang province, while CMAC Phnom Penh Headquarters was responsible for the clearance, especially the requests from local authorities and communities from Phnom Penh, Kandal, Kampot, Takeo, Kampong Speu, Preah Sihanouk, and Koh Kong.

With the responsibility in each province, all CMAC demining teams worked to support the clearance in the highly prioritized areas and tasks selected from the National Planning Mechanism through MAPU and PMAC processes as participatory and bottom-up approach methods to mine action planning. The demining teams also responded to urgent humanitarian interventions and supported development tasks requested by local authorities and







communities affected by landmine/UXO. The following Table indicates the demining tools deployment in 2021.

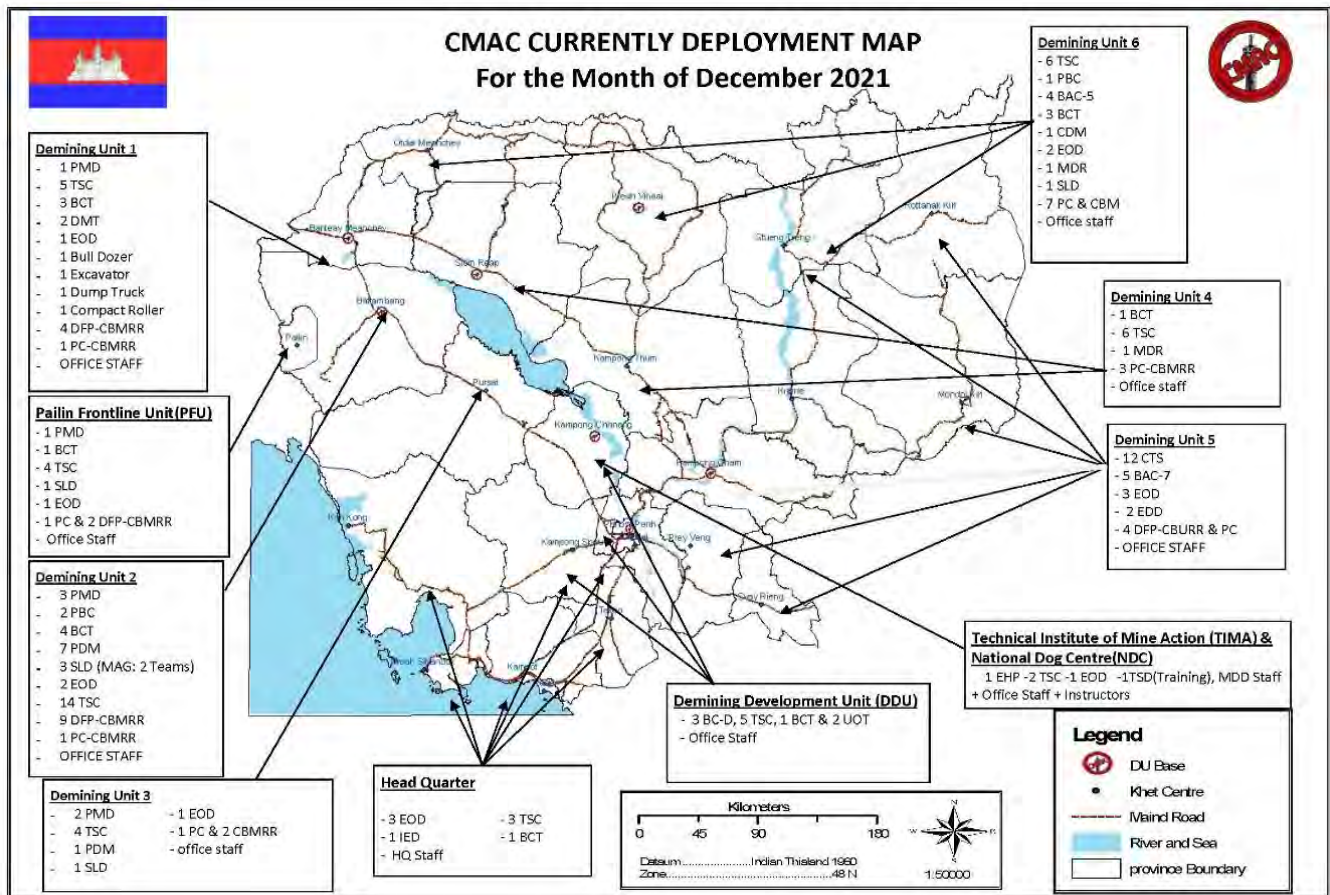
Demining Tools	Deployment in 2021											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Platoon-Manual Demining (PMD-27 staff)	-	-	1	1	1	1	1	1	1	1	1	1
Platoon-Manual Demining (PMD-17 staff)	6	6	6	6	6	6	6	6	6	6	6	6
Battle Area Clearance- Large Team (BAC-L: 16 staff)	4	4	-	-	-	-	-	-	-	-	-	-
Battle Area Clearance Team (BAC- 7 staff)	5	5	5	5	5	5	5	5	5	5	5	5
Battle Area Clearance Team (BAC- 5 staff)	4	4	4	4	4	4	4	4	4	4	4	4
Cluster Technical Survey Team (CTS- 7 staff)	3	3	12	12	12	12	12	12	12	12	12	12
Technical Survey and Clearance Team (TSC-7 staff)	49	49	49	49	45	45	45	46	45	45	46	49
Platoon-Brush Cutter Machine (PBC- 15 staff)	3	3	3	3	3	3	3	3	3	3	3	3
Brush Cutter Machine Team (BCT- 9 staff)	10	10	10	10	10	10	10	10	10	10	10	11
Brush Cutter Machine-Development (BC-D- 2 staff)	6	6	6	6	6	6	6	6	6	6	6	6
Platoon-Demining Machine (PDM- 16 staff)	8	8	8	8	8	8	8	8	8	8	8	8
Demining Machine Team (DMT- 2 staff)	2	2	2	2	2	2	2	2	2	2	2	2
(Cluster Demining Machine Team (CDM- 2 staff)	1	1	1	1	1	1	1	1	1	1	1	1
Explosive Ordnance Disposal (EOD-5 staff)	10	10	14	14	14	14	14	14	14	14	14	14
Underwater Operations Team (UOT- 5 staff)	2	2	2	2	2	2	2	2	2	2	2	2
Explosive Harvesting Program	1	1	1	1	1	1	1	1	1	1	1	1
Battle Area Clearance-Multi Technical Team (BAC-MTT)	4	4	-	-	-	-	-	-	-	-	-	-
Short Leash Detection Dog (SLD-10 staff)	6	6	6	6	6	4	4	4	4	4	4	4
Explosive Detection Dog (EDD-6 staff)	6	5	5	5	5	7	7	7	7	7	7	7
Improvised Explosive Device Dog Team (IED_5staff)	14	14	14	14	14	14	14	14	14	14	14	14
Technical Survey Dog (TSD_5staff)	8	8	8	8	8	8	8	8	8	8	8	8
Mine Detection Rate (MDR-10 staff)	2	2	2	2	2	2	2	2	2	2	2	2
Community Based Mine Risk Reduction (CBMRR)	35	35	35	35	35	35	35	35	35	35	35	35
Explosive Harvesting Program (EHP)	1	1	1	1	1	1	1	1	1	1	1	1

**Note:**

- 3TSC (#19,48 & 49) of former DU6\_CCL03 integrated into PMD#01, PMD#02 and PDM#06 of DU3\_PIMV 01 May 2021.
- TSC#28 of former DU4\_CCL03 integrated into BCT#28 of PFU\_CFR-25 on 01 May 2021.
- 3TSC (#19,48&49) were recreated and deployed operations at HQ-NPA on 01 December 2021.



To clearly see the real locations of CMAC demining resources throughout the country in 2021, the following map shows CMAC tool deployment from January to December 2021.



### 2.1.2. Summary of Progress Achievements

The progress achievements from 01 January to 31 December 2021 were ranged from the delivery of largescale mine clearance, community development, grassroots community education activities, and international training programs to cutting-edge technological research. During the reporting period, CMAC achieved significant operational clearance as follows:

<ul style="list-style-type: none"> <li>▪ Total released Landmine/UXO contaminated areas: <b>101,040,252m<sup>2</sup></b> and divided into 3 categories as below:</li> </ul>	
- Mined Field:	60,035,136 m <sup>2</sup>
- UXO Field:	35,831,367 m <sup>2</sup>
- Areas Survey and Safety principle:	5,173,749 m <sup>2</sup>
<ul style="list-style-type: none"> <li>▪ Total Mine/UXO found and destroyed: <b>88,803</b> items</li> </ul>	
- APM:	17,293 items
- ATM	337 items
- UXO:	71,153 items
- Improvised mine:	20 items

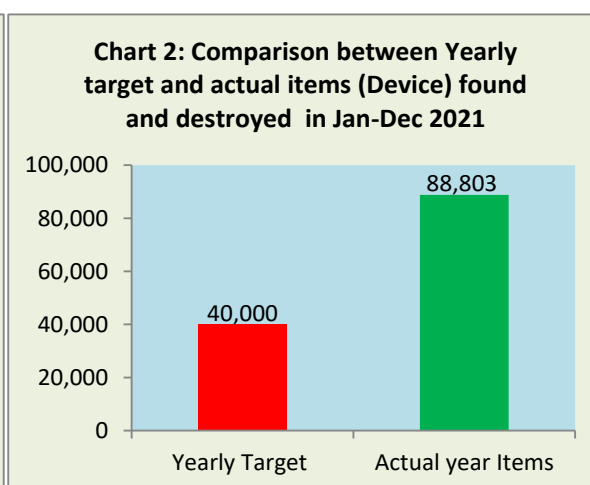
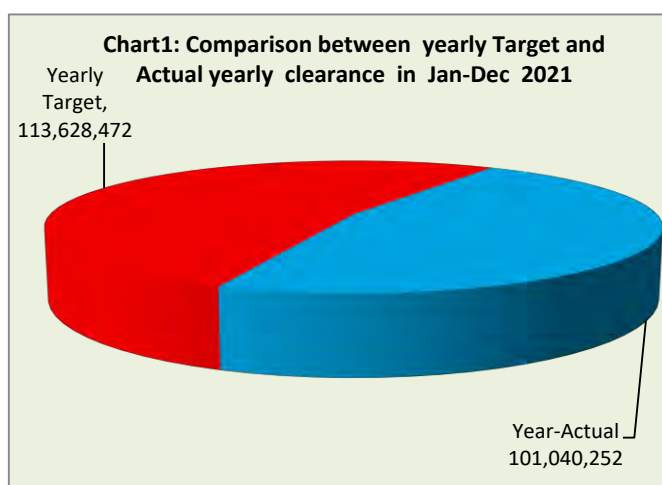


- Small Arms found and destroyed:	16,562 Kg.
- Fragment:	1,837,251 pieces
▪ Cutting grass:	<b>11,502,344 m<sup>2</sup></b>
▪ Liner of marking:	<b>50,169 m</b>
▪ Responded to EOD calls from local authorities and communities	<b>3,752 requests</b>
▪ Conducted MRE sessions to:	<b>924,692 audiences</b>
- Men:	377,105 persons
- Women:	407,047 persons
- In school children:	84,187 persons,
- Out-of school children:	56,353 persons
▪ Number of MRE session:	<b>17,214 courses</b>
▪ Number of households visited:	<b>565,359 times</b>
▪ Number of villages visited:	<b>10,244 villages</b>

### 2.1.3. Operational Achievement Analysis

From January to December 2021, CMAC cleared and released **101,040,252 m<sup>2</sup>** of landmine/UXO contaminated areas throughout the country (see chart 1 below) by having found and destroyed **17,293 anti-personnel mines, 337 anti-tank mines, 20 improvised-mines and 71,153 UXOs**. Those areas cleared included 60,035,136 m<sup>2</sup> of minefield areas, 35,831,367 m<sup>2</sup> of UXO-field areas, and 5,173,749 m<sup>2</sup> of areas cleared as so-called Survey and Spot Check for Safety without sketches. The land clearance achievements stood for **88.92%** compared to yearly target of **113,628,472 m<sup>2</sup> for 2021**, while the number of landmines/UXOs found and destroyed amounted to **88,803 landmines/UXOs**, which was equivalent to **222.01%** compared to the annual target of **40,000 items** (see chart 2 below).

By comparing these items (mines and Explosive Remnants of War) which were found and destroyed for 1 year As of 3,752 items) to the annual target in 2021 (as of 40,000 items), it is 74.04%. The Chart.2 below is presented the devices found and destroyed by comparing to yearly target of mine/UXO in 2021.



1. To compare the achievements with the previous year, it is important to note that CMAC demining teams were able to clear and release **101,040,252 m<sup>2</sup>**, while the total accumulative

In addition to the deployment by each Demining Units (DU) and by month, CMAC also deployed its demining resources (assets) to support each project so that they may respond to the projects' target as said within the project agreement and also to meet the project's requirement as the following resources in Table 3:



achievements for the same period in **2020** were **92,724,775 m<sup>2</sup>**. This result rated 8.97% higher than the yearly achievements in 2020 in terms of the size of the landmine/UXO contaminated areas.

#### 2.1.4. Social Economic Output

During the reporting period, all Demining Units completed at least **963 mine/UXO fields** which was equivalent to **95,198,869m<sup>2</sup>**. All completed landmine/UXO fields were handed over to the local authorities and communities for other purposes in accordance with their requests.



The achievements thereof contributed significantly to the country not only in terms of landmine/UXO casualty reduction but also in terms of the enhancement of livelihood, resettlement, socio-economic and infrastructure activities for individual, and the affected community development so as to meet the National Strategy in poverty reduction. Without demining, most development activities could not be taken

place as a result of ERW scattered in the entire country. Therefore, demining activities have been still prioritized to support the Royal Government of Cambodia's ambition to make Cambodia free from the threats of landmine/UXO.



Regarding the socio-economic benefits, a large portion of the cleared land was used to support development, resettlement, and agriculture activities, and another small portion went to humanitarian and emergency purposes. Those achievements provided benefits to **93,996 families**. Among this total amount, **40,001 families** were direct beneficiaries, and another **53,995 families** were the indirect ones. The following table is 3 categories of land use after the clearance in 2021.

Development Category	Size of Land Areas
Agriculture	73,749,674 m <sup>2</sup>
Resettlement plus Agriculture	8,946,930 m <sup>2</sup>



Development Category	Size of Land Areas
* Others Uses (Pond, health center.....), See below	12,242,660 m <sup>2</sup>
<b>Total</b>	<b>94,939,660 m<sup>2</sup></b>

\* **Other Uses:** Pagoda, temples, tourist site, administrative office, well, pond, health center, historical sites, construction sites, risk reduction.

## 2.2. Baseline Survey (BLS) Operations

The multi-skill teams and Technical Survey experts of Demining Unit1, 2, 4, 5, 6, PFU, TIMA, and CMAC HQ conducted the baseline survey in their responsibility areas. As a result, CMAC BLS teams could achieved the baseline survey on **102,201,557 m<sup>2</sup>** from **163 villages** where were divided into 644 polygons. Amount this eminent achievement, DU5 conducted the BLS in **287 polygons** from **98 villages**, which was equivalent to **51,672,157 m<sup>2</sup>**, whereas DU3 made in **151 polygons** from **10 villages** with the land areas of **19,365,564 m<sup>2</sup>**. For further details, the following table shows the number of villages where each CMAC BLS teams visited and the polygons and land areas where the teams marked as BLS operation areas.



Demining Unit	Description			Remarks
	No. of village visited	No. of new BLS Polygons discovered	Total new BLS size (m <sup>2</sup> )	
DU1	1	3	330,027	
DU2	14	80	5,779,181	
DU3	10	151	19,365,564	
DU4	21	32	2,598,532	
DU5	98	287	51,672,157	
DU6	12	70	14,737,492	
PFU	2	7	392,225	
TIMA	3	12	1,236,117	
HQ	2	2	6,090,262	
<b>Total</b>	<b>163</b>	<b>644</b>	<b>102,201,557</b>	



## 2.3. EOD Team Operations

From January to December 2021, CMAC deployed 5 EOD teams at TIMA and CMAC Phnom Penh HQ. Moreover, there were other demining tools such as BAC, TSC, ERWI, BAC-MTT, and so on deployed at DU1, DU2, DU3, DU4, DU5, DU6, and DDU to collect and destroy landmines/UXOs requested by the local people, local authorities, policemen, NGOs, and so on. The EOD teams aimed at providing a safe environment or threat-free from landmines/UXOs in the entire country.



For the year 2021's achievements, the EOD teams were able to respond to **3,752** requests (EOD calls), which was equivalent to 75.04% compared to the annual planned target of 5,000 requests. The lower rate than the plan was due to the outbreak of covid-19. However, those requests responded could cleared the land areas of 251,465 m<sup>2</sup>. In the operations, the teams found and destroyed 62,151 landmines/UXOs (including 8,917 anti-personnel mines, 286 anti-tank mines, 10 improvised mines, and 52,938 UXOs), 16,562kg of small arms, and 42,356 pieces of fragmentation. The table below indicates the comparison of EOD teams achievements in 2021 vs. 2020.

Description	Jan-Dec 2021	Jan-Dec 2020
Areas Cleared (Spot check) in m <sup>2</sup>	251,465	323,524
EOD tasks conducted (Responded)	3,752	3,932
APM destroyed	8,917	3,137
ATM destroyed	286	41
ERW destroyed	52,938	20,940
Improvised mines destroyed	10	-
Small Arms Ammunition (kg)	16,562	590
Fragment (pieces)	42,356	16,031

## 2.4. Special Unit of Underwater Operations

The Special Unit of Underwater Operations (SUUO) was established by CMAC in 2013 and technically supported by the US Government in the aim to conduct the underwater clearance, ranging from recovery underwater UXO/AXO, sunken barge search and clearance, bridge and pier searches, evidence collection, stranded vessels, and downed aircraft to damaged





structure and body recovery or personal rescue.

Nevertheless, the year 2013 was the training and trial phase only; SUUO started its underwater operations in 2014 onwards by having found and destroyed a total of 62 items and involving in safeguard for high-ranking government officials for 10 times. Most of these achievements were the results of the operations in 2021 when SUUO gained trust from the government, particularly from the inter-ministries in charge of underwater clearance, to conduct the underwater clearance operations in the fourth site in the riverbed located in Boeung Krum Village, Boeung Krum Commune, Lvea Em District, Kandal Province. In 2021 alone, SUUO could found and destroyed a total of 51 items and 22 kg of small arms.



Projectiles Found in the Fourth Site in the Riverbed					
No.	Types	Model/Effect/Origin	Size	Quantity	Remarks
1	Artillery	M-1/HE, US	105mm	12	
2	Artillery	M-314/Illum, US	105mm	8	
3	Rocket	M-151/HE, US	70mm	5	
4	Mortar	M-362/HE, US	81mm	7	
5	BOMB	MK-82/GP, US	274mm	2	
6	Mortar	M-49/HE, US	60mm	5	
7	Artillery	M-48/HE, US	75mm	2	
8	Hand Grenade	F-1/HE-fragment	55mm	1	
9	Grenade Launcher	M-381/HE, US	40mm	5	
10	Hand Grenade	M-18/Smoke Colored, US	40mm	1	
11	Artillery	MK-2/HE-T-SD, US	40mm	1	
12	Artillery	M-60/WP, US	105mm	1	
13	Artillery	M-64/WP, US	75mm	1	
14	Small Arms				22 kg
<b>TOTAL</b>				<b>51</b>	
HE: High Explosive; US: Made in the United States of America; Illum: Illumination; GP: General Purpose;					



## 2.5. Explosive Harvesting Program

The Explosive Harvesting Program (EHP) was established since 01 March 2005 under CMAC-Golden West cooperation. The program, financially and technically supported by the US through Golden West Humanitarian Foundation, has been aimed at collecting all types of UXOs from all CMAC DUs, Demining NGOs, and communities as well as defective bombs in the RCAF's warehouse and National Police's warehouse to be recycled into new explosives for using to explode any landmines or UXOs that cannot be unearthed or transported to safe places.

Since its inception from 2005 to 2021, EHP achieved eminent results such as cutting 42,278 ordnances, destroying 168,907 items of ordnances, recovering 209,985.57 kg of FFE metals and 76,111.1 kg of explosives, and producing 574,311 blocks of newly recycled explosives. Nonetheless, for a period of 12 months from January to December 2021, EHP was able to cut 2,975 ordnances, destroy 40,399 items of ordnances, recover 9,180.06 kg of FFE metals and 4,289.09 kg of explosives, and produce 37,500 blocks of newly recycled explosives.







## 2.6. Dog Centre

Under the cooperation between CMAC and Swedish Armed Forces, the concept of the Mine Detection Dog Program was established in 1996, and the project was launched in 1997 at the CMAC Training Centre in Kampong Chhnang province with the technical support from the Swedish Armed Forces and the financial support from the Swedish government through the Swedish International Development Agency (SIDA).

After the Swedish Armed Forces completed its mission in Cambodia in 2002, Mine Detection Dog Program was handed over to CMAC to manage on its own. Since then, CMAC, in partnership with NPA and with the financial support from Norwegian Ministry of Foreign Affairs, continued its cooperation and developed several searching techniques such as Long Leash Detection Dog (LLD) and Explosive Detection Dog (EDD) for the purpose of speeding up the operation and providing security to the high ranking officials for the Royal Government of Cambodia (RGC).

CMAC Mine Detection Dog (MDD) ownership was reflected through successfully breeding and training its high-quality mine detection dogs which were recognized by national authority, local operator and international demining organization throughout the world.

Now, more than ever before, Dog Centre, approved by Samdech Techo Hun Sen, Prime Minister of Cambodia, in March 2021, could successfully train dogs to detect COVID-19 infection people by just sniffing the suspected patients. These COVID-19 detection dogs could be used to detect in the public places such as airport, stadium, national ceremony events, and so on because the dogs detect faster than the testing machines or devices.



### 2.6.1. Dog Breeding

To ensure sustainable supply of dogs in mine action and other purposes, CMAC relies on its own breeding program. The dogs produced from the breeding program are not only for CMAC's internal use to support its on-going mission and domestic market, but also for potential exports of quality dogs and services overseas.



The program focuses mainly on selection of quality parent dogs including the consideration of best age and best time for breeding. Normally, a CMAC femal dog is able to produce offsprings in average from 7 to 12 puppies to the letter, and between 60% and 70% of the puppies to the letter can be trained to become the skilled dogs.



**Process of Breeding**



**2.6.2. Dog Training**

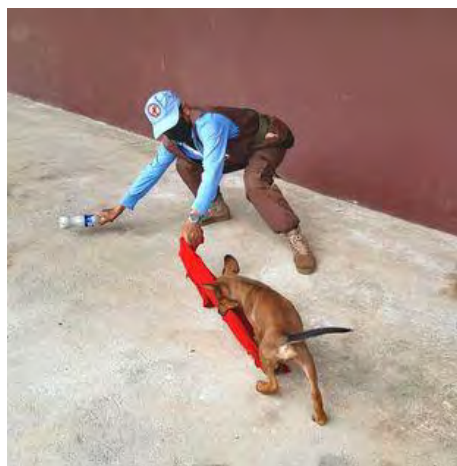
The trainings for MDD has begun as early in the dog’s life as possible. There are critical stages in the dog’s life that strongly affect their learnings and behaviors, and many of these occur in the first weeks. Not every dog can be trained for mine detection operations. The dog must naturally possess certain traits and characteristics which can be developed during trainings. The process of selecting and training dogs with potentiality to be MDDs is extremely difficult and involves an ability to foresee potentiality in the dogs.



CMAC has continued to seek for new innovations to improve training and deploy dogs in the landmine/UXO contaminated areas by diversifying the dog detection skills, including the introduction of the current training of cluster munitions technical survey dogs (CTD).

➤ **Puppy Training**

Puppies are trained from the age of one week to the age of 8 months according to the training program and undergo two competency tests before





possibly moving to the upper level of training, namely semi-training which lasts for six months.

➤ **Adult Dog Training**

The training and test/accreditation of dogs are usually conducted in accordance with the international and national standards and strictly based on CMAC’s own procedures to ensure quality and reliability of the products.

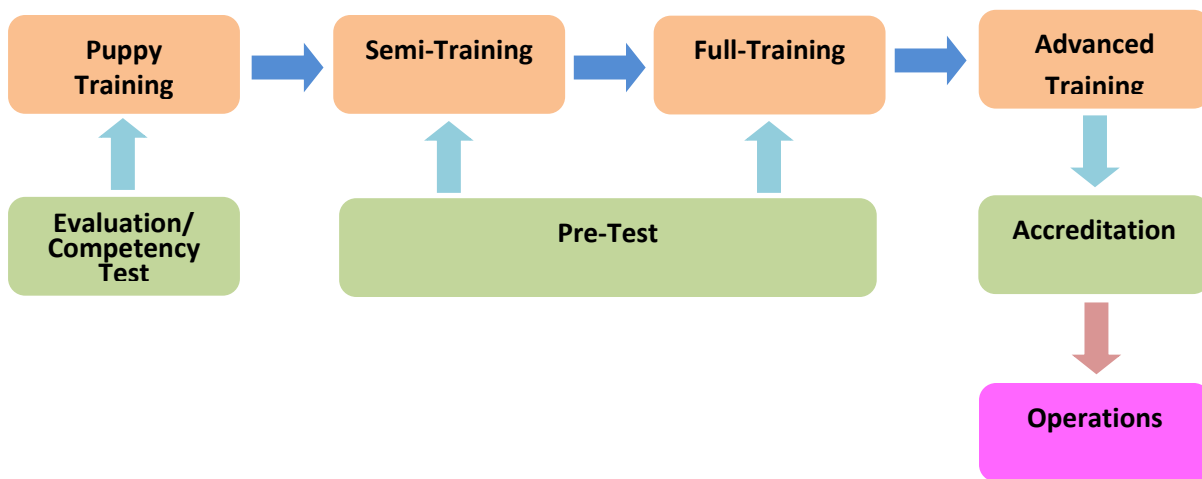
Dogs are trained with all kinds of ammunition and repellents and sniffed for processed or real ammunition and then put them in a car, in a garden, in a public office, etc. All dogs need to be tested for a license after training and prior to use or operations.



Regarding to the dog training equipment and tools, CMAC Dog Centre has both field location and sufficient technical training equipment for dog training, including dog physical training and dog technical skills. In

addition to the dog skills above, CMAC Dog Centre plans to train other dog skills, including drug dogs, protection dogs, and social demonstration dogs or bodyguard dogs, etc.

➤ **Process of Training**





### 2.6.3. Dog Training Achievements in 2021

From January to December 2021, Dog Centre conducted the trainings on 157 dogs, including 26 demining operation dogs, 58 under-training dogs, 53 under-training puppies, and 20 bitches for breeding. In order to provide the training for these 157 dogs, Dog Centre employed 13 dog instructors to conduct 9 refresher courses and 5 dog instructors to conduct 5 advanced training courses.

#### Dog's Training in 2021

Dog Situation:	Variety	Sex		Total
		Male	Female	
Dog Operations	EDD	3	1	4
	SLD	9	9	18
	IED	3	1	4
Dog Under Training	Semi-training	21	20	41
	Pre-Test Skill	6	1	7
	Full Training	9	1	10
Puppy Under Training	Green training	28	25	53
Bitches For Breeding		1	19	20
<b>Total:</b>		<b>80</b>	<b>77</b>	<b>157</b>

#### Refresher Training Course for Dogs in 2021

Course Title	Team	N. of Course	N. of Trainees		Instructor	Date	
			Staff	Dog		Start	End
Refresher	SLD#06,09	240	9	04	2	11-01-2021	22-01-2021
Refresher	EDD#2,IED#1	241	6	04	1	18-01-2021	29-01-2021
Refresher	EDD#5,SID#2,BHQ#1	242	12	05	2	15-02-2021	01-03-2021
Refresher	SLD#06,09	243	7	02	1	07-06-2021	18-06-2021
Refresher	EDD#02	244	4	02	1	05-07-2021	16-07-2021
Refresher	CBRR#01,02	245	18	08	2	02-08-2021	13-08-2021
Refresher	SLD#,05,12	246	16	08	2	11-10-2021	22-10-2021
Refresher	SLD#03	247	8	03	1	25-10-2021	05-11-2021
Refresher	SLD#02,EDD#5	248	10	03	1	15-11-2021	26-11-2021
<b>Total:</b>		<b>9</b>	<b>90</b>	<b>39</b>	<b>13</b>		

#### Advanced Training Course for Dogs in 2021

Advanced Training Course							
No	Name Course	N. of Course	N. of Trainees		Instructor	Date	
			Staff	Dog		Start	End
1	Advance Course #	53	2	2	1	04-1-2021	19-3-2021
2	Advance Course #	54	1	1	1	18-1-2021	19-3-2021
3	Advance Course #	55	1	1	1	17-5-2021	11-6-2021
4	Advance Course #	56	1	1	1	02-9-2021	23-9-2021



5	Advance Course #	57	2	2	1	6-12-2021	30-12-2021
	<b>Total:</b>	<b>5</b>	<b>7</b>	<b>7</b>	<b>5</b>		

#### 2.6.4. COVID-19 Detection Dog

COVID-19 has broken out in the Kingdom of Cambodia since the early 2020. The presence of this type of viral virus has resulted in insurmountable difficulties, causing tens thousands of patients, thousands of deaths, economy problems, lack of supply of commodities and food, social distance, and so on. In efforts to cope with this, besides putting all efforts into the rescue of the COVID-19 infection patients, the Royal Government of Cambodia (RGC) decided to imposed lockdown in the entire country, especially no cross-borders travel, in order to cut the source of the virus spread. The difficulties lengthened for a long period of time.



In this connection, CMAC, acknowledging the experiences of some countries succeeding in COVID-19 Detection Dogs such as Germany, Sweden, Finland, Russia, and Thailand, had ambition to train its resourceful dogs to do the same. After seeking approval from Samdech Techo Prime Minister Hun Sen, CMAC, in cooperation with the University of Health Science, started to thoroughly conduct this historically eminent task with some material supports from the Getxent Company in Switzerland.



The training process took 9 months from March to November 2021 to accomplish the successful course. As a result, there were 12 CMAC dogs passing the test, becoming COVID-19 Detection Dogs after the many successful tests with the COVID-19 patients to verify with the testing machines.



## Name List of COVID-19 Detection Dogs

No.	Asset Code	Dog's Name		Sex	Date of Birth	Micro-chip	Remarks
		Khmer	Latin				
1	DEM060283	ណូរី	Nory	M	27.04.2020	900057600129709	
2	DEM060204	ខ្លាំង	Khlang	M	12.10.2018	900057600129578	
3	DEM060277	ង៉ែត	Nget	M	14.08.2019	900057600129595	
4	DEM060209	បាយ័រ	Bayer	M	11.06.2016	578075500020021	
5	DEM060174	ខាណា	Khana	M	31.08.2016	578075500020073	
6	DEM060191	ឆាកូ	Chhako	F	04.09.2019	900057600129828	
7	DEM060269	ណៃនូ	Naino	F	27.04.2020	900057600129719	
8	DEM060276	ណាតូរូ	Natoro	M	27.04.2020	900057600129717	
9	DEM060224	ដាម៉ូ	Damo	M	17.04.2020	900057600129706	
10	DEM060160	អេដ	Aid	M	04.07.2017	578075500020155	
11	DEM060252	ខៀវ	Kheav	M	07.02.2018	578075500020152	
12	DEM060159	បៃកា	Baika	F	11.06.2016	578075500020016	

## 2.7. Research & Development

Research and Development (R&D) has played very important roles in contribution to the achievements of landmine/UXO clearance in the Kingdom of Cambodia thus far. Without R&D, the speed of clearance must have been unacceptably too slow, and it must have been too dangerous to work in mine action sector. R&D has advanced the technology of mine detection machines, demining machines, brush cutter machines, and so on in order for more safety and productivity. For a period of 12 months in 2021, CMAC's R&D program conducted 4 different studies with companies, NGOs, and universities from foreign countries.

### ➤ Advance Landmine Imaging System (ALIS)

R&D, in cooperation with Tohoku University of Japan, has conducted many case studies and researches, since 2007, on the use of the Advance Landmine Imaging System (ALIS) in minefields and UXO-fields in Cambodia in order that the technical teams from Tohoku University could understand and update ALIS technology so as to accurately speed up the clearance.

In 2021, Tohoku University provided CMAC with 6 ALIS machine with dual sensors detector that could be used to detect landmines, UXOs, and other suspected objects. The difference between ALIS and normal mine detection machine is that the dual sensors of ALIS is able to detect objects under the ground and it has the Ground Penetration Radar (GPR), a system to show image in the screen, to detect the shape and type of object detected under the ground.



### ALIS Operation in Minefields



### ALIS Operation in UXO-Fields



#### ➤ Evaluation of Mine Detection Rats

In 2021, R&D, in cooperation with APOPO, evaluated a total of 20 Mine Detection Rats (MDR) before verifying Rats’ capacity to be able to detect landmines and UXOs in the Kingdom of Cambodia.



#### ➤ Demining Robot

CMAC has closely worked with the Innovative Operations System on the innovation of Demining Robot (DMR). In June 2021, the study was on its capacity of the carrier to load the air system, and in November 2021, R&D conducted the research on DMR’s capacity to press the air on landmine or UXO it detected so as to unearth them.





PMN found after airing

### ➤ **Electro-Magnetic Shovel**

R&D has conducted the study on using the Electro-Magnetic Shovel to dig for the landmine or UXO after a mine detection machine gave a signal of object detected. The Electro-Magnetic Shovel, invented by CMAC expert teams, is able to absorb the pieces of metal fragmentation when deminers dig it to where the mine detection machine signalises. With the Electro-Magnetic Shovel, deminers take less time to recognize whether the object is piece of metal fragmentation or landmine, or UXO. Therefore, it is contributed to the acceleration of landmine/UXO clearance. By virtue of its success and effectiveness, CMAC will use Electro-Magnetic Shovel to help deminers accelerate the speed of clearance in 2022.







## 2.8. Mine/UXO Risk Education, Victim Assistance and Post-Clearance Development

Mine/UXO awareness activities began in Cambodia in 1993 as the initial activities focusing on providing knowledge on mines and UXO to returnees and internally displaced people who were settling in often heavily contaminate areas after the cessation of the conflict. Awareness was usually provided by roving educational teams who gave presentations in villages outlining the different types of ordnance, the danger they posed, and the steps that could be taken to avoid or minimize the risk of accidents. The Mine/UXO Awareness Program of CMAC began in 1994, focusing primarily on refugees, internally displaced people, and returnees. The main components of the program included a mobile mine/UXO awareness team, a mass media campaign, a billboard campaign and an NGO campaign.

However, despite the significant reduction in accidents overtime, the number of mine/UXO accidents in Cambodia continues to threaten the safety of individuals and communities as well as pose the hindrance for developing the country. Therefore, CMAC still prioritizes landmine/UXO clearance and Landmine/UXO education simultaneously on the road to zero accident.



On that basis, Mine/UXO Risk Education (MRE) today still plays a vital role in reducing casualties and removing threats provoked by landmines and UXOs. In 2021, CMAC conducted mine/UXO risk education activities throughout the country, especially in the high risk areas. As a result, the CMAC's MRE teams conducted 17,214 MRE courses for 565,359 households with 924,692 audiences including 377,105 men, 407,047 women, 84,187 students (in-school children), and 56,353 out-school children.



Based on data provided by the Cambodian Mine Victim Information System (CMVIS) of Cambodian Mine Action and Victim Assistance Authority (CMAA), from January to December 2021, landmine/UXO accidents accounted for 33 cases with 44 casualties including 11 deaths throughout the country. This number decreased 32.30% compared to 65 casualties in 2020.

CMAC also has the development teams to construct the infrastructure after landmine/UXO clearance in order to improve the living condition of the people. Engineering teams, funded by various donors, implemented the post mine clearance development projects in Battambang and Pailin province,



focusing on the rural and farm roads, agricultural facilities construction, and agriculture trainings. The project became a model for other landmine/UXO affected provinces in the Kingdom of Cambodia.

### 2.8.1. Mine/UXO Risk Education (MRE)

In addition to the landmine/UXO clearance, CMAC also deployed the volunteer network in the grassroots of the affected community in order to effectively provide messages about the hazard of landmines and UXOs, albeit the spread of COVID-19. On that basis, CMAC divided the MRE programs into four types, namely the CMAC Mobile Teams itself, the Community-Based Mine Risk Reduction (CBMRR), the Community-Based UXO Risk Reduction (CBURR), and the National Police.



#### ➤ CMAC Mobile Teams

Every CMAC staff members, both office and field staff, is the network of landmine/UXO education. In particular, the landmine/UXO clearance and intervention teams, namely Explosive Ordnance Disposal (EOD), Cluster Demining Machine (CDM), Battle Areas Clearance Team (BAT), Technical Survey and Clearance Team (TSC), Baseline Survey Team (BLS), Mine Detection Dog Team (MDD), Explosive Detection Dog Team (EDD), Mine Detection Rat (MDR), Brush Cutter Team (BC), Explosive Remnants of War Intervention



(ERWI), and Mobile Platoons (MPL), have always contributed to conducting landmine/UXO risk education in their operational areas. As a result, these teams, in 2021, provided 4,953 courses of mine/UXO risk education with a total of 346,944 audiences from 252,033 households.



Period	Courses	Audience Group				Total	Households
		Men	Women	Students	Outside-School Children		
Jan-Dec, 2021	4,953	144,333	163,380	24,828	14,403	346,944	252,033

After mine/UXO risk education messages were advertised and spread to the localities, it was notable that many people—old and young, especially those who participated in the courses—became more aware of the danger of landmines/UXOs and particularly knew how to send messages to CMAC officials or the nearest local authorities when they encountered landmines, UXOs, or other suspected objects. In 2021 alone, CMAC Mobile Teams received 1,460 emergency requests for intervention from local authorities and communities and collected 1,257 anti-personnel mines (AP), 39 anti-tank mines (AT), 9,082 UXOs, and 168kg of small arms.

Period	Emergency Request from the Local Authorities and Communities					Response to Emergency Request from the Local Authorities and Communities				
	Request	AP	AT	UXO	Small Arm (kg)	Request	AP	AT	UXO	Small Arm (kg)
Jan-Dec, 2021	1,460	1,338	31	9,059	209	1,438	1,257	39	9,082	168

Nevertheless, CMAC in year 2021 deployed a core team with 38 members to focus on strengthening the capability of the volunteer network throughout the country. For 2021 alone, this team provided mine/UXO risk education as a capacity building to 3,618 volunteers including 2,307 local authorities and communities, 603 national polices, 43 monks, and 665 CMAC staff members in order that these group of awarness recievers will be able to further forward the mine/UXO education messages to those living in or around the landmine/UXO contaminated areas.

### ➤ **Community-Based Mine Risk Reduction (CBMRR)**

CBMRR aims to reduce the number of landmine/UXO casualties in its target areas through strategies that can distribute to risk reduction. This network works to develop the capacity of communities to interact with other mine action components and to ensure that these mine action components are responsive to community requests. Local people in the target areas are mobilized to become focal point for the mine/UXO problems in their community through the establishment of Mine/UXO Committee at village, commune and district level. At the same time, the CBMRR Project establishes links with community development Projects to assist with development Projects, which can help to reduce the risk, and with victim assistance Projects to facilitate reintegration of individual injured by mines/UXO.

For year 2021, CBMRR, with its 2,209 volunteers, provided mine risk education messages in 7 heavily landmine affected provinces including Pursat, Battambang, Pailin, Banteay Meanchey, Oddar Meanchey, Siemreap, and Preah Vihea. As a result, CBMRR conducted 5,724 courses of mine/UXO risk education with a total of 145,531 audiences from 52,554 households.



Period	Courses	Audience Group				Total	Households
		Men	Women	Students	Outside-School Children		
Jan-Dec, 2021	5,724	54,565	53,443	18,218	19,305	145,531	52,554

After mine/UXO risk education messages were advertised and spread to the localities, it was notable that many people—old and young, especially those who participated in the courses—became more aware of the danger of landmines/UXOs and particularly knew how to send messages to CBMRR when they encountered landmines, UXOs, or other suspected objects. Therefore, though CBMRR, CMAC received 383 emergency requests and collected 398 anti-personnel mines (AP), 35 anti-tank mines (AT), 1,227 UXOs, and 52kg of small arms.

Period	Emergency Request from the Local Authorities and Communities through CBMRR					CMAC's Response to Emergency Request				
	Request	AP	AT	UXO	Small Arm (kg)	Request	AP	AT	UXO	Small Arm (kg)
Jan-Dec, 2021	383	393	22	1,270	60	356	398	35	1,227	52

### ➤ Community-Based UXO Risk Reduction (CBURR)

With similar objectives to CBMRR, CMAC established CBURR since 2004 to spread the mine/UXO risk education messages to the UXO-affected provinces. Less than a decade of operation, it was unfortunately suspended in 2010 by virtue of financial constraints. However, this programme became activated again from 2012 onwards with financial support from the US project to provide mine/UXO risk education messages in heavily UXO-affected provinces.

For year 2021, CBURR, with its 763 volunteers consisting of 763 CMAC staff and 98 local authorities and communities, provided mine/UXO risk education messages in 17 UXO-affected provinces including Kampong Thom, Kampong Cham, Kampong Chhnang, Kampong Speu,



Kandal, Takeo, Prey Veng, Svay Rieng, Steng Treng, Tbong Khmum, Siemreap, Preah Vihea, Oddar Meanchey, Banteay Meanchey, Battambang, Pailin, and Pursat. As a result, CBURR conducted 1,502 courses of mine/UXO risk education with a total of 116,264 audiences from 36,564 households.



Period	Courses	Audience Group				Total	Households
		Men	Women	Students	Outside-School Children		
Jan-Dec, 2021	1,502	45,800	39,377	24,754	6,333	116,264	36,564

After mine/UXO risk education messages were advertised and spread to the localities, it was notable that many people—old and young, especially those who participated in the courses—became more aware of the danger of landmines/UXOs and particularly knew how to send messages to CBURR when they encountered landmines, UXOs, or other suspected objects. Therefore, though CBURR, CMAC received 319 emergency requests and collected 89 anti-personnel mines (AP), an anti-tank mine (AT), 672 UXOs, and 100 kg of small arms.

Period	Emergency Request from the Local Authorities and Communities through CBURR					CMAC's Response to Emergency Request				
	Request	AP	AT	UXO	Small Arm (kg)	Request	AP	AT	UXO	Small Arm (kg)
Jan-Dec, 2021	319	55	1	674	100	291	89	1	672	100

### ➤ National Police

Having the same objectives as what just mentioned above, national police was trained by CMAC's MRE teams in pursuit of enrichment for more understanding and awareness of mine/UXO risk. After well trained, this volunteer network works independently, not organized by CMAC anymore, to provide mine/UXO risk education in the affected localities.

In 2021, there were 603 national police who received mine/UXO risk education from CMAC's MRE teams and after, they became part of MRE program. This network conducted the operation in the same provinces as CBMRR and CBURR did, for CMAC recently has updated the MRE program by involving national police and monks in order to increase the spread of mine/UXO awareness. As a result of one year operation, national police conducted 5,035 MRE courses with 315,953 audiences from 224,208 households.





Period	Courses	Audience Group				Total	Households
		Men	Women	Students	Outside-School Children		
Jan-Dec, 2021	5,035	132,407	150,847	16,387	16,312	315,953	224,208

After mine/UXO risk education messages were advertised and spread to the localities, it was notable that many people—old and young, especially those who participated in the courses—became more aware of the danger of landmines/UXOs and particularly knew how to send messages to national police when they encountered landmines, UXOs, or other suspected objects. Therefore, through national police, CMAC received 1,381 emergency requests and collected 515 anti-personnel mines (AP), 13 anti-tank mines (AT), 5,546 UXOs, and 12,649kg of small arms 2021.

Period	Emergency Request from the Local Authorities and Communities through National Police					CMAC's Response to Emergency Request				
	Request	AP	AT	UXO	Small Arm (kg)	Request	AP	AT	UXO	Small Arm (kg)
Jan-Dec, 2021	1,381	527	13	5,567	12,645	1,319	515	13	5,546	12,649

## 2.8.2. Victim Assistance

Thanks to demining clearance and mine/UXO risk education programs, the casualties decreased from year to year. In fact, it fell down from 2,298 casualties in year 1997 to 858 casualties in year 2000 and continued dropping to less than 100 in year 2016—that was 83 casualties. However, despite the significant reduction in accidents since the inception of the clearance and mine/UXO risk education program, there were people recorded as being injured or killed by mine or UXO within Cambodia. For many families in rural Cambodia, landmines and UXOs remain a daily threat and a serious obstacle to their ability to maintain a sustainable livelihood and to achieve some level of socio-economic development.

Therefore, CMAC remains committed to working with local NGOs as a linkage with donors to provide assistance including financial support and community development to benefit mine/UXO victims. More remarkably, CMAC has been very





active in coordinating to send the casualties to hospital. CMAC prepared its ambulances and even helicopter—a contracted one—to do this job. In 2021, there was a total of 33 accidents, resulting in 44 casualties including 11 deaths throughout the country. This number decreased 32.30% compared to 65 casualties in 2020.

Date	UXO	Mines		Total
		AP	AT	
January-December 2020	37	19	9	65
January-December 2021	22	6	16	44

### 2.8.3. Post-Clearance Development

In efforts to remove threats, return hopes and rebuild a prosperous future for the Cambodian people, in particular the landmine/UXO victims, not only did CMAC accelerate its clearance operation and supported victim assistance, but CMAC also conducted the post-clearance development for sake of the localities.

Community Development Assistance in 2021 was provided based on the most prioritized needs on necessary infrastructure development in the post-clearance areas in order for better socio-economic improvement in the localities. The projects aimed at converting



minefields/UXO-fields into green farmlands after the clearance activities. CMAC’s Community Development Assistance teams worked in close collaboration with the demining components in order to integrate demining and community development activities together.



There were two projects supported by the People and Government of Japan, contributing to community development in 2021: the Project for Integrated Mine Clearance and Landmine Victim Assistance, Phase I (PIMV-I), implemented in Pailin Province with the cooperation of CA and the Safety Village Construction (SVC) implemented in Banteay Meanchey with the cooperation of the Japan Mine Action Service (JMAS).



➤ **Project for Integrated Mine Clearance and Landmine Victim Assistance, Phase I (PIMV-I)**

PIMV-I constructed a total of 4,579 m of rural and farm roads, 3 places of water cross structure, and a community market in Pailin Province, while SVC constructed 3,928 m of new rural roads, 5,162 m of canals, a drainage, and 3 community ponds, repaired 2,239 m of laterite roads, and filled 10,000 m<sup>2</sup> of soil in the school yard in Banteay Meanchey Province. Besides infrastructure improvement, CMAC project teams also focused on providing agriculture and animal husbandry trainings to the communities in the project areas in order that they would become skillful farmers. To reiterate, all achievements thereof have contributed to bettering the livelihood of the individuals and communities living both in and around the post-clearance areas.



➤ **Safety Village Construction (SVC) Project**

The Safety Village Construction (SVC) is part of Reconstruction Support of Demining in Banteay Meanchey (RSDB) project, and aims to bring about the personal security and safety of the people and community living in the mine affected areas in Toul Pong Ro commune, Malay district, Banteay Meanchey province, and to improve their economic and social opportunities through community infrastructure rehabilitation and development.



The project was implemented by CMAC in partnership with JMAS in Srolao Chroum Village, Toul Pong Ro commune, Malay district, Banteay Meanchey province. This project has fully been funded by KOMATSU Co. Ltd and the Japan Mine Action Service (JMAS) in Phnom Penh Cambodia.





In 2021, with joint efforts between CMAC staff and JMAS Technical Advisor, the project achieved the following fruitful outcomes:

- One primary school with 3.5 rooms in Srolao Chroum Village, Toul Pong Ro Commune
- 5946m meters of earth road cover laterite with both-side gutter
- 5986 meters of road maintenance
- 6 Box culverts (1mx6m)
- 5 community pond (36mx88mx5m)
- 1 pump well



The construction of these facilities was based on the request from the community and local authorities for the purposes of:

- Transportation of agriculture products to central commune and market
- Flood prevention and provide water for irrigation and drinking water
- Improvement of quality of rural infrastructures and living condition of the people after mine clearance

The number of 716 people in 186 families living Srolao Chroum, Toul Pong Ro commune directly benefited from the construction of these facilities.



## 2.9. CMAC Community Development Centre

Undeniably, all CMAC’s field staff members always move from place to place in their job. When they finish the landmine/UXO clearance in one site, they will have to move to start clearing in other sites at different places, so their lives—and the families—are not in only one area, focusing on doing certain business and developing the economy for the family. Deminers sacrifice their lives, efforts,



and time in removing threat and danger from landmines and UXOs as well as in contributing to development for Cambodia. However, looking back at themselves, their livelihood is far inferior to the people in the community. In order to encourage the deminers, CMAC established a so-called CMAC Community Development Centre (CDC), located in Koas Krala District, Battambang Province. This community provides house land and farmland to CMAC's deminers, aiming at integrating the retired CMAC staff members, especially the disabled, into a similarly sustainable livelihood as the other Cambodia people who benefit from post-landmine/UXO clearance have been enjoying.

CDC contributed development not just to CMAC retired staff members but also to individuals and communities nearby. The roads, ponds, reservoirs, canals, drainages, trees and so on served both the people living in and near the CDC. In 2021, CDC provided agricultural trainings and produced 4,310 young plants, planted 125 trees, repaired a total of 45,250m of rural roads, a total of 450m of the broken dams, and an drainage, restored 50m of canal with planting flowers, constructed 120m of canal with planting trees along its bank and 2 ponds, and removed one drainage. CDC was a place for COVID-19 patients as well during the spread of the viral virus in Cambodia.





## 4. CORPORATE MANAGEMENT

### 4.1. Human Resources Management

In maintaining the function of CMAC, the Department of Human Resources implements the human resource information system to enhance the management of staff information, staff relocations, and essential database staff information within the organization. This information system has significantly improved the process of staff information management, therefore enhancing the management of skills and resources within the organization. Furthermore, the process of identifying key skills to match areas of work has been improved, allowing CMAC management to better utilize the expertise of staff. In addition to this, the system enables staff's personal data to be stored in a central database maintained at CMAC Headquarters in Phnom Penh to be well maintained and protected.

#### ➤ Staff Deployment

From January to December 2021, CMAC deployed 1,446 staff members including 1,217 permanent staff members and 197 Short Service Agreement (SSA) staff members to support its field operations and office work. Furthermore, 32 staff stood down from the job. For further details, please kindly find the following table.

No.	Location/Operation Site	Permanent Staff	SSA Staff	Stand-Down	2021	2020	Increase/Decrease	
					Total Staff	Total Staff	Staff	%
1	Headquarters	156	18	6	180	151	29	19%
2	Demining Unit 1	115	19	1	135	130	5	4%
3	Demining Unit 2 & ITT	328	62	7	397	450	-53	-12%
4	Demining Unit 3	79	13	2	94	112	-18	-16%
5	Demining Unit 4	53	12	1	66	81	-15	-19%
6	Demining Unit 5	156	9	3	168	194	-26	-13%
7	Demining Unit 6	113	19	9	141	111	30	27%
8	Development DU	61	2	1	64	56	8	14%
9	Central Workshop	14	3	0	17	16	1	6%
10	Dog Centre	36	14	0	50	39	11	28%
11	Community Development Centre	2	3	1	6	9	-3	-33%
12	Peace Museum of Mine Action	2	3	0	5	5	0	0%
13	Technical Institute of Mine Action	34	16	1	51	36	15	42%
14	Pailin Frontline Unit	68	4	0	72		72	NA
<b>Total:</b>		<b>1,217</b>	<b>197</b>	<b>32</b>	<b>1,446</b>	<b>1,390</b>	<b>56</b>	<b>4%</b>

#### ➤ Staff Training

During the year, the human resources capacity has been well managed and strengthened with the necessary skill sets and information technology. The commitment towards building staff effectiveness can be shown through provision of training courses to employees irrespective of their current job



positions. The Department of Human Resources worked very closely with the relevant departments, especially Technical Institute of Mine Action (TIMA), to conduct a training needs assessment (TNA), identify and organize training courses, arrange staff for training and make sure that training records were well updated and maintained for all staff. The trainings were well embedded within the human resource management system and categorized into internal and external trainings.

In spite of the context of COVID-19, the internal trainings were conducted in an attempt to strengthen as well as to refresh the capacity of CMAC staff members—usually before deploying to the new projects. Not just were what mentioned thereof, but the internal trainings also provided the Basic Demining Course to the raw recruits (completely new deminers) before they became well-trained deminers to fight against the legacy of war in contribution to saving lives and supporting development for Cambodia. The following table indicates the internal trainings that TIMA achieved in 2021:

No	Name of Course	No. of Trainee	Male	Female	Start	End
1.	Capacity Building for Team Leader	50	50	0	04-02-21	19-02-21
2.	Basic Demining Course 141	83	60	23	18-05-21	16-11-21
3.	Team Leader Skill Training Course	28	28	0	28-06-21	16-07-21
4.	Mine Detection Dog for Instructor	15	13	02	07-07-21	17-08-21
5.	Team Leader Skill Training Course	28	28	0	06-12-21	31-12-21
6.	2ic Team Leader Skill Training Course	48	48	0	06-12-21	31-12-21
7.	Basic Dog Handler	20	11	09	13-12-21	15-03-22
<b>Total:</b>		<b>272</b>	<b>238</b>	<b>34</b>		

Regarding the external trainings, besides MRE training to national police, CMAC also provided the Basic Demining Course (Generation 140) to 100 trainees from the Royal Cambodian Armed Forces (RCAF) from 22 February 2011 to 07 May 2021. The training was to enrich the capacity and skills of the Cambodian soldiers.

### ➤ Staff Motivation

In terms of staff motivation, CMAC provides equal opportunities to all staff members to receive trainings, to be promoted to higher positions, to receive an increase in salary, to work in different positions, and to regularly access work areas for staff safety. The table below shows the staff motivation activities in 2021.

No	Description	Staff
1.	Position/Location Rotation	1051
2.	Promotion/Salary	86
3.	Sick leave without pays	11
4.	Leave without pay	21
5.	Maternity/Pregnancy leave	6
6.	Re-appointment	28
7.	New position appointment	122



## ➤ Staff Separation

For this reporting period, 48 staff contracts were terminated. The main factors of staff separation are listed below:

No	Description	Staff
1.	Abandon the post	1
2.	Resignation	21
3.	Disability of work and chronic illness	0
4.	Death	7
6.	Turnover	2
7.	Incompetence	0
8.	End Contract	17

The decrease of staff has posed concern to the quantity and quality of CMAC operations. Among the staff members who resigned and left CMAC, most of them got a new job with better payment, and other resigned from CMAC to work for demining operators overseas, while some resigned due to family circumstances—they moved their place of living—or due to personal health issues. Another concern to CMAC management within staff resignation is due to the increase number of retired staff as well as uncertainty and instability with the employment resulted from project termination, suspension, gap and downsizing of funding.

## ➤ Compensation and Incentive Payment

CMAC has been committed to a reasonable staff compensation policy to ensure that staff are fairly treated in case of injuries, death or other types of staff separation, in consideration of their past performance and duration of service. For the year 2021, CMAC spent a total amount of USD 36,598.27 on staff compensation, in which USD 28,800 was paid on compensation due to staff death and USD 7,798.27 for medical operations.

## ➤ Retirement Staff

Under the tireless efforts of incumbent CMAC management, CMAC staff members who reached the retirement age or requirement, since 2018 onwards, were allowed to get retirement title as military official in the Ministry of National Defense. The year 2021 marked the 4<sup>th</sup> phase that CMAC put its retired staff members to the Ministry of National Defense. The following table indicates that 324 CMAC retirement staff members got successfully sent to the Ministry of National Defense in year 2021.





Phase	Year	Reach	Apply for	Decided after checking the target							Total Staff
				Retirement		Disabilities		Deaths		Disappearances	
				M	F	M	F	M	F		
Phase I	2018	409	0	214	4	90	1	53	4	43	409
Phase II	2019	122	0	78	1	42	1	0	0	0	122
Phase III	2020	73	91	80	3	72	2	7	0	0	164
Phase IV	2021	63	261	202	7	101	8	6	0	0	324
<b>Total:</b>				<b>574</b>	<b>15</b>	<b>305</b>	<b>12</b>	<b>66</b>	<b>4</b>	<b>43</b>	<b>1,019</b>

### ➤ New Demining Expert Recruitment

Since its inception in 1992 with all experts in mine action sector, now CMAC has turned almost 30, and most of the staff members also reached the retirement age and requirement. For instance, from 2018 to 2020, there were almost 700 CMAC staff members who got retired. This has posed a big concern for staff management and deployment since there would be a sharp decrease of staff deployment from the operations.

However, with wise leadership of CMAC top management team, a so-called New Demining Expert (Successor) Program was initiated and thus established since year 2017 in order to readily prepare to respond to the upcoming numerous amounts of retirees from 2018 onwards. The program has aimed at replacing the retirees as well as cultivating the spirit of new demining successors so as to continuously boost acceleration of the clearance operations.

In the procedural selection of candidates as new demining experts, male and female adult children of CMAC demining experts have been encouraged to apply application form to CMAC. However, the selection has been conducted in very strict and thorough manners based on some requirements as the followings:

- Family documents/Personal information: each candidate must be a son or a daughter of CMAC demining experts or CMAC office officials.
- Age: each candidate must be between 18 and 35 years old.





- Education: each candidate must hold a certificate of a high school diploma or at least used to study in Junior High School (Grade 7).
- Physical and Mental Health: each candidate must be physically and mentally healthy, plus innocent of addictive substance/drug.
- Height: each male candidate must be at least 160 cm tall, while female candidate must be at least 155 cm tall.

For year 2021 alone, CMAC selected candidates to train for beginner course called Basic Demining Course. As a result, there was a total of 242 male/female candidates who passed the procedural selection and the basic demining course. Thus, they all have been further trained in order to be deployed to various demining sites to carry on the demining operations.

➤ **Staff Health Care**

CMAC has also taken good care of the health of staff members by introducing emergency education, general health check and health care, and so on, providing first aid trainings, evaluating staff health, and performing 99 evacuation exercises for helping the victim in case of emergencies. More than that, CMAC coordinates with the National Social Security Fund (NSSF) to issue NSSF Card for CMAC staff members so that they can get health check or hospitalized for free. In case they are seriously sick, CMAC coordinates directly with the hospital to rescue them by helping deal with the payment. For instance, CMAC in 2021 sent 88 staff members to the hospital for rescue. Unfortunately, there were 6 deaths among the 88 sick staff members.



Besides, Cambodia in 2021 was seriously suffered from insurmountable difficulties of COVID-19. The virus spread throughout the county, and in response, the Royal Government imposed the curfew and lockdown in the country to prevent that spread. Plus, under wise leadership of the Royal Government, anti-COVID-19 vaccines were feasible soon after the spread of the virus. Therefore, CMAC top management spared no effort to closely work with the Ministry of National Defense and Ministry of Health to get 1,234 CMAC staff members jabbed with the third dose of vaccines, which represented 85.33% compared to 1,446 staff members deployed in 2021. The rests who did not get jabbed were due to some reasons such as allergy, chronic disease/illness, and pregnancy or plan for pregnancy.

disease/illness, and pregnancy or plan for pregnancy.



No.	HQ/DU	Vaccine Data for CMAC Staff Members in 2021		
		First Dose	Second Dose	Third Dose
1	HQ	139	139	139
2	DU#01	133	133	115
3	DU#02	279	279	334
4	DU#03	138	138	138
5	DU#04	29	29	29
6	DU#05	137	139	139
7	DU#06	134	134	135
8	PFN (Pailin Frontline Unit)	43	43	44
9	DDU (Demining Development Unit)	Data counted in TIMA		
10	TIMA (Technical Institution of Mine Action)	88	88	47
11	MDD (Dog Center)	49	47	47
12	CWS (Central Workshop)	15	16	16
13	CDC (Community Development Centre)	6	6	6
14	ITT (Infrastructure Technical Team)—Engineer	7	7	7
15	PMA (Peace Museum of Mine Action)	Data counted in DU#04		
<b>Total</b>		<b>1,197</b>	<b>1,253</b>	<b>1,234</b>

In spite of attempt to prevent the infection of COVID-19 by pouring vaccines into all staff members, in 2021 alone, there were 46 CMAC staff members who became infected. However, there were no death of this pandemic. All of them were sent to rescue and ultimately got a well recovery.

#### Other activities:

- Issued the 2021 Individual Retirement Plan.
- 31 staff officers who have reached retirement age and volunteered to retire before the deadline are included in the Royal Cambodian Armed Forces (RCAF) of the Ministry of National Defense and are targeted for disability and death pensions.
- Coordinated and cooperated with the Sub-Committee on Policy of Veterans, Deaths, Disappearances, Disabilities and Pensions of the Ministry of National Defense to prepare for indemnity payments for 644 representatives of the families of fallen, disabled and retired soldiers.
- Recruited new employees, who had completed the 139<sup>th</sup> Basic Mine Action Techniques Training Course, and deployed them to carry out demining operations in various demining units.
- Requested and issued health equity fund pass to 1,297 staff.
- Disseminated policies and procedures for applying early retirement and submitting voluntarily for early retirement.
- Paid functional sovereign fund to 107 retired staff.
- Monitored, disseminated, guided and implemented measures to prevent and prevent the spread of COVID-19 according to the directives of the Ministry of Health and the Royal Government.





## 4.2. Support Management

The Department of Support has been assigned to provide improvement of support services to all operational areas of CMAC. The department has made tremendous efforts to support the operational work of CMAC, ranging from assessing logistical needs to the procurement and distribution of supplies, the maintenance of small vehicles and repairs, and the support to the management of the CMAC transport fleet and machinery.

### ➤ Logistic Management

Responding to the challenges of providing equipment, logistical support to an organization deployed work forces to various remote parts of Cambodia. The department paid a high level of attention to their communication and logistic systems, ensuring that there was continual monitoring. The current systems have enabled the department to perform its duties and deliver satisfactory results.

The followings are the achievements during the year 2021:

- ❖ Prepared a table comparing the increase or decrease of state assets for 2020
- ❖ Regularly and monthly managed and monitored the movement of all equipment.
- ❖ Received and supplied all kinds of operational equipment, including uniforms, shoes, mine clearance equipment and tires to all Demining Units and projects.
- ❖ Received and distributed the materials donated by the Royal Government budget such as laptop, desktop computer, office desk and chairs to all demining units.
- ❖ Distributed desktop computer and tablet donated by MAG to database office, operation department and all demining units.
- ❖ Conduct consumable store stock take to verify and evaluate the condition, availability and operational requirements of the field.
- ❖ Coordinated with all demining units to check the existing operational equipment in order to equip to the team before reaching the target.
- ❖ Checked, verified, and evaluated the condition of equipment and operational equipment requirements for the field.
- ❖ Facilitated the preparation of medical equipment and other hygiene items such as water, alcohol spray hose, soap powder, water tank, thermometer, thermometer and scarf to distribute to staff in all units as the hygiene and infection prevention measures against Covid-19.





## ➤ Maintenance and Transport Management

Transportation is the biggest component of CMAC operations and constitutes the largest cost in the inventory. The costs are mainly attributed to spare parts, fuel, and maintenance costs. To run its operations smoothly, there must be a proper maintenance and strict management for vehicles, mechanical clearance machines (Brush Cutter and Heavy Demining Machines), and other demining equipment.

Through the efforts to manage the means of transport to ensure their quality and reliability for supporting operations on the ground, some achievements in 2021 are presented as follows:

No	Type of Vehicles	Qty
1	Vehicles of various classifications	511
2	Brush cutting machines (excavator type)	44
3	Bulldozers	2
4	Heavy demining machines	13
5	Tractor, Kubota	2
6	Excavator	1
7	Compact Roller	2
8	Motorbikes	101
9	FORKLIFT	2

- ❖ Checked and verified the fuel consumption report from each demining unit, TIMA, PMA and CDC and submit the payment to department of finance.
- ❖ Prepared quarterly fuel consumption plans for all Demining Units and projects to ensure project level utilization and budget.
- ❖ Monitor and update vehicles and machinery to ensure both quality and efficient usage to meet the operation requirement in the fields.
- ❖ Modified and equipped with the installation of roof, cabin and rear seats and rear pedals for Isuzu Truck, and roof tent and rear seat for L/C Double Cab.
- ❖ Cooperated with CMAC Central Workshop to conduct maintenance service for all vehicles and demining machines.
- ❖ Cooperated with CMAC Central Workshop to inspect the quality and condition of the cars and heavy machinery, and changed engine oil for all types of vehicles for all Demining Units. In addition, damaged tires were replaced.
- ❖ Coordinated with the General Department of Taxation to deal with 256 vehicles fined and 418 road tax applications for 2021.





## ➤ Mine Detector Management

Mine Detector is the key tools for supporting the demining operations. In efforts to support the demining operations in 2021, Mine Detector Division conducted many tasks as the followings:

- ❖ Repaired 375 units of all type of mine detection machines.
- ❖ Coordinated with all Demining Units to check the quality of the use of rechargeable batteries for mine detector and replace damaged batteries.
- ❖ Coordinated with QA/QC department to check and verify the unserviceable mine detector in the store for future repair.
- ❖ Provide trainings to the Royal Cambodian Armed Forces on the use and maintenance of Ebinger UPEX 740M, Minelab F3 and CEIA-D1/DS.



## ➤ Explosive Management

In 2021, the CMAC explosive section played a vital role in explosive delivery, not only to all CMAC demining units but also to other demining operators. The followings are the achievements for a period of 12 months from January to December 2021:



- ❖ Received 30,000 block of recover explosives from Explosive Harvesting Program (EHP) for supporting operation of CMAC from the CMAC-EHP Golden West Cooperation Project.
- ❖ Issued 100g EHP Charge Booster to all Demining Units and Teams, HALO Trust, MAG, NPA and CSHD for supporting their operations.
- ❖ Conducted spot check on store custody, management and utilization at all Demining Units, HALO Trust, MAG, CSHD and NPA.
- ❖ Conducted surprise check to mobile teams for the usage and requirement of explosive in order to ensure that the management, transportation and storage of explosive have been properly conducted in a safe manner.
- ❖ Coordinated with other relevant institutions and CMAC departments for the deployment of Interior and Intervention Team for security safety to high-ranking official meetings and national events.





## ➤ Procurement Management

Given the nature, size and locations of CMAC's operations which is based on stock, on-time support is a vital role for Procurement Section. The Section must identify and purchase quality materials and equipment in a transparent manner, then deliver it in a timely manner to field teams and Demining Units to meet requirements of field operations. Some key achievements during this year are described as follows:

- Coordinated with specialized institution in preparing legal documents to import materials donated by Japanese Government through the Peace Building project, Japanese Min Action Service, Sorghum Project, and fuel for operations support.
- Conducted file documents for purchase and resettlement for all projects.
- Coordinated preparation of house rental contract for mobile teams and Demining Units.

## 4.3. Project Management

To smoothly manage all the projects and accurately develop an advance project proposal, CMAC in early 2012, newly created one of the most important pillar Departments which currently is the Department of International Cooperation and Project Management (DIC&PM). DIC&PM liaises with all departments of CMAC to ensure that project proposals are well developed, funding secured, resources deployed and to ensure project outcomes and outputs are monitored, analyzed and reported. DIC&PM also maintains CMAC's relationships with the donor countries and development partners to make sure that their requirements will be achieved by the projects that have been funded. Besides, DIC&PM also ensures that the new funding opportunities will be identified and secured.

More importantly, DIC&PM has been established in order to strengthen project management and coordination as well as donors/partners relationship. DIC&PM, moreover, coordinated with mine affected countries and international organizations to advance the sustainable development campaign via trainings. DIC&PM also plays an active and responsible role towards the international community and to contribute to international training programs on mine action sector through sharing experiences and learning from CMAC.

The nature of project funding to CMAC has been provided through a number of Channels. However, the financial cash flows into CMAC have so far involved with two kinds of project funding types: the project funding received from donor contributions including bidding projects and the project funding received from contractual service. In year 2021, CMAC received most of its project funding through donor contributions and bilateral contractual aside from the bidding projects.

## ➤ Project Funding from Donor Contributions

The project funding contribution refers to the humanitarian specific projects bounded by agreements signed between CMAC, on behalf of the Royal Government of Cambodia, and the particular development partners. This type of contribution was directly channeled to CMAC. In 2021, CMAC implemented 15 bilateral projects and 3 bidding projects. However, it is suggested that donors and



development partners who wish to support CMAC operations place their support through bilateral funding scheme. The table below shows the operational projects through bilateral contribution among donors and partners in the year 2021—plus another 3 bidding projects of Clearing for Results supported by UNDP.

No.	Grand Title	No. of Projects
<b>I. BILATERAL PROJECTS</b>		<b>15</b>
1	Royal Government of Cambodia	1
2	United States of America-NPA-DU5	1
3	Golden West Humanitarian-TIMA	1
4	Improving Settler for Disable Staff	1
5	CCL4-China Aid	1
6	IMV4-JPN	1
7	IMCCD-JPN	1
8	CMAC-Community Development Assistance project of the post clearance-JPN	1
9	CMAC-JMAS (RSDB-RSCS & SVC) Project	2
10	APOPO Fund	2
11	Japan International Cooperation Agency (JICA)	3
<b>II. BIDDING PROJECTS</b>		<b>3</b>
1	UNDP-Clearing for Result (CFR)	3
<b>BILATERAL AND BIDDING PROJECTS IN 2021 IN TOTAL</b>		<b>18</b>

### ➤ Contractual Service Projects

Besides humanitarian demining activities in 2021, CMAC also provided the contractual services to support development in various sectors in the Kingdom of Cambodia. In 2021, CMAC had 2 contractual projects with the Mine Advisory Group (MAG) and another 2 with Ministry of Economy and Finance of Cambodia (MEF). The table below shows the 4 operational projects implemented by CMAC through contractual service in year 2021-2022.

No.	Grand Title	No. of Projects
<b>CONTRACTUAL SERVICE PROJECTS</b>		<b>4</b>
1	Mine Advisory Group (MAG)	2
2	Road/Sewer Pipe and Sewage Treatment Plant and Construction-MEF	1
3	National Road 5 Borrow Pit-MEF	1

### ➤ Project Monitoring

In the field of project management, DIC&PM has regularly conducted all projects monitoring by:



- Managing and coordinating with all elements of the project's overall progresses and productivities,
- Providing support and guidance to the Project Focal Person/Coordinator and core project staff,
- Providing advice to the Project Focal Person/Coordinator in relation to the implementation of project activities and the development of monthly, quarterly and annual report, and
- Investigating in each project outcome with its implementation period.

To effectively manage all projects, DIC&PM has developed its project management matrix where each project has its clear start and end date—the places where the project operated and the name of partners and donor contribution. In pursuit of more understandings, please find the following Table indicating the project management matrix in 2021 with the detail information of the 51 projects including 20 on-going projects, 17 completed projects (January-December 2021), 4 in-the-pipeline projects, and 10 under-negotiation projects.

Sr	Donor/Partner	Project Location	Project title	Project Period			
				Period (moths)	From	To	
<b>I- On-going Humanitarian Demining Projects</b>							
1	UNDP	CMAA	DU1	Mine/ERW Clearance in BMC	12	1-Jan-22	31-Dec-22
2	JPN	JMAS	DU1	Reconstruction Support with Demining Disposal in BMC	12	1-Mar-21	28-Feb-22
3	JPN	JMAS	DU1	The Project of Safety Village Construction (SVC)	12	1-Apr-21	31-Mar-22
4	UNDP	CMAA	DU2	Mine/ERW Clearance in BTB	12	1-Jan-22	31-Dec-22
5	JPN	CA	DU2 & 3	The Project for Integrated Mine Clearance and Landmine Victim Assistance (PIMV)	24	1-Jul-20	30-Jun-22
6	JPN	IMCCD	DU2	Community Anti-tank Mine Clearance	12	16-Aug-21	15-Aug-22
7	MAG	MAG	DU2	Leasing MDD to MAG Cambodia Program (SLD #12)	12	1-Nov-21	30-Oct-22
8	MAG	MAG	DU2	Leasing MDD to MAG Cambodia Program (SLD #05)	12	1-May-21	30-Apr-22
9	UNDP	CMAA	PFU	Mine/ERW Clearance in PLN	12	1-Jan-22	31-Dec-22
10	MDR	APOPO	DU4	Training, Testing & Operational Development of APOPO MDR	12	1-Jan-22	31-Dec-22
11	USA	NPA	DU5	Cluster Munitions Remnant Survey (CMRS) and Clearance in Eastern Cambodia	12	1-Mar-21	28-Feb-22
12	JPN	JMAS	DU6	Reconstruction Support with cluster Disposal in Stung Treng	12	1-Mar-21	28-Feb-22
13	RGC	RGC	DDU	Road/Sewer Pipe and Sewage Treatment Plant & Construction			



14	RGC	RGC	DDU	National Road 5 Borrow Pit			
<b>II- On-Going Victim Assistance, Post Clearance Development and Technical Cooperation Projects</b>							
15	RGC	RGC	HQ	Royal Government Fund	12	1-Jan-21	31-Dec-21
16	JPN	JPN	HQ	South-South Cooperation Program on mine action for Lao PDR	36	2019	2023
17	JPN	JPN	HQ	South-South Cooperation Program on mine action for Republic of Colombia		2017	2022
18	AA	AA	CDC	Improving Shelters for Disabled Staff	6	AA	AA
19	JPN	JICA	HQ	Strengthening CMAC Function		2020	2024
20	USA	GW	TIMA	Explosive Harvesting Program	36	1-Jan-18	31-Dec-20
<b>III- Completed Projects from January to December 2021</b>							
1	JPN	JPN	DU4	Comprehensive Mechanical Demining (CMD)	12	1-Jan-21	31-Dec-21
2	USA	NPA	DU5	Cluster Munitions Remnant Survey (CMRS) and Clearance in Eastern Cambodia	12	1-Mar-20	29-Feb-21
3	JPN	SVC	DU1 & 2	Community Development Assistant Project of the post mine clearance	12	1-Apr-20	31-May-21
4	MAG	MAG	DU2	Leasing MDD to MAG Cambodia Program (SLD #12)	12	1-May-20	30-Apr-21
5	MAG	MAG	DU2	Leasing MDD to MAG Cambodia Program (SLD #03)	12	1-May-20	30-Apr-21
6	MAG	MAG	DU2	Leasing MDD to MAG Cambodia Program (SLD #05)	12	1-Jun-20	31-May-21
7	MAG	MAG	DU2	Leasing MDD to MAG Cambodia Program (SLD #12)	1	1-Jun-21	30-Jun-21
8	JPN	IMCCD	DU2	Community Anti-Tank Mine Clearance	12	16-Aug-20	15-Aug-21
9	MAG	MAG	DU2	Leasing MDD to MAG Cambodia Program (SLD #12)	4	1-Jul-21	30-Oct-21
10	UNDP	CMAA	DU1	Mine/ERW Clearance in BMC (CFR2021)	12	1-Jan-21	31-Dec-21
11	NPA	NPA	DU1	Pilot Project Survey and Clearance on Cambodia- Thailand Border	2	1-Nov-21	31-Dec-21
12	UNDP	CMAA	DU2	Mine/ERW Clearance in BTB (CFR2021)	12	1-Jan-21	31-Dec-21
13	UNDP	CMAA	PFU	Mine/ERW Clearance in PLN	12	1-Jan-21	31-Dec-21
14	NPA	NPA	Kep	Kep Mine Free Province Project	1	1-Dec-21	31-Dec-21
15	MDR	APOPO	DU4	Testing and Cooperation Development of APOPO MDR	12	1-Jan-21	31-Dec-21
16	MDR	APOPO	DU6	Acceptance Trial Technical Survey Dog with Smart Kits integrated with CMAC Capacity on Land Release	5	1-Aug-21	31-Dec-21
17	China	China	DU6	The China-Aided Cambodia Landmine	12	1-Jan-21	31-Dec-21





Elimination Project (phase 2)							
<b>IV- In-The-Pipeline Projects</b>							
1	JPN	JICA	HQ	Southwest Irrigation System	12	1-Mar-18	28-Feb-19
2	RGC	PNA	DU4	Landmine and ERW Clearance in Angkor Heritage Compound (Phase 2)		1-Jan-20	31-Dec-20
3	JPN	CA	DU2	Equipment and spare parts			
4	JPN	JICA	HQ	Equipment and spare parts (JICA)			
<b>V- Under-Negotiation Projects</b>							
1	APOPO	Belgium		Expand Demining Machine & Rats in Preah Vihea			
2	APOPO	USA		Expand Demining Machine & Rats			
3	APOPO	UN		Purchase MDD For Oversee Operation			
4	R & D	JPN		Excavation Tool from Hiroshima			
5	R & D	USA (MAG)		Universal Database Field Networking			
6	R & D	Germany		Valloon Detection Improvement			
7	R & D	Australia		Melbourne University Support MDD			
8	R & D	Norway		Strengthen MDD Capacity			
9	NPA	NPA	DU1	The Project for humanitarian demining cooperation between Cambodian Mine Action Center and Thailand mine action center toward landmine impact free by 2025			
10	PRC	MEF		Toward impact free Cambodia 2025: China-Aided Landmine/ERW Elimination Project in the Kingdom of Cambodia			



#### 4.4. International Cooperation

South-South Cooperation program has been initiated since 2012 by the Japan International Cooperation Agency (JICA) to support the Third Country Training Program (TCTP), a scheme in which JICA provides participants from developing countries with a technical training program in collaboration with a Southern partner (third country) for the purpose of transfer or sharing of development experiences, knowledge, and technology, for mine affected counties.



CMAC has been involved with TCTP in the purpose of exchanging experience, knowledge and know-how in mine action sector with some countries such as Angola, Colombia, Iraq/KRG, and Lao PDR. Not only have those countries benefited greatly from the program, but CMAC has also had the opportunities to build and improve capacity for better development from those countries through TCTP.

Knowledge exchange and experience sharing among mine and UXO affected counties are ways of enhancing the mine action practice due to different natures of landmine and UXO problems and practices by individual country. This training is a model for other mine and UXO affected countries in sharing knowledge and exchanging experiences in mine action sector.

It is intended also to enhance mine action in those effected countries by developing human resources and strengthen institutional capacity of those institutions through sharing experiences and learning from CMAC in mine action regarding to different topics.





Due to the outbreak of COVID-19, Cambodia took several steps to prevent the spread of such viral virus. In fact, the Royal Government of Cambodia imposed measures to restrict the people from gatherings at the beginning. Later, curfew was imposed ahead of the complete lockdown in the entire country. During the lockdown, all types of business, party, or unnecessary traditional ceremony aside from food service were temporarily terminated. In order for self-protection, the Ministry of Health issued the directives instructing the people to protect themselves from infection of COVID-19 by wearing mask regularly, especially when going outside their living houses, washing hands with handwashing soaps, alcohol, or sanitized ethyl alcohol gel, and keeping distance between each other. At the same time, the Royal Government also tightened the travel law with strict requirements before entering Cambodia. Unless travelers, especially foreigners, had a positive confirmation of COVID-19 infection for at least the last 72 hours, they would be allowed to do self-quarantine for 15 days in the hotel. Therefore, since it was too complicated too, CMAC decided to delay several major cooperation events such as training courses to Colombia and Laos in 2020.

There were five courses under South-South Cooperation Phase III. Information and Quality Management was the second among five training sessions as agreed in the Minutes of Meeting by the three parties: CMAC, UXO Lao, and JICA. This course should have been held in mid-2020; however, due to the outbreak of COVID-19, it was delayed until late 2021. As the COVID-19 pandemic still posed high risk until 2021, the two parties CMAC and UXO Lao, under the coordination from JICA, decided to organize this course online.

In training process, the course was divided into two sections. The first was about the Information Management held from November 8 to 12 November 2021, including a total of 14 participants (7 participants from CMAC led by Mr. Ea Kimly and another 7 participants from UXO Lao led by Mr. Kitsana Inthavong). The second one was the Quality Management held from November 22 to 26 November 2021, including a total of 15 participants (7 participants from CMAC led by Mr. Khun Ratana and 8 participants from UXO Lao led by Mrs. Malayvanh Phanthavongsa).

No	Name of Course	Country	Trainee	Start	End	Remarks
1.	Information Management	Online	14	08-11-21	12-11-21	Completed
2.	Quality Management	Online	15	22-11-21	26-11-21	Completed
<b>Total:</b>			<b>29</b>			

#### 4.5. Quality Management and Internal Audit

Quality Management and Internal Audit are key management function that would be done based on CMAC internal procedures and standard, serving as a tool for managers in decision-making, prospective evaluation, and problem solving. Monthly, weekly field visit by designated staff both at HQ (QA/QC unit) and Demining Unit QA/QC team will be organized to inspect the support services function and demining operations activities to observe whether the productivity and discipline of deminers are maintained, and to assess what is the requirement in the field for supporting the demining operations effectively and sufficiently.

The internal audit was performed based on review of the pertinent documentation relating to selected deliverables, interviews with management and field personnel responsible for their tasks



and direct observations of the clearance process. The audit team analyzed and evaluated information gained throughout the process in order to make a determination whether or not the performance was satisfactory. Recommendations and advises were given to the top management in terms of operational point of view and support function to speed up field productivities when feedback and physical monitoring at the fields have been received and conducted.

### ➤ Internal Audit on Support Services and Operations Function

During the reporting period as of 31 December 2021, CMAC audit teams has conducted audit on support services function and operations function and found 157 deficiencies requiring immediate attention on site correction and further action. These found deficiencies require addressing on site correction and to be addressed at the field by the Demining Unit level and headquarter staff.

No.	QA Team	Description (shift)		Finding and Corrective Action		Follow up action
		QA/QC (shift)	QC Prior MF handover	Deficiencies (case)	Correction (case)	
1	QA HQ	01 shift	00	12	09	03
2	Sub QA	00	00	00	00	00
3	QA DU1	18 shifts	47 shifts = 49 MF	21	19	02
4	QA DU2	12 shifts	04 shifts = 4 MF	67	39	28
5	QA DU3	00	00	00	00	00
6	QA DU4	00	00	00	00	00
7	QA DU5	24 shifts	24 shifts	57	57	00
8	QA DU6	00	00	00	00	00
<b>Total</b>		<b>55 shifts</b>	<b>75 shifts = 53 MF</b>	<b>157</b>	<b>124</b>	<b>33 cases</b>

For further detail, please see the finding 157 deficiencies in different demining units in year 2021 as described in the table below:

No	Description	Deficiencies (Cases)	Corrective Action
1	<p><b>SOPs Compliance:</b></p> <ul style="list-style-type: none"> <li>▪ BCT#01-DU1: Long Grass Cutting make deminers difficult to use detector in searching mine.</li> <li>▪ BCT#02-DU1: the grass cutting in each lane of each team was found inconformity to SOP e.g. grass was cut and thrown into minefield.</li> <li>▪ BCT#02-DU1: their detectors and safety helmets were placed in minefield.</li> </ul>	3	<ul style="list-style-type: none"> <li>• Immediate debrief to minefield commander, platoon and section commanders and correcting in place.</li> <li>• Debrief to DUs Manager, OPS and DUs QA.</li> </ul>
2	<p><b>Mine Marking:</b></p> <ul style="list-style-type: none"> <li>▪ TSC#11/DU1: Permanent concrete poles were not marked at the corners of the cleared MF</li> </ul>	16	<ul style="list-style-type: none"> <li>• Immediate debrief to minefield</li> </ul>



	<ul style="list-style-type: none"> <li>▪ TSC#13/DU1: Permanent concrete poles were not marked at the corners of the cleared MF</li> <li>▪ TSC#02/DU1: mine sign were not properly used to mark safe, un-safety, clear and un-cleared areas</li> <li>▪ BCT#02/DU1: mine sign were not properly used to mark safe, un-safety, clear and un-cleared areas</li> <li>▪ MPB#02, BAC#04, BAC#05, CTS#01, #03, #07, #08/DU5: No signs to show road entre to minefields.</li> <li>▪ PBC#07, TSC#35, #27/DU2 No signs to show road entre to minefields.</li> </ul>		<p>commander, platoon and section commanders and correcting in place.</p> <ul style="list-style-type: none"> <li>• Debrief to DUs Manager, OPS and DUs QA.</li> </ul>
3	<p><b>Medevac:</b></p> <ul style="list-style-type: none"> <li>▪ TSC#14/DU2 No enough medicines in medical box (corrected).</li> <li>▪ BAC/MTT# 02, BAC#05, #13/DU5 Some stretchers were torn and not prepared in minefield in some cases</li> <li>▪ BAC#05/DU5 Medicine form were not completely fulfilled into document medicine.</li> <li>▪ TSC#14, TSC#04/ DU2: No common medicines in Medical kit (follow up)</li> <li>▪ PMD#07/DU2, TSC#11/DU1 Some stretchers were torn and not prepared in minefield in some cases</li> <li>▪ PBC#01/DU1 Medevac form were not properly fulfilled</li> </ul>	11	<ul style="list-style-type: none"> <li>• Immediate debrief to minefield commander, platoon and section commanders and correcting in place.</li> <li>• Debrief to DUs Manager, OPS and DUs QA.</li> </ul>
4	<b>UXO Demolition</b>	0	
5	<p><b>Safety rule:</b></p> <ul style="list-style-type: none"> <li>▪ MPB#02, CTS#12/DU5: Some teams not enough safety distance from each other</li> </ul>	2	<ul style="list-style-type: none"> <li>• Immediate debrief to minefield commander, platoon and section commanders and correcting in place.</li> </ul>
6	<p><b>Site Administration:</b></p> <ul style="list-style-type: none"> <li>▪ BCT#02/DU1: Administration areas are located far from demining lane</li> <li>▪ TSC#04/DU2: Not enough Table Chairs and whiteboard</li> <li>▪ BC#12, TSC#46, PDM#02/DU2: Not enough Table Chairs and whiteboard</li> <li>▪ TSC#17/DU2: Not enough A0 paper for sketching</li> <li>▪ BAC#04 Not preparing parking area properly</li> <li>▪ EDD#02: Test point for mine detectors not cutting grass</li> <li>▪ EDD#02: not prepare fragments/UXO pit</li> <li>▪ PBC#01, PBC#14/DU1: Not prepare site sketch for visitors</li> <li>▪ TSC#13/DU1: not prepare rest area (WC) for visitors.</li> <li>▪ PBC#14/DU1: not set up test point for their mine detectors.</li> </ul>	26	<ul style="list-style-type: none"> <li>• Immediate debrief to minefield commander, platoon and section commanders and correcting in place.</li> <li>• Debrief to DUs Manager, OPS and DUs QA.</li> </ul>



	<ul style="list-style-type: none"> <li>▪ CTS#12, MPB#04, BAC#04//DU5 and TSC#11, TSC#12, PBC#02, PBC#01, BCT#01/DU1 and MPB#02/DU5: not prepare administrative point</li> <li>▪ PBC#02, TSC#02/DU1: not prepare administrative tent for storing their equipment</li> </ul>		
7	<p><b>Tools integration:</b></p> <ul style="list-style-type: none"> <li>▪ DU2: 14 teams do not have full members but 9 teams have already fulfilled (PDM#01, PDM#03, PDM#09, TSC#27, PMD#05, PDM#07, BC#011, BC#12, PDM#05) and other 5 teams are in follow up process.</li> </ul>	14	<ul style="list-style-type: none"> <li>• Debrief to DUs Manager, OPS and DUs QA.</li> </ul>
8	<b>Demining Drill:</b>	0	
9	<b>Quality Control</b>	0	
10	<b>Productivity</b>	0	
11	<p><b>Tasks Dossier Documents:</b></p> <ul style="list-style-type: none"> <li>▪ PMD#07, PBC#27, TSC#03 /DU2: No BLS report in tasks Dossier</li> <li>▪ TSC#03/DU2, PBC#01: No request and beneficiaries in tasks Dossier</li> <li>▪ PBC#14/ DU1: Tasks Dossier is not available</li> </ul>	6	<ul style="list-style-type: none"> <li>• Immediate debrief to minefield commander, platoon and section commanders and correcting in place.</li> <li>• Debrief to DUs Manager, OPS and DUs QA.</li> </ul>
12	<p><b>Completed Minefield Site Sketch:</b></p> <ul style="list-style-type: none"> <li>▪ EDD#02, #05/DU5: some missing points were found in site sketch drawing on A0 paper for visitor briefing</li> </ul>	2	<ul style="list-style-type: none"> <li>• Immediate debrief to minefield commander, platoon and section commanders and correcting in place.</li> </ul>
13	<b>Explosive Storage and Explosive Safety Case:</b>	0	
14	<p><b>Minefield Management:</b></p> <ul style="list-style-type: none"> <li>• MPB#02, #04, CTS#01, #02, #05, #06, #12, BAC.MTT#28/DU5: daily operation reports were not recorded in the team's recorded notebook.</li> <li>• CTS#01, #02, #05, #06, MPB#02 #04, BAC#04, #05, #11, #13, EDD#02, #05/DU5: some points were absent in their briefing</li> <li>• CTS#06, #05, #02/DU5: team member task assignment was not done properly</li> <li>• BAC#04, #05, #11, #13, CTS#02, #05, #06, MPB#02, #04, BAC.MTT#28/DU5: daily vehicle operations were not recorded in the recorded notebook.</li> <li>• BAC#11, #13, CTS#12, #01, #05, #06/DU5: opening box to detect ERW/cluster munitions evidence was not properly applied</li> </ul>	39	<ul style="list-style-type: none"> <li>• Immediate debrief to minefield commander, platoon and section commanders and correcting in place.</li> <li>• Debrief to DUs Manager, OPS and DUs QA.</li> </ul>
15	<p><b>Quality of Equipment and Equipment Maintenance:</b></p> <ul style="list-style-type: none"> <li>▪ TSC#45/DU2: vehicle tyres were aged</li> </ul>	4	<ul style="list-style-type: none"> <li>• Debrief to DUs</li> </ul>



	<ul style="list-style-type: none"> <li>▪ BC#11/DU2: vehicle tyres were aged</li> <li>▪ TSC#42/DU2: sketcher was aged and torn</li> <li>▪ PDM#05/DU2: Administrative tent size 4m x 6m was aged and torn</li> </ul>		Manager, OPS and DUs QA.
16	<p><b>Support Service for Operations:</b></p> <ul style="list-style-type: none"> <li>▪ TSC#14, PMD#06, TSC#17/DU2: lack of tent size 2m x 3m</li> <li>▪ TSC#46, PDM#02, TSC#02, TSC#04, PDM#09/DU2: lack of Tent size 2m x 3m</li> <li>▪ BC#12, PMD#06/DU2: lack of tent big size 4m x 6m</li> <li>▪ PDM#02, TSC#02, TSC#04, PDM#03, PDM#09/DU2: lack of tent big size 4m x 6m</li> <li>▪ TSC#14, PMD#06/DU2: lack of vest cover</li> <li>▪ PMD#05, BC#11, BC#12 TSC#14, #17/DU2: lack of paints (white, red and yellow color)</li> <li>▪ TSC#17, TSC#42, #02/DU2: lack of safety rope</li> <li>▪ TSC#14, #17, #42, #02, PDM#09: lack of mine sign</li> <li>▪ BC#11, BC#12/DU2: lack of vehicle</li> <li>▪ TSC#27/DU2: lack of one kit demining equipment</li> </ul>	34	<ul style="list-style-type: none"> <li>• Immediate debrief to minefield commander, platoon and section commanders and correcting in place.</li> <li>• Debrief to DUs Manager, OPS and DUs QA.</li> </ul>
17	<b>Site Accommodation:</b>	0	

**Note:** The remaining 33 cases of deficiency were mostly support services e.g., operation equipment which was aged and torn and required for repairing and replacement on time.

### ➤ Internal Audit on Finance

In 2021, Quality Management and Internal Audit Unit conducted internal financial audit on 3 projects at DU2, DU3, and DU5 in the following dates:

- 29 November to 04 December 2021: USA25-DU5 01 March 2021 to 28 February 2022
- 15 December to 20 December 2021: JPN35-DU2 01-July 2020 to 30 June 2021
- 20 December to 25 December 2021: JPN35-DU3 01-Jul-2020 to 30-Jun-2021



## 5. CHALLENGE AND PATH AHEAD

The activities of CMAC on the whole in 2021 were of honors, achieving favorable results. All relevant corporate managements to support the field operations ran smoothly in cooperative manners, albeit some disturbs from curfew, lockdown, transportation difficulties etc. Nevertheless, the operation outputs accounted for 101,040,252 m<sup>2</sup> of landmine/UXO contaminated areas throughout the country, which was equivalent to 88.92% compared to the annual target of 113,628,472 m<sup>2</sup> for 2021. There were many challenges in the operational years posing lower outputs than that of the workplan, yet the followings are few big factors which will be discussed.

**COVID-19:** The presence of COVID-19 posed insurmountable difficulties in everyone's living conditions and in mine action sector as well. In response to the spread of COVID-19, RGC imposed curfew prior to complete lockdown in the entire country. Hence, it was hard for deminers to move their operations from place to place, leading to the delay in the clearance operations sometimes. Moreover, the COVID-19 protocol of isolation, quarantine, and social distancing, especially the COVID-19 testing, temperature checking, and hand cleansing, really impacted the clearance outputs.



**Staff Separation:** In 2021, there were approximately 50 staff separating from CMAC. Most of them are field staff, seeking a new job or move closer to their place of residence. CMAC has introduced a number of measures to mitigate this loss of staff and expertise, including multi-skill training courses for all field staff. CMAC Human Resources strategies have been further developed and implemented to mitigate this risk.

**Retirement:** The deminers have been getting retired gradually due to the fact that they reach the retirement age. Over the last few years from 2018, there were 1,019 CMAC staff who reached retirement requirement and were sent to get pension from the Ministry of National Defense. For 2021 alone, CMAC sent 324 retirees to the Ministry of National Defense, thereby reducing the demining forces, which impacted the clearance outputs as well. CMAC management needs to take this issue into immediate account, or CMAC will face the lack of human resource. The solution to this issue is that sparing resources by recruiting new deminers, who are prioritized and strongly encouraged for the family members of the former or current CMAC deminers. For instance, CMAC launched a program called New Demining Experts to recruit young generation to replace the retirees in carrying out landmine/UXO clearance. The program selected 242 male/female candidates in 2021 from the family members of the former or current CMAC deminers to train and equip with demining skills. However, it is time-consuming to make the new generation adapt to the demining work like the former ones.





**Environmental Factors:** The environmental condition has been one of the biggest impacts on demining activities. Experience shows that environmental factors, including terrain, weather conditions and density of vegetation slowed down demining work considerably. Appropriate solutions must be found to address these issues at the field level. To address this, new approaches to landmine/UXO clearance and technology will be introduced, demining teams will be retrained and refreshed, multi-skills training will be provided, thus allowing field personnel to appropriately respond to prevailing environment.

**Heavy Dependency on Donors:** Approximately 80% of CMAC's current activities are supported by different donors, development partners and contracting clients. There are two aspects to this. Firstly, each of these financing sources has its own focus, which sometimes has a critical impact on CMAC. Secondly, funding could be reduced from donors during the course of this plan; this has been the case so far. To mitigate this risk, strong productive relationship with these organizations will be maintained. CMAC will also review its revenue streams through actions highlighted in this plan.

**Demining is Dangerous by its Nature:** It is generally accepted that demining work is a dangerous task; deminers require a high level of concentration and must strictly follow the standard operating procedure (SOP) as a safety guideline and maintenance of work standards. Reduced funding and trying to do the same or more with less can put pressure on safety. CMAC ensures that work practices are undertaken in the safest environment for all staff, demining tools and equipment are appropriately allocated, maintained and supported; this will ensure that targeted outputs are reached successfully.

All challenges mentioned above prevented CMAC from achieving the clearance outputs as its workplan. Nonetheless, CMAC was committed to finding the best possible solutions to deal with all those problems that emerged during the



implementation of IWP-2021. Less serious impacts could often be dealt with through improving communication, coordination, and trainings and mobilizing appropriate resources and methods to address problems. More serious impacts caused by financial shortfalls or lack of political



wills could result in more drastic contingencies which CMAC will have to take into consideration to respond to each crisis as best as possible when they occur.

In addition to the fact that CMAC management has been trying all utmost efforts to seek for assistance to support its humanitarian activities in demining operation so as to provide safety for the vulnerable people, other challenges are at the same time emerging as critical issues which require serious and immediate actions and solutions from the management as well as the Royal Government.

For a period of 12 months in 2021, there were a total of 33 cases of landmine/UXO accidents, causing 44 casualties, and 11 of them died, according to the Cambodian Mine Victim Information System (CMVI) of CMAA. Plus, the remaining contamination problems in the Kingdom of Cambodia is still huge so that RGC has prioritized the mine action sector in an attempt to free Cambodia from landmines so as to ensure the safety of individuals and communities as well as to meet the Ottawa Convention by the end of 2025 as a state party.

In support to the RGC's burning ambition for the removal of threat from landmines and for the socio-economic development, CMAC, from 2022 onwards, is committed to deploying all demining tools to accelerate the clearance of landmine/UXO contaminated areas as recorded in the national database. Key effort to further address this remaining contamination will be the land release method. In this regard, CMAC plans to release a total ambitious clearance of 200 km<sup>2</sup> in 2022 alone, including 150 km<sup>2</sup> of minefields and 50 km<sup>2</sup> of UXO-fields.





## 6. ACTIVITY PHOTO OF THE KEY EVENTS IN 2021



Beginning 2021, on Monday 04 January 2021 at CMAC's Headquarters in Phnom Penh, new orders as the path ahead for 2021





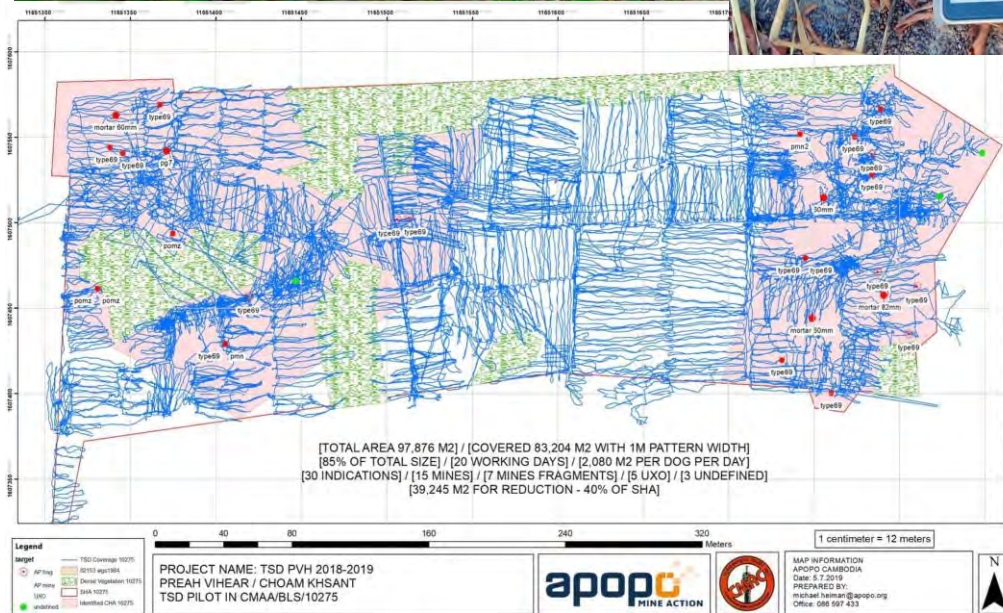
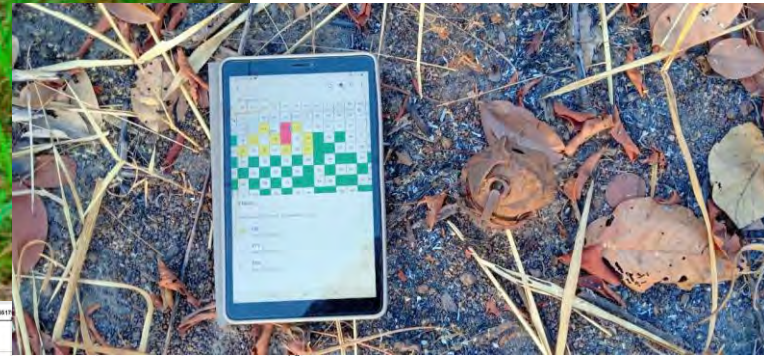
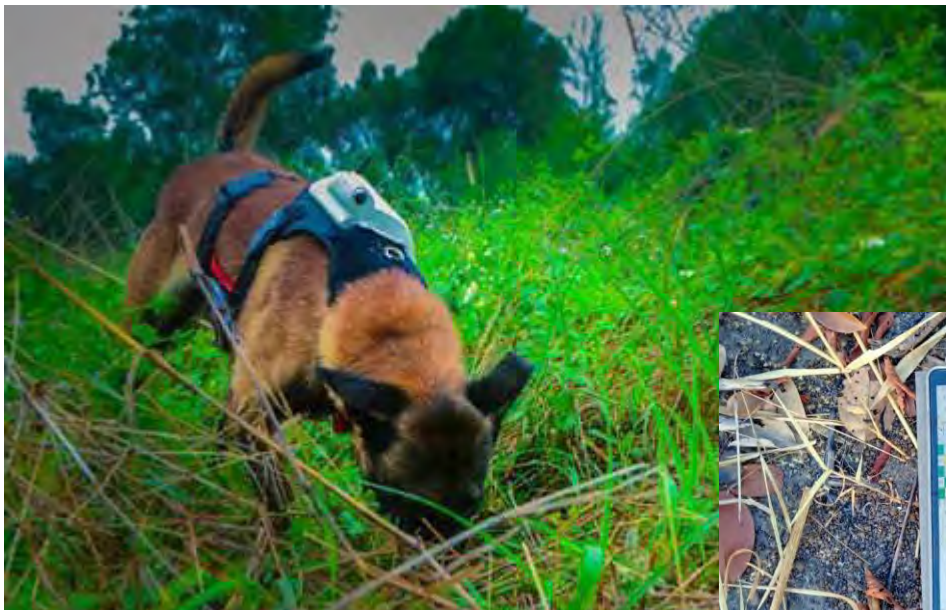
An aerial bomb MK82 found at around 7 meters depth in Chhvoang Commune, Ponhealeu District, Kandal province was safely removed by CMAC EOD Experts 14 January 2021.





On 18 January 2021 at CMAC's Technical Institute of Mine Action in Kampong Chhang province, **H.E Heng Ratana, delegate of the Royal Government in charge as CMAC Director General**, attended an opening ground on technical training in mine action for 301 new Demining experts. This training is going to focus on theory for 160 hours, field practices 320 hours, that not included training hours for sports, discipline orders and social skills.





Finding cluster submunitions by positioning the right locations  
 This is a technical survey detection dog team operations on 20 January 2021





On 21 January 2021 at CMAC Headquarters, CMAC’s Governing Council hold a meeting to officially decide on:

1. CMAC’s 2020 Achievements Reports and
2. CMAC ‘s Integration Work Plan 2021.





On 21st January 2021 at CMAC's Headquarters in Phnom Penh, **H.E Heng Ratana, delegate of the Royal Government in charge as CMAC Director General** and CMAC Management team hold a meeting with the delegation of Japan International Cooperation Agency (JICA) from Tokyo led by Mrs. Eri Komukai, JICA Senior Advisor and consultant team. Our discussions focus on namely 1. Demining progress achievements and the path ahead, 2. Strengthening south south cooperation projects, 3. CMAC requests of strengthening hardware on building constructions for supporting technical institute of mine action, and 4. Preparation workshop for finalization of CMAC's strategy and mandate after 2025.







On 26 January 2021 there was an anti-tank mine accident caused damages of a tractor and wounded tractor driver while he was plowing his cassava farm at Santepheap Commune, Sampov Loon District, Battambang province





H.E Heng Ratana, delegate of the Royal Government in charge as CMAC Director General attended the Second National Ecotourism Forum, which was held at Siem Reap Sokha Hotel in Siem Reap Province on 27 January 2021





On 29 January 2021 CMAC EOD Experts responded emergency call from local people in Teukchhou District, Kampot Province to clear an aerial bomb M117 weighs 750 pounds (around 340Kg) found at around 5 meters depth. It was safely removed by CMAC EOD Experts.



On 19th February 2021, H.E Heng Ratana, delegate of the Royal Government in charge as CMAC Director General and CMAC team observed the Progress of development achievements at the Technical Institute of Mine Action, Kampong Chhang Province





On 09 March 2021, at Toulkor Village, Tonle Bet Commune, Tboung Khmom District, Tboung khmom Province, CMAC EOD experts have safely removed and transported an aerial bomb type MK82





it's very lucky for tractor's driver who was safe from explosion as his tractor was exploded by anti-tank mine while he was plowing his farm. The accident occurred in Anlung Veng District of Oddar Meanchey province, on 25 April 2021.





On 27 April 2021 at CMAC's Headquarters **H.E Heng Ratana, delegate of the Royal Government in charge as CMAC Director General** and CMAC team having a meeting with very limited number of management members to decide on the most urgent matters related to supporting field operations during this COVID 19 pandemic. It is vital to note that CMAC's field operations continue their works as planned.



On 28 April 2021, a zoom meeting with all demining unit managers and key managers to review progress achievements and the path a head. Although COVID 19 pandemic has separated us, CMAC still has collectively made a clear determination, commitment and efforts to confront this hard time!







On 03 May 2021, at Kampong SIEM District, Kampong Cham Province, CMAC EOD experts have safely removed an aerial bomb type M17 with total weight around 750 pounds or around 350 Kg. It was remnants of war in 1970s.





On the 3rd May 2021, an anti-tank landmine found and removed from cultivation farmland in Khleang Meas Commune, Borvel District, Battambang province. The landowner is very lucky for having no those days. The land was cultivated and used for years. It now has a completed peace and find no fears of accidents caused by landmines as the land has already been cleared by CMAC demining experts.





On 21st May 2021 at CMAC's Demining Unit 5 Headquarters in Tbong Khmom province, **H.E Heng Ratana, delegate of the Royal Government in charge as CMAC Director General** chaired a meeting:  
(1). to strengthen CMAC's operations in this critical period of COVID 19 pandemic and  
(2). to reenforce methodology of the cluster munitions remnants technical survey.





At late this afternoon, 27th May 2021 there was an anti-tank mine accident, instantly killing a driver and seriously wounding another. This accident occurred in Sung commune, Samlot District, Battambang province. May his soul rest in peace!





**H.E Heng Ratana, delegate of the Royal Government in charge as CMAC Director General met with CMAC's retired staff and offered them their pension funds when ending their mandate with CMAC at CMAC's Headquarters in Phnom Penh on the 3rd June 2021**





09 June 2021, at Win-Win Monument in Phnom Penh H.E Heng Ratana, delegate of the Royal Government in charge as CMAC Director General was honorably invited to participate in a handover ceremony of “the Cambodian first drop of oil” for historical display at the museum of Morodok Samdach Techo’s of Win-Win Monument. This event was presided over by Samdach Pichey Sena, Deputy Prime Minister and the Minister of Defense.



On 30th June 2021 at CMAC's Demining Unit Headquarters 5 in Tbong Khmom province, **H.E Heng Ratana, delegate of the Royal Government in charge as CMAC Director General** met with team leaders and representatives of experts to update CMAC general situations and presented donations from His Majesty the King, Preah Karuna Preah Bat Sâmdach Preah Bâromneath Norodom Sihamoni, the King of the Kingdom of Cambodia to all CMAC experts. CMAC wishes to express a greatest respect and gratitude to His Majesty the King for this very kind gifts and supports.





On 12 July 2021, CMAC’s rural development experts in cooperation with Pailin Provincial Department of Agriculture, Forestry and Fisheries conducted agriculture training program and transferred technical knowledge of agricultural best practice and at the same time also contributed selected seeds to support 250 landmine victims/families. This is the project of Integration of landmine clearance and landmine victim assistance granted by the Government of Japan to the Royal Government of Cambodia for supporting CMAC demining and victim assistance activities. The next project is going to conduct in Veal Veng District, Pursat province.





CMAC's experts have safely removed an aerial bomb type MK82 in Trapeang Chan Village, Trapeang Chan Commune of Kampong Chhang province. This bomb was at around 5m in depth and cleared on 26th July 2021.





On 30 July 2021 at Phnom Penh's Port H.E Heng Ratana, delegate of the Royal Government in charge as CMAC Director General attended an inter-ministerial meeting for underwater UXO clearance and sunken barge salvage. This sunken barge and these piles of unexploded ordinances as the remnants of war, thus the Royal Government decides to remove this threat from the bottom of Mekong river.





On 12th August 2021, in Beung Kreul Village, Sangkat Ov Loak, Khan Kambol, Phnom Penh: CMAC Explosive Disposal experts have safely removed and transported an aerial bomb type MK82-230Kg in weight as the remnants of war.





**On 12th August 2021, at Thmey Village, Konteur Commune, Banon District, Battambang province there was an anti-tank landmine accident completely destroying a harvesting machine (Kubota) and seriously wounded two drivers. CMAC would share its sadness with the families of the two innocent victims.**



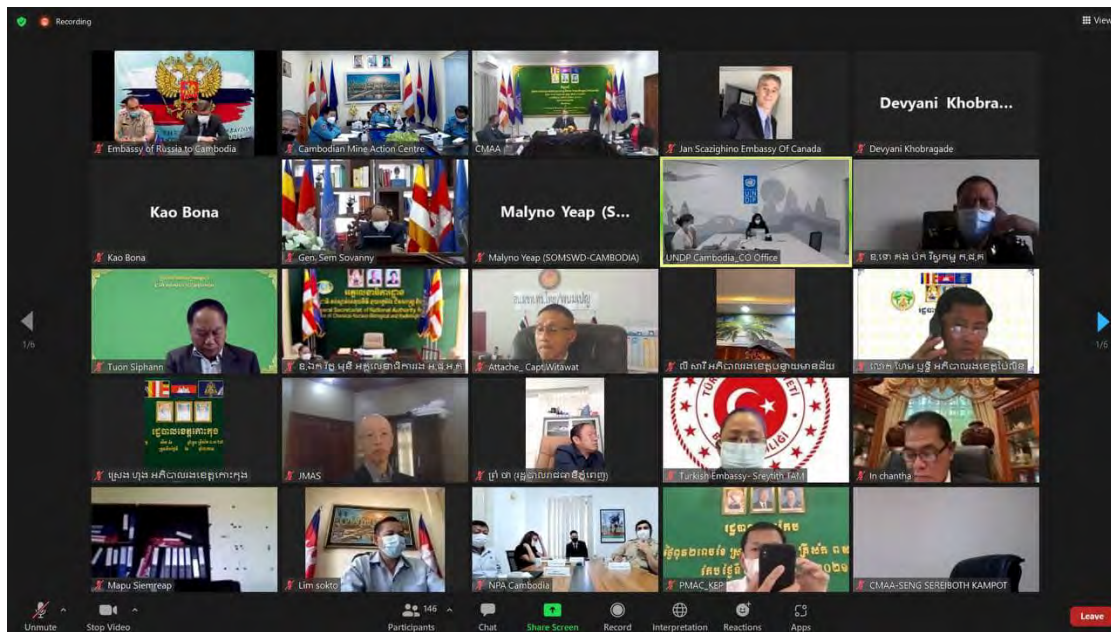


CMAC Demining experts based in the eastern part of Svay Rieng and Prey Veng provinces have already received the third dose or the booster dose on the 23rd August 2021.





On 25th August 2021, **H.E Heng Ratana, delegate of the Royal Government in charge as CMAC Director General** and CMAC management attended the technical working group for mine action between the Royal Government and the development partners involved in mine action sector in the Kingdom of Cambodia. In short, the meeting congratulated progress achievements, looking into the remaining problems and commitments for continuing supports the Royal Government’s national strategic plan towards 2025





On 13 September 2021, CMAC EOD experts safely removed an aerial bomb type MK82, in Kandal province. This bomb is the remnants of war and it lasted approximately 50 years underneath the ground, and its conditions remains active.



An aerial bomb type MK82 hidden underground for more than 50 years and accidentally discovered on the 12th October 2021. This bomb has safely removed and transported to CMAC's harvesting facilities in Kampong Chhnang Province







On 21st October 2021 at CMAC's Headquarters in Phnom Penh **H.E Heng Ratana, delegate of the Royal Government in charge as CMAC Director General** and CMAC management met and discussed issues to deal with COVID for new normal operations to ensure that the COVID pandemic will NOT affect CMAC's field operations, thus CMAC is to establish the new normal control and management.





On 24 November 2021, field trip to CMAC minefield in Kork Rokar Village, Donbar Commune, Korskrolor District, Battambang Province: Donor delegation including Australia, Canada, Republic of Korea who donated Clearing for Results Project under UNDP and CMAA umbrella for mine clearance in Banteay Meanchey, Battambang and Pailin for 2021 and 2022 approximately 3 million per year.



On 29 November 2021, the resident presentation of NPA, Mr. Rune and H.E Heng Ratana, delegate of the Royal Government in charge as CMAC Director General signed a contract agreement for the project of Kep Mine Free Province. It's vital to note that Kep province still remains 8 minefields with total size around 90 hectares and with current deployment resources it may take around 4 months to finish Kep province and declare the first mine free province! CMAC was going to deploy more resources to southern provinces of Cambodia namely Takeo, Kampot, Kampong Speu, Shihanouk and Koh Kong provinces to gradually clear and declare those provinces become mine free provinces. CMAC would work hand in hand with CMAA and development partners to reach the Kingdom landmines impact free country by late 2025.





On 30 November 2021 at CMAC's Phnom Penh Headquarters, CMAC's Governing Council members observed a demonstration of how to detect COVID 19 patient performed by CMAC COVID 19 Detection Dog Team





From 29 November – 01 December 2021  
Three CMAC’s officers were dispatched to Colombia to provide trainings to mine action experts in Colombia as part of the south-south cooperation initiatives supported by the Government of Japan through JICA. The Republic of Colombia is one of the greatest South American countries with over 50 million populations and has the distance around 18,000km from this Kingdom with more than 20 hours flights! We highly appreciated our experts and this technical cooperation between the Kingdom of Cambodia and the Republic of Colombia on this south-south cooperation project!





On the 2nd December 2021, anti-tank mine accident wounded a tractor's driver and damaged a Kubota tractor. This accident happened in Preah Prolay Commune, Oddar Meanchey Province. May his soul rest in peace!





On 6th December 2021 at the technical institute of mine action in Kampong Chhang province, **H.E Heng Ratana, delegate of the Royal Government in charge as CMAC Director General** chaired an opening course for platoon commanders and second in command (2ic) as field management leaders for both management and technical skills to strengthen national ownership in addressing landmines and the remnants of war in the Kingdom.



On the 6th December 2021, at Tramkok District, Takeo province, CMAC's EOD experts cleared an aerial bomb type M117 as the remnants of war, this M117 was safely removed and transported to CMAC's harvesting facilities for neutralization. It looked like an old and degraded bomb, in fact it remains good shapes and active explosion. Sticky applying the safety rules first when doing excavation pits!







On 16 December 2021 at CMAC’s Headquarters, **H.E Heng Ratana, delegate of the Royal Government in charge as CMAC Director General** and **Mr. Michael Heiman, the APOPO’s country resident representative** signed a MoU as cooperation agreement in amount of USD351,711 for a 12-month period from 01 January 2022 to 31 December 2022 to support Mine Detection Rats and Mine Detection Dogs Operations integrated with Demining Machines. This year is the 9<sup>th</sup> Year of Cooperation between CMAC and APOPO





On 22 December 2021: CMAC Covid-19 Detection Dogs team conducted an integration trial to detect VOC of suspected patients-COVID 19 at Koh Pich's and Steung Meanchey centers. It's proud to note that the results were comparable between Covid Detection Dogs and Covid Test Kids. It's vital to note that this is a final trial of covid 19 detection dogs research and development. It came to final conclusion with positive outcome.



On 24th December 2021, CMAC technical team in cooperation with technical team from the University of Health Science as directed by the Ministry of Public Health launched a closing technical working group on research & development of COVID 19 detection dogs at CMAC's Technical Institute of Mine Action in Kampong Chhang province. The closing workshop would be able to highly evaluate the success of their research and development of COVID 19 detection-dogs, and positively proved and concluded that dog trainers and dogs are capable to work in detection of COVID patients





Congratulations to the 23rd anniversary of ending war in the Kingdom (29 December 1998-29 December 2021). Let visiting the Win Win monument in Phnom Penh to learn more about the remnants of war and Peace. CMAC joined a display of landmine and UXO exhibition within two days with the Royal Government of Cambodia





## 7. DONOR AND PARTNER ACKNOWLEDGEMENT



Kingdom of Cambodia



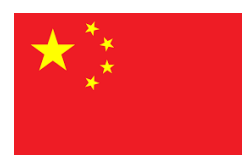
Australia



Belgium



Canada



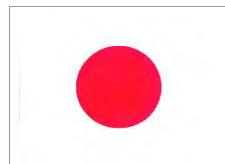
China



EU



Germany



Japan



Republic of Korea



Spain



Sweden



UN



USA

- AUSTCARE
- CMAA
- GICHD
- JICA
- JMAS
- KOICA
- Local Authorities
- NPA
- Peace Boat
- Rotary International District 2650
- UNDP
- UNICEF
- UNMAS
- NGOs
- Good Earth of Japan (GEJ)
- Private Donors

